A Structural Equation Model of Consumers' Intentions to Consume Functional Foods: an Application to Yoghurt and Margarine in the UK

By

Mohammad Tahir bin Zainuddin

Newcastle University Business School

A thesis submitted to the Faculty of Humanities and Social Sciences at the University of Newcastle upon Tyne in partial fulfilment of the requirements for the degree of Doctor of Philosophy

February 2019

Declaration

I hereby declare that this thesis is the result of my own investigations and no part of it has been submitted for any degree other than Doctor of Philosophy at the University of Newcastle upon Tyne. All the work in this thesis was composed by me, except where specific acknowledgements are made.

MOHAMMAD TAHIR BIN ZAINUDDIN

Newcastle upon Tyne

February 2019

Abstract

Purpose: The aim of the study is to develop a structural equation model of consumer intentions to purchase and consume functional foods. The study is set in the context of the UK and focuses on two different types of products: Yoghurt with Live Cultures and Cholesterol Lowering Margarine.

Methodology: The research utilises a quantitative methodology. An Extended Health Belief Model (EHBM) was developed from the Health Belief Model (HBM) to explain consumer intentions to purchase functional foods. The model specifies six antecedent constructs and three control measures. The data were generated from a survey of UK food consumers consisting of sub-samples of 350 for each product group. The analysis utilises a comprehensive approach, where the respondents for each product is split between User Group and Non-User Group for comparison.

Findings: The measures of the antecedent constructs have acceptable measurement properties. The EHBM models reveal that five constructs (i.e. Perceived Benefits, Perceived Susceptibility, Perceived Barrier, Self-Identity and Cues to Action) determine Behavioural Intention for User Group of Yoghurt with Live Culture, and three constructs (i.e. Cues to Action, Perceived Benefits and Perceived Barrier) determine Behavioural Intention for Non-User Group of Yoghurt with Live Culture. Meanwhile, for Cholesterol Lowering Margarine models, four constructs (i.e. Perceived Benefits, Cues to Action, Perceived Barrier and Self-Identity) determine Behavioural Intention for User Group of Cholesterol Lowering Margarine, and one construct (i.e. Cues to Action) determine Behavioural Intention for Non-User Group of Cholesterol Lowering Margarine. The control variables do not have a significant effect on either product in the structural models.

Theoretical contribution: The EHBM model extends the original HBM model in the specification of a new endogenous construct of ‘Behavioural Intention’ and the inclusion of a new antecedent construct of ‘Self-Identity’. In addition, new dimensions of measurement models were developed for all EHBM variables which are reliable and valid in dimensions of two different types of functional foods, using the quantitative method adopted.

Managerial insight: The results inform the managers that different types of functional foods product require varying marketing approaches. Furthermore, they provide the opportunity to develop a greater understanding of the use of models for other functional products. In addition, the emphasis on a health context provides clear insight into consumers' perceptions of functional foods in the market.

Keywords: Extended Health Belief Model (EHBM), Consumers' behaviour, Functional foods, Structural Equation Modelling (SEM).

Dedication

To the merciful God, for being my fundamental determination, health and strength, to my late parents Madam Sanabiah and Mr Zainuddin, who inspired me with phenomenal spirits… I wish I could make both of you proud, and to my family for their continuous support and their prayers.

Acknowledgments

The PhD journey requires passion, commitment, time and supports. There are numbers of special people who contributed to the success of this tough journey. Firstly, I want to thank my supervisors, Professor Matthew Gorton and Dr Mitchell Ness, who read several versions of the study with a very high commitment. I will miss their intellectuality in guiding me completing the research. My thanks also go to the Head of School, lecturers and support staff from Newcastle University Business School and Faculty of Humanities and Social Science, in term of guidance and assistance especially during the progression.

My lovely wife, Noraslinda Ahmad is the best friend as well as the best motivator. Her great loyalty to be the best mother to our sons is amazing. Her simple belief that always inspire me “the end is more important no matter where the start is” are the treasures for my strength. The other includes my five brilliant sons Ammar Faiz, Adam Ikhwan, Amir Hakim, Muhammad Rizq Zuhair and Rizq Daniel. Thank you for your wholehearted love and greatest inspiration that strengthen my spirit throughout this long journey.

I also glad to thank the management of USIM, Ministry of Higher Education Malaysia, especially for their financial support during my time in the United Kingdom. My high appreciation also goes to respondents who gave their time completing the questionnaires for my research.

There are many others also contributed to the completion of this mission. My friends, family members, colleagues, and many more…thanks a million to everyone!

Table of contents

List of tables

List of figures

List of equations

Abbreviations

AIC	Akaike Information Criterion
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CITC	Corrected Item to Total Correlation Coefficient
CR	Composite Reliability
EHBM	Extended Health Belief Model
EFSA	The European Food Safety Authority
EV	Expectancy Value Theory
GFI	Goodness of Fit Index
HBM	Health Belief Model
IFI	Incremental Fit Index
MANOVA	Multivariate Analysis of Variance
NFI	Normed Fit Index
PMT	Protection Motivation Theory
PNFI	Parsimonious Normed Fit Index
PCFI	Parsimonious Comparative Index
RMSEA	Root Mean Square Error of Approximation
SD	Standard Deviation
SEM	Structural equation modelling
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action

Chapter 1. Introduction

1.1 Introduction

The chapter aims to present an introduction to the key elements of the thesis. This study develops empirical research to explore the key issues associated with UK consumers' Behavioural Intentions to purchase functional foods. The research is relevant to obtain a clear picture of current consumer's insight in the market. The structure of the chapter is as follows. Section 1.2 presents the background of the study in the context of functional foods and health. Section 1.3 explains the motivation and rationale of the study. Section 1.4 specifies research aims and objectives. Section 1.5 explains the research method. Section 1.6 describes the structure of the thesis. Finally, Section 1.7 summarises the chapter.

1.2 Functional Foods and Health

Better health is a major concern for societies and individuals. Generally, nutrients in foods are known in providing many health benefits. It also believed able to act as disease prevention. In 460 B.C, Hippocrates proposed "let food be the medicine" (Kris, 2009, p. 13). According to Sarkar and Costa (2008), the marketing environment in the food sector is increasingly competitive. Food producers must be more innovative to improve market share, and this is reflected in the variety of offers from manufacturers in the food industry. The types of food intake may influence the susceptibility of consumers to disease (Department of Health, 2000). In addition, the Department of Health (2000) stated that many foods that, if consumed in appropriate proportions, seem to lessen the risk and dangers of creating significant diseases (i.e. coronary heart disease). However, many consumers continue to follow inappropriate diets. From another perspective, there a sign of increasing consumers' interest to change their diet towards healthier food (European Consumer Organisation, 2015). Consequently, new sorts of nutrients thought to advance health and reduce the risk of diseases, designated as functional foods, entered the market in the 1990s (Niva and Makela, 2007).

Literally, functional foods are distinguished from conventional foods based on its unique characteristic of health benefits offered in the nutrients they contain (Federal Register, 2006). Functional foods are the type of "foods that promote health beyond providing basic nutrition, are on the rise" (Parvez et al., 2006, p. 1172). In other words, functional foods guarantee consumers' changes in specific physiological capacities, for example, in the reduction of cholesterol levels and enhanced digestive capacity (Diplock et al., 1999; Thompson and Moughan 2008).

The national government and international agencies played a role to support mass campaign in public health nutrition (Department of Health, 2000a) due to lack of awareness among consumers (i.e. Western consumers), as they typically consume much less of these components than is currently recommended. Therefore, in this relation, Wilkinson et al., (2005) urged the consideration of possible health and welfare benefits to consumers from following nutritional guidelines.

American Dietetic Association, (1995) reported that there are many proven scientific evidences of the positive effect of food additive such as phytochemicals (derived from plant) and zoo chemicals (derived from animal). Literally, the addition of such food constituents that creates functional foods, may provide greater health benefit beyond its basic nutrition value. Among the amazing health benefits of certain functional foods are reducing the risk of chronic diseases such as osteoporosis, cardiovascular diseases and cancer. Since its ability to provide physiological health benefit and minimising the risks of getting chronic disease, thus these foods are termed functional (Health Canada, 1998). This type of foods provides a new option for people who seeks a healthier diet and living in the 21st century.

In this context, understanding the determinants or factors that predict consumers' Behavioural Intention to purchase and consume functional foods is essential. This will provide actual and current perspectives of consumers' insight on the existing products in the market. By exploring through this research, the significant as well as insignificant factors can be identified and from this point forward, necessary steps can be suggested to be undertaken by relevant stakeholders such as marketers etc. These efforts perhaps would provide better health and wellbeing for the people.

1.3 Motivation and Rationale of Research

Based on the discussion in Section 1.2, functional foods can be summarised as types of food which contain unique nourishment that provide greater health advantages over ordinary essential nutrition.

There is limited knowledge regarding the consumers of functional foods. This includes their view, comprehension, motivation and inspirations for uptake of functional foods. For instance, do target customers see a level of individual risk adequate to influence them to decide which type functional foods to be consumed? What are the various motivations related to the consumption of functional foods? An answer may be obtained by investigating current consumers’ behaviour towards purchasing and consuming functional foods.

From an academic perspective, according to van Kleef et al., (2005), there were limited numbers of consumer research in the context of functional foods in the UK market. In particular, whether the combination of health benefits claimed could attract purchasers’ Behavioural Intention. While from a practical point of view, consumers may not have a perception of the medicinal roles on functional foods, but health-related issues are salient as they would only buy these items due to the perception of consuming functional foods would provide them with better health than the ordinary food’ alternatives (Vassallo et al., 2009).

To further justify the choice of the theme of this study, a previous study demonstrated the influence of products’ perceived healthiness in dictating the health claims (Bech-Larsen and Grunert, 2003). Despite there is expanding proof that some food categories have useful and greater impacts beyond the delivery of basic nutrients and supplements, the advancement of viable convincing health claims is experiencing difficulties in attracting a consumer’ attention (Leathwood et al., 2007). Meanwhile, from other perspectives, Frewer et al., (2003) suggested that the greater positive strength of the relationship between buyers' affordability, knowledge and their states of mind to functional foods are among the factors impacted the effectiveness of health claims in influencing consumers.

According to Margetts et al., (1997), decisions about food choice are commonly made based on taste, convenience, and the cost with healthier benefits being one reason among numerous others. In other views, Bech-Larsen and Grunert, (2003) stated that the purchasers' perceptions of functional foods include healthiness, processes, and advancements. In addition, other identified factors are pleasure and familiarity (Poulsen, 1999; Urala and Lahteenmaki, 2003 and Urala and Lahteenmaki, 2004). Nevertheless, there is a need to further investigate the consumer behaviour regarding various types of functional foods. In the previous studies, Arvola et al., (2008) and Dean et al., (2007) highlighted that in spite of the possibility of achieving good demand for oat based functional foods, the number of research is still small regarding consumer behaviour. Since there are rapid changes in the trend of diet among consumers, therefore the study will fill the gaps to better understand consumers.

In exploring consumer insight and to understand consumers' health behaviour, there are several numbers of suitable model. Among the popular models and very relevant includes the Theory of Planned Behaviour (TPB) (Ajzen, 1991), the Transtheoretical Model (Prochaska et al., 1992), Theory of Self-Efficacy (Bandura, 1977), and Health Belief Model (HBM) (Rosenstock, 1974).

Major focus is given to the foundation of The Health Belief Model (HBM), for the ideas related to this study. The HBM has been established for decades, which initially used to study the individual's behaviour towards the decision of not participating in health prevention programmes (Rosenstock, 1974). Over the years of its establishment, the HBM has been used to study various health related behaviours (Sheeran and Abraham, 1995) including diet-related behaviour (Janz 2002).

The HBM is suitable to be employed in the study of consumers' behaviour towards consuming functional foods. This is in line with functional foods' health claim (benefits) to reduce the risk of getting diseases and the condition of illnesses always associated with severity, an individual susceptibility to a disease. Since the existing marketing efforts lack in giving focus on this aspect, therefore, the study has provided precise insight based on factors highlighted in the HBM.

A key justification of this research is to question the conclusions of Niva and Makela (2007) and Krystallis et al., (2008) who argued that there are difficulties to capture consumers' views on health issues that would influence them deciding to consume functional foods. This is because, the reasons and motives behind the consumption of functional foods might be different according to different type of functional products (Urala and Lahteenmaki, 2007). Therefore, one of the gaps identified is that previous research in consumer behaviour has not addressed the issue of consumers' Behavioural Intentions to purchase, particularly the comparison of different types of functional foods. While there are some studies of consumer uptake of functional foods several lacks an appropriate theoretical framework.

1.4 Research Aim and Objectives

The aim of the study is to develop a structural equation model of consumer Behavioural Intentions to purchase and consume functional foods. The study is set in the context of the UK and focuses on two different types of products: Yoghurt with Live Cultures and Cholesterol Lowering Margarine. The objectives of this study are;

1. To examine consumers' attitudes towards functional foods (focusing on Yoghurt with Live Cultures and Cholesterol Lowering Margarine).

2. To model the determinants of consumers' consumption of functional foods and the factors underpinning the acceptance/rejection of functional foods (analysis of the current level of consumers' orientation). This will extend existing models of consumer food choice.

3. To offer insights for practitioners for devising marketing strategies (how should functional foods be communicated and marketed to consumers) for functional foods thus, creating opportunities to broaden its market internationally.

1.5 Research Method

The study employs a quantitative methodology consistent with a deductive positive research philosophy. The central theme of this research focuses to the establishment of an appropriate conceptual model to be relevant to the nature of functional foods i.e. Yoghurt and Margarine product groups. The foundation of the model is based upon the adoption of the Health Belief Model (HBM). This HBM constructs further examines and modify accordingly to establish an Extended Health Belief Model (EHBM). The EHBM is useful to explain consumer Behavioural Intention to purchase and consume different types of functional foods. The determinants' constructs of EHBM include Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity. The model also provides for the potential influence of control variables (Age, Gender and Education).

The main research instrument is a survey of food consumers using a structured questionnaire to collect data on behaviour, demographics and items for each construct. The sampling method utilises a simple random sampling of the UK population aged above 18. The survey method uses Qualtrics.com as a panel survey platform. The sample size collected for each product group is 350 respondents, giving 700 respondents in total.

The analytical strategy employs descriptive analysis, reliability analysis, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), MANOVA and structural equation model (SEM) analysis.

Descriptive analysis is employed from two perspectives. The first focuses on respondents' demographic profiles and purchase behaviour. The second conducts descriptive analysis of items for constructs with respect to means, standard deviation, skewness and kurtosis.

Reliability analysis is conducted to evaluate the internal consistency of items related to the main constructs. The analysis examines Cronbach's alpha coefficient, the corrected item to total correlation coefficient (CITC) and the impact on alpha of item deletion from the scale.

Exploratory factor analysis (EFA) is employed to identify the dimensionality of each of the main constructs. The KMO index and Bartlett's test are used as the preliminary criteria to confirm that the data are in fact, correlated. Meanwhile, total variance explained, and communalities are used to assess the goodness of fit for the model.

The confirmatory factor analysis (CFA) assessment applies to each construct' measurement model. The models are evaluated in terms of measures of model fit. Subsequently, the constructs are validated for convergent validity.

Multivariate analysis of variance (MANOVA) with post-hoc test is conducted to examine the impact of the control variables on the dependent variable of Behavioural Intentions. For this assessment, the null hypothesis is that the true mean scores of the set of dependent variables are equal between groups whilst the alternative hypothesis is that the true mean scores of the set of dependent variables are not equal between groups.

Structural equation modelling (SEM) is conducted to estimate the models for each product group. The models are evaluated for measures of model fit, the significance and the acceptability of the signs of the estimated coefficients. The model modification is undertaken in the case of problems with the fit or relevance of items. Finally, the models are evaluated for the property of discriminant validity.

1.6 Structure of the Thesis

Chapter 2 presents a systematic literature review. The discussion includes a definition of functional foods, as well as analysis of the market of functional food, studies related to understanding consumers' behaviour towards purchase and consume functional foods, and theories that are compatible to explain health psychological influence in relation to predict consumers' Behavioural Intention towards the consumption of functional foods. This particularly to capture consumers' psychological insight and perceptions.

Chapter 3 is an extended literature review. It describes a market data analysis in the UK. The discussion provides presentation of an actual data together with the forecasted data related to the functional food products. The sales performance of the functional food products is discussed in detail. It also provides supporting data to justify the context of the study.

Chapter 4 concerns the development of the conceptual framework. The process blends ideas based on research objectives and literature reviews. The developed conceptual framework produces relevant hypotheses to be tested. Briefly, the chapter provides justifications and details of the selected model's constructs utilised in this research. Furthermore, it also discusses the relevant analysis made in previous studies. From the analysis, the theoretical framework is established.

Chapter 5 explains the research methodology. The discussions in the chapter consist of seven main topics which includes scientific research design, research design and purpose: quantitative research strategy, research implementation (method of data collection and administration), the research sampling, reliability, validity and unidimensionality of the measures, data preparation and screening and finally the data analysis technique and administration.

Chapter 6 presents the results of descriptive, reliability and exploratory factor analysis (EFA). First, it describes the characteristics of the respondents and the effects of socio-demographics on consumers' purchase decisions of functional foods. Second, the chapter presents the results of a descriptive analysis of each construct in the measurement models which derived from a consumer perception of two different categories of functional foods, i.e. functional foods with general health benefits and functional foods with specific health benefits based from the theoretical framework established. Consequently, it also presents the results of reliability analysis and the exploratory factor analysis (EFA).

Chapter 7 presents the results of the confirmatory factor analysis (CFA) of the measurement models for the constructs. The models are evaluated for measures of model fit. Subsequently, the models are assessed for construct validity from consideration of the significance of the coefficients, the acceptability of signs and their magnitude and for composite reliability (CR) and average variance extracted (AVE).

Chapter 8 presents the results for the structural equation models. The preliminary analysis conducts MANOVA analysis in two phases. The first phase of MANOVA analysis is to identify possible significant differences between the two categories of respondents in the study, i.e. User Group vs Non-User Group towards the dependent variable of Behavioural Intention. The motive is to justify the evidence to split the structural equation model between User Group and Non-User Group. Subsequent to the first phase of MANOVA analysis, the second phase of MANOVA analysis examines the possible significant differences between groups in each control variable on the dependent variable of Behavioural Intention, which examination made on both groups of respondents, i.e. User Group and Non-User Group. The results are used to determine which of the control variables are to be specified in the product models. Subsequently, the results of the structural equation models are presented for each product group and model modification is undertaken. The final models are evaluated for measures of model fit, the significance and acceptability of the signs of the estimated coefficients.

Chapter 9 presents a discussion of the results of the estimated EHBM models in the context of the hypotheses derived from the conceptual model and subsequently to discuss the results in the context of the current literature.

Chapter 10 presents the conclusions of the study. It provides a summary of the study, addresses the research questions, explains the contributions of the study, the study's limitations and, proposes directions for future research.

1.7 Chapter Summary

This chapter presented a general overview of the thesis. It provided a discussion of the background to the key issues in the context of the study theme. It proceeded to explain the motivation and rationale of the study leading to the specification of research aim and objectives. In this context, the research method is explained and finally, the chapter closes with an explanation of the structure of the thesis. The thesis continues with a review of the literature in the Chapter 2.

Chapter 2. Consumer Behaviour and Functional Foods: The Literature Reviews-Part I

2.1 Introduction

This chapter presents a review of the literature and establishes the context for this study. It is important to identify issues related to consumer behaviour regarding functional foods, to identify research gaps and to define the research focus. The literature review provides insights from two fields: consumer behaviour related to food choice and functional foods (Chapter 2), and current market data of functional food products (Chapter 3). The chapter begins with Section 2.2 by presenting the definitions of functional food. Section 2.3 describes an overview of functional foods and market prospects. Section 2.4 deals with the health benefits of functional foods. Section 2.5 explores the diversity of determinants in the study of consumer behaviour on food in general. Section 2.6 considers recent contemporary frameworks of consumer behaviour on food in general. Section 2.7 reviews the development of consumer behaviour research on functional foods in various countries. Section 2.8 assesses the divisions of categories of relevant determinants to understand consumer behaviour on functional foods. Section 2.9 deals with dependent variables. Section 2.10 elaborates selected psychological models of consumer behaviour applied to food. Section 2.11 considers the theoretical framework adopted in the study, and finally Section 2.12 summarises the content of this chapter.

2.2 Definitions of functional food

Some foods may forestall or lessen the risk of eating regime related disease or may upgrade certain physiological capacities (Diplock et al., 1999). This category includes functional foods. Functional foods can be categorised as a diversified food group which cuts across many product categories (Siro et al., 2008). For example, among popular functional foods are dairy based products, baby food products, soft drinks and bakery products (Menrad, 2003).

Arvanitoyannis (2005) stressed that a precise formal definition of a functional food is yet to be established. What differentiates functional foods from non-functional alternatives, is that there has been some form of modification or addition of specific ingredients which provide an extra health benefit beyond ordinary nutritional values which contribute to lowering risks of diseases (Clydesdale, 1997; Abdel Salam, 2010).

Menrad (2003) described functional foods as those which can be frequently consumed in the daily diet, are palatable and have a positive influence on one or more target capacities in the body. Such foods extend sufficient dietary impacts to promote a condition of well-being and prosperity and/or diminish the risk of disease. Furthermore, Menrad (2003) explained that the food has experienced some sort of alteration. Examples of functional foods include phytosterol/ stanol-improved margarine, eggs upgraded with omega-3 unsaturated fats, milk invigorated with calcium and dairy products such as yoghurt with live cultures.

Siro et al., (2008) explained that initially, the creation of functional foods, was mainly driven to correct improper diets which led to nutritional deficiencies. For example, breakfast cereals may be fortified with folic acid. Functional foods include but are not restricted to nutraceuticals. A nutraceutical offers restorative and/or medical advantages, including aversion or treatment of infection (Siro et al., 2008) which comes in a medicinal form. There is a physiological advantage provided by a nutraceutical. This contributes to the health properties that possibly reduce the risks of chronic disease (Health Canada, 1998).

Roberfroid (1996) acknowledged all these definitions, functional foods- only include those which have undergone some degree of manipulation, and / or fortification, thus excluding foods with natural health benefits. A good example to understand this is soy products that claim to reduce cholesterol levels. Since the protein in soy products occurs naturally, and has not been modified or manipulated, thus it does not meet the definition.

Functional foods contain either a non-nutrient or nutrient based ingredients that convey additional health benefits. One non-nutrient ingredient is plant sterols, the function of which is to reduce cholesterol levels. Meanwhile, nutrient based ingredients (e.g. folic acid in fortified bread or breakfast cereals), should offer direct health benefits, i.e. an ability to reduce the risk of certain disease (Taylor, 2010; Roberfroid, 2000; FAO, 2007).

In a more recent study, a wider and profound perspective than the previous definition of functional food by Roberfroid (1996) is acknowledged. Literally, functional food is defined as “Natural or processed foods that contains known or unknown biologically-active compounds; which, in defined, effective non-toxic amounts, provide a clinically proven and documented health benefit for prevention, management, or treatment of chronic disease.”

(Martirosyan and Singh, 2015, p. 215). This definition by Martirosyan and Singh (2015) is adopted for the purpose of the current study.

Section 2.3 develops an overview of functional foods and market prospects as an attempt to discover relevant issues.

2.3 Overview of functional foods and market prospects

Chronic diseases are known as a major cause of death, accounting for 60 percent globally (Demmer and Barondess, 2018). Indeed, the presence of chronic diseases imposes a great burden on society. Dietary problems are the main cause of some chronic diseases such as osteoporosis, cancer, cardiovascular disease, diabetes and obesity (The World Health Organisation (2002). Furthermore, WHO (2000) considers this to be a global issue.

In the context of the UK, it is estimated that 85 percent of all deaths annually, are due to chronic diseases (The World Health Organisation, 2002). This worrying phenomenon has stimulated the UK government policy to take initiatives, develop policy initiatives to reduce the risks of diet related chronic disease among people. Among the steps taken by the UK government to reduce the medical burden of dietary related disease is to continually introduce healthy eating campaigns from time to time. In order to reduce the burden of the diet related disease, a solution to the problem is a nutritional strategy to encourage people to consume more healthy foods (Segal and Opie, 2015). Hence, the need to switch to a healthy lifestyle is essential. A healthy lifestyle should begin with a healthy diet.

Such awareness of the importance of a healthy lifestyle and to encourage people to consume much healthier foods has provided opportunities to the food industry. Consequently, many types of healthy foods have been developed by the food industry. Functional foods are thus positioned in this segment of the market. Functional foods were introduced in the European market in the mid 1990's (Menrad, 2003).

Functional foods are designed to provide health properties to prevent many types of chronic disease. They contain ingredients whose benefits extend basic nutrition to enhance health, hence would also able to reduce the risk of certain disease accordingly (Ashwell, 2004). According to Gray et al., (2003), the growth of new products in the market is due to the positive views of consumers who are conscious of the health benefits of foods in general. Nevertheless, the response from consumers indicates that some are unsure about the exact nutritional value of food products (Chandon and Wansink, 2007).

Over time, the market for functional foods has grown worldwide with the introduction of various new products (Bigliardi and Galati, 2013). The growth of the functional foods market in the EU has been strong recently (Ozen et al., 2014). In general, the positive growth is mainly due to consumers' desires to reduce the risk of disease and to enjoy good health. In particular, the Millennials group (born between 1982 and 2005) is more interested in premium priced functional food products than baby boomers (born between 1943 and 1960) (Nielsen Company, 2015). Thus, there are huge potential market for functional foods.

Nevertheless, despite a positive growth, there are some marketing issues related to the functional food products. Evidence of this problem is that, although the sector has enjoyed positive growth in terms of new product launches, the sale of such products has been yet to achieve satisfactory returns when many of the new functional food products launched fail, despite being introduced by established companies (Mellentin, 2014).

In a related development, another major marketing issue is that consumers are confused and unable to differentiate between different types of functional foods, which potentially can reduce demand in the long run (Granqvist and Ritvala, 2016). Hence, this suggests that the industry should develop awareness of the determinants of consumers' intentions towards the consumption of functional food products.

In addition to that, Urala and Lähteenmäki, (2003) and Ozen et al. (2012) emphasise the importance of understanding consumer behaviour is essential, to succeed in marketing and product development. Therefore, further study of various consumer perspectives of functional foods is needed as the range of products in the current market is wide (Ozen, Pons, and Tur, 2012).

In creating the framework to understand consumer behaviour towards functional foods, it should be developed from the gaps in the existing literature studies relating to food choice. Since functional foods are created with diseases prevention properties, studies of consumer behaviour should focus on elements of preventative behaviour that would motivate consumption (Moorman and Matulich, 1993). In relation to preventative behaviours, the assessment of consumers' perceptions towards the risk associated with diseases and the health benefits of the products may give a better insight into functional food products. These findings can inform marketing strategist to encourage consumers to switch and place greater emphasis on affective appeals rather than cognitive elements have been applied frequently in food advertising (Hoch and Loewenstein, 1991).

2.4 Health benefits of functional foods

Taylor (2010) explains that healthy food can be defined generally as food products with healthy, nutritious ingredients that can be consumed daily. Thus, each functional food could be defined as healthy, but not all healthy foods are functional.

From a legal perspective in the EU, the certification of functional foods requires that they comply with the principal standard criteria of nutrient profiles. The European Food Safety Authority (EFSA) provides guidelines for nutrient profiles of food products to the European Commission for certification. The guidelines suggest consideration of "fat, saturated fat, trans-fatty acids, salt/sodium and sugars, unnecessary admissions of which in the general eating routine are not suggested, and poly and mono-unsaturated fats, accessible carbohydrates other than sugars, vitamins, minerals, protein and fibre" (Verhagen et al., 2010, p. 10). It is very common to see two different types of functional foods which target health functions. These relate to gastrointestinal health (for general health) and cardiovascular health (for specific health). Gastrointestinal health has been targeted for general health since its roles to maintain metabolic functions in the human body system (Taylor, 2010; FAO, 2007).

Generally, the health benefits offered by functional food products are distinguished from ordinary food products. This is a major determinant that has a positive impact on consumers' intentions to consume functional food products. Nevertheless, in order to achieve a better understanding of consumer behaviour, other possible determinants should also be considered. In this context, Section 2.5 provides a review of the various determinants of consumers' intentions related to food in general.

2.5 The determinants of consumer behaviour towards food in general

Before an examination of the literature concerning functional food consumer behaviour, it is useful to examine studies relating to food behaviour in general as to identify some relevant issues. According to Steptoe et al., (1995), the study of attitudes towards healthy food choice has become a relevant topic and many researchers have focussed on various perspectives on this issue over time.

With respect to food behaviour research, Steptoe et al., (1995) aim to determine the motives of food choice, have identified nine factors represented by 36 items including familiarity, convenience, health, ethical concern, mood, sensory characteristics, natural content, weight control, and price which represented by The Food Choice Questionnaire (FCQ). Scores on each scale range from 1–4 (not at all important, a little important, moderately important and very important). Such determinants seem suitable to assess consumer behaviour towards foods from a general overview.

In understanding the salience of factors that varies across consumer groups by Gender, Age, and Income, some interesting findings could be used as a good guideline for other food research. Particularly, the results of the FCQ scale assessment by Steptoe et al., (1995) show that women are significantly higher than for men. This indicates that higher concern on motives of food choice exists among women. In relation to the factor of Gender, both women and men have significant positive correlations existed on three FCQ scales, i.e. natural content, familiarity and ethical concern. Meanwhile, for the factor of Age in women, positive correlations found between two factors, i.e. health and sensory appeal. Interestingly, the factor of Age in men shows positive correlations on the other two factors, i.e. mood and weight control. The assessment of Income met the expectation that individual with higher income are less sensitive to the price in their food choice. Among the lower income group indicated that familiarity is more important in their food choice. An orderly relationship between Income and the importance of sensory appeal in the food choice shows the high-income groups rated the highest, followed by the moderate and the lower income groups.

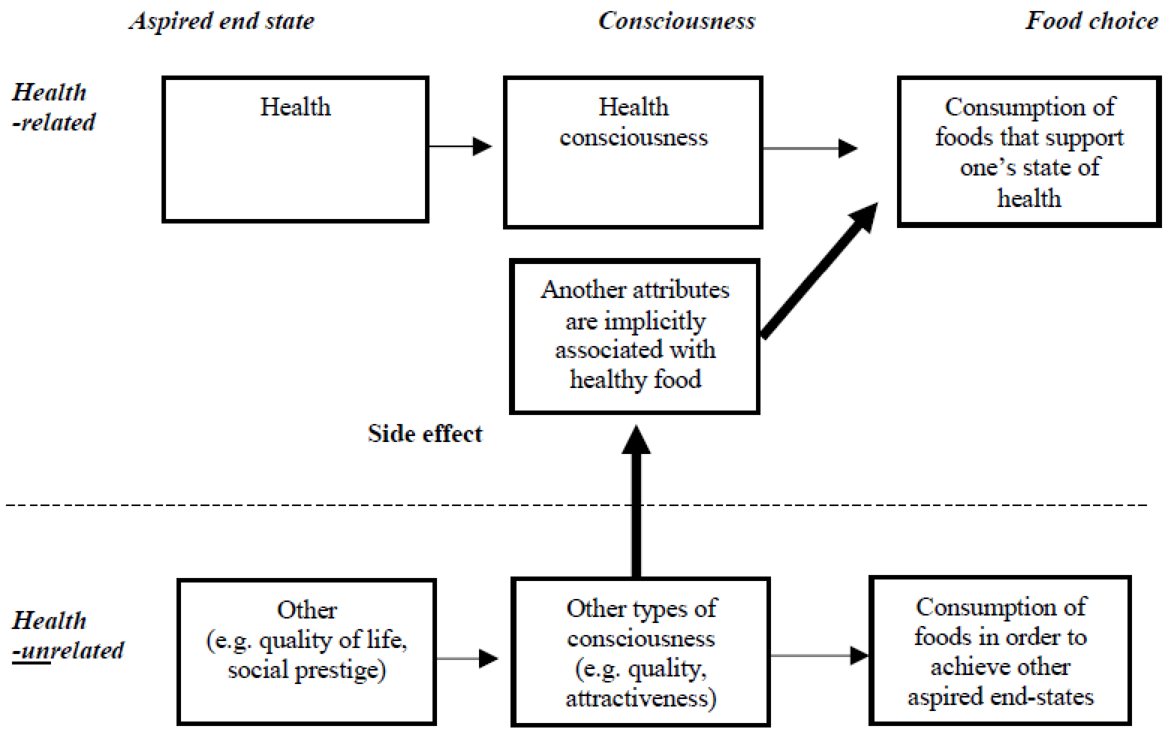
Apart from that, Roininen and Tuorila, (1999) developed scales for health-related factors in food choice (interest in general health, low fat products and natural products) and factors related to taste (desire for sweet foods, food as reward and pleasure) in the Health and Taste Attitudes Scale (HTAS). The scales measured using a seven-point Likert scale with the categories ranging from “strongly disagree” to “strongly agree”. Among the examples of items used for factor of health-related, the scale of general health are ‘I am very particular about the healthiness of food’, ‘I always follow a healthy and balanced diet’, scale of low fat products such as ‘I believe that eating light products keeps one’s cholesterol level under control’ and ‘ I believe that eating light products keeps one’s body in good shape’, scale for natural products such as ‘ I do not eat processed foods, because I do not know what they contain’ and ‘ I try to eat foods that do not contain additives’. Whilst among the examples of items used for factor of taste, the scale of desire for sweet foods are ‘I often have cravings for sweets’ and ‘I often have cravings for chocolate’. Example of scales of food as rewards are ‘I reward myself by buying something really tasty’, and ‘I indulge myself by buying something really delicious'. Examples of scale of pleasure are 'When I eat, I concentrate on enjoying the taste of food' and 'An essential part of my weekend is eating delicious food'.

In summary, there are various determinants have been studied. Nevertheless, it can be concluded that emphasis was given on common attributes which being used by many researchers. To further understanding this, Section 2.6 reviews some recent studies and illustration of selected frameworks of consumer behaviour studies in the context of food in general.

2.6 Recent contemporary frameworks of consumer behaviour towards food

There are variety types of contemporary framework created to investigate consumer behaviour towards food. In a more recent example, several related studies have been selected to gather further insights. For instance, a new concept known as the 'health-supportive side effects framework' has been developed by Mai and Hoffmann, (2017). The model is presented in Figure 2.1. The model includes two major elements that determine food consumption. The first element is represented by health-related attributes that reflect the motive to develop aspiration of health through health consciousness and other elements associated with healthy food. The second element is represented by health-unrelated attributes that reflect the aspirations of quality of life and social prestige and other types of consciousness such as quality and attractiveness. Hence, the model considers food consumption to be determined by motives linked to health and other motives. It is important to note that health consciousness is a significant factor in food choice behaviour.

Figure 2-1 Health-supportive side effects framework



Source: (Mai and Hoffmann, 2017, p. 56)

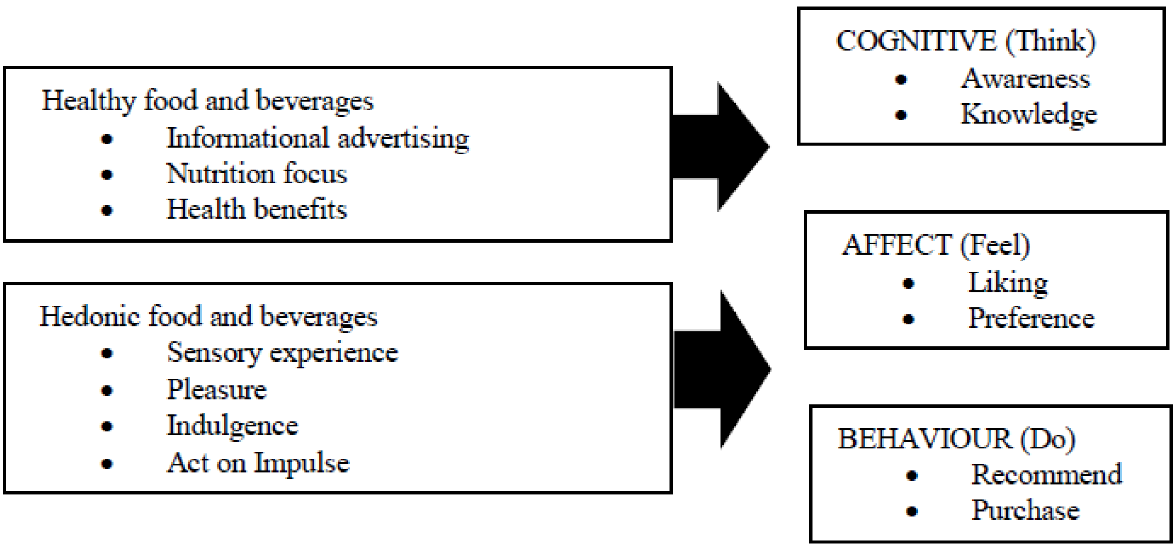
Since the health consciousness has a significant positive impact on consumer engagement with the consumption of healthy food, the issue can be considered in terms of health orientation. In a recent development, Cavaliere et al., (2016) developed a concept to understand the effect of different degrees of health orientation towards two main concerns of label information and health claims. The results suggest that people with a high health orientation would be more likely to be influenced by the label information, whilst people with a low health orientation would be more likely to be influenced by health claims of the products.

Meanwhile, to further understand factors affecting consumer behaviour towards food choice, Hung et al., (2016) developed a concept to study the influence of health claims on consumer food choice. It is suggested that higher level of consumer knowledge of health claims positively influence the attitude and purchase intention.

Furthermore, a new concept to understand consumer behaviour between two different categories of food products, the Consumer Marketplace Experience was developed by Bublitz and Peracchio (2015). The conceptual model is presented in Figure 2.2. The model includes different factors for two different food products (i.e. healthy food and hedonic food) that would influence consumer cognitive thinking about the food products (i.e. awareness, and knowledge), how consumers feel (i.e. liking or prefer the product), and the behavioural responses (i.e. recommend to others, or purchase the product). However, one weakness identified as the concept does not include attributes that measure consumer perception on the possible negative impact of certain disease i.e. heart disease or other diseases, which consumption of healthier food with balance nutrition would prevent such disease to occur.

In a related development, for products of healthy food and beverages, the significant factors identified were informational advertising, nutrition focus and health benefits. Meanwhile, for products of hedonic food and beverages, factors such as sensory experience, pleasure, indulgence and act on impulse were identified significantly able to influence consumers (Bublitz and Peracchio, 2015). Such findings from this study provide some insight to the current study. The study reveals that the consumption of healthy types of food products affected by creative marketing communication practices utilising identified key elements, of which health benefits is one of them.

Figure 2-2 Consumer Marketplace Experience



Source: (Bublitz and Peracchio, 2015, p. 2490)

In summary, the insights from the literature related to food in general show various dimensions have been studied as the concepts that affects consumer behaviour. Such relevant information is useful prior to a focus on functional food. For example, the element of health benefits is very relevant to investigate consumer behaviour on functional foods. This is one of the important elements as functional food producers claim the product contains health properties beyond basic nutrition. Furthermore, Section 2.7 considers relevant concepts of consumer behaviour and functional food.

2.7 The development of consumer behaviour research towards functional foods in various countries

There are various approaches to the study of consumer behaviour in food choice. As explained in Section 2.5 and 2.6, numerous studies and frameworks have been used to explore consumer behaviour towards foods in general. Since the focus of this study is to look beyond conventional foods, the discussion continues with a review of the literature associated with functional food.

Functional foods particularly have attracted attention from researchers to identify possible factors that influence its consumption. Many previous studies on functional foods have focussed on the benefits to health and disease prevention. However, recent research has challenged this approach by exploring other food values beyond health and disease prevention properties. Particularly, other non-health drivers such as origin, safety, naturalness, price have also been included. For example, Papalardo and Lusk (2016) researched consumer willingness to pay premium for a functional snack product. Nevertheless, such a study may not be applicable to all types of functional foods.

This study focuses on functional foods in the context of the UK. Hence it is important to consider research studies in this context, with the aim of identifying research gaps. Table 2.1 summarises consumer behaviour studies on functional foods in the UK.

Table 2-1 The Studies of Consumer Behaviour towards Functional Foods in the UK

Author	The research aims	Research context (sample, country)	Conceptual model	Key results
Hilliam, (1996)	To assess the consumers' view about the functional ingredients and its health claims	Selected six European countries-UK, France, Germany, Belgium, Spain, Netherlands	No specific theoretical framework used. Leatherhead Food Research Association (LFRA) conducted the research between 1990 and 1995. Qualitative studies explore respondents' health concerns, i.e. stress, migraine, heart disease, obesity, cancer of stomach/colon, memory decline, high blood pressure, raised cholesterol level, osteoporosis	The level of awareness about the functional foods varies across countries (i.e. UK, France, Germany, Belgium, Spain, Netherlands)
Korzen and Jensen, (2006)	The consumer view on the properties of preventative measure in functional foods to reduce the risk of heart disease among post-menopausal women	Denmark and United Kingdom	No specific theoretical framework used. Using qualitative study, the study accesses the acceptability of food based that could help to improve the health. It was conducted by a controlled dietary intervention to prevent heart disease, which participants consumed fortified foods with isoflavones.	Despite the respondents positively agree the existence of the health properties of functional foods in the reduction of the heart disease, nevertheless, there are varieties of problems (barriers) faced as a hindrance to the consumption.
Chambers and Lobb (2007)	The impact of the level of education to the consumption of functional food products	United Kingdom	No specific theoretical framework used. The study focuses on three fresh products, strawberries and lettuce with higher antioxidant levels, and lamb chops with higher levels of unsaturated fatty acids. It measures the factors affected the willingness to pay for the three functional agriculture foods, i.e. price, independently from functional characteristics, and longer shelf life.	Contrary to findings by Stewart-*La* Barbera et al., (2016), the finding of the study suggests there is no significant impact on various levels of education to the consumption of functional foods.

From the information in Table 2.1, it can be concluded that the scopes of consumer behaviour research associated with functional food products in the UK context are still limited and very little. Therefore, further investigation is needed to explore various dimensions and contexts using relevant conceptual model. In addition to this, previous studies that have been conducted are relatively old. Since consumer behaviour is very dynamic (Douglas and Craig, 1997), there is a need to re-examine the identified attributes to suit a more contemporary context.

Apart from the UK, there are growing number of studies on consumer behaviour with respect to functional foods, conducted in various countries. It evolves over the years and explore various dimensions. For example, in the context of the US, among the studies focused on functional foods' consumer behaviour, the impact of economic and issues related to product development (Childs, 1997). Meanwhile, Childs and Poryzees, (1997), paid their attention in study the attitudes of functional food consumer and the implication to public policy. Gilbert, (2000) focused on ways to reach a target customer. Precisely, it is suggested that there are four factors prioritised by consumers in relation to healthy food choice, i.e. taste, self-education, nutritional individualisation, and filling the nutritional gaps. In addition, Gilbert (2000) also found that there are five primary benefits positively influence the food buying decisions for functional and nutritional products, i.e. Prevention, Performance, Wellness, Nurturing and Cosmetics. Nevertheless, despite these benefits are recognised by consumers in relation to the contents of functional properties of disease prevention and health enhancement, this attitude seems yet to translate into a real careful healthy eating. This scenario is proven as the study indicates that only small percentage, i.e. 10% of consumers always choose foods for health reasons (Gilbert, 2000). Such scenario may due to lack of health information obtained by the majority consumers. Hence, further continues investigations on the consumers' intention is needed.

In a related development, the study in the context of Belgium, Verbeke (2005) explained three factors i.e. Beliefs, Knowledge and Control over Health, positively influence consumer acceptance of functional foods. A positive correlation exists between the three factors and the dependent variable of consumer acceptance. The scale to measure the dependent variable of the acceptance utilising 2 items on 5-point Likert scale. The items are ‘‘Functional foods are acceptable for me if they taste good.’’ and ‘‘Functional foods are acceptable for me, even if they taste worse than their conventional alternative foods.’’ In relation to the independent variables, the Health benefit belief assesses using 4 items in 5-point scales, i.e. ‘‘Functional foods are likely to have a beneficial impact on my personal health.’’. Whilst Knowledge measured using 3 items in 7-point scales, i.e. ‘‘I know foods with specific beneficial health impact.’’, ‘‘I know enriched foods.’’, and ‘‘How do you judge your personal knowledge of functional foods.’’. The third independent variable of Perceived role of food for health represents by 3 items and assessed using 7-point scales, i.e. ‘‘Food plays an important role for my personal health.’’, ‘‘I feel to have control over my personal health.’’, and ‘‘I feel to eat healthier now as compared to 5 years ago.’’. The findings of the study reveal that the main positive determinant of acceptance is the Belief in the health benefits of functional foods. In addition to that, the presence of an ill family member stimulates the positive effect on functional food acceptance. In relation to this, high level of claimed knowledge or awareness of the concept decreases the acceptance. This result indicates that this adverse impact decreases in older people. Such a finding contrary to previous reports profiling users of functional food, the socio-demographic factors outweigh the Belief, knowledge and presence of an ill family member (Verbeke, 2005).

Meanwhile, Urala and Lähteenmäki (2007) developed a measurement with four factors to understand factor influencing consumer behaviour towards functional foods in the Finland.

The scales to measure consumers' willingness to use functional foods were developed. The assessment using (7-point scale: 1 = not at all willing and 7 = extremely willing). The application of factor analysis to the scale identified four dimensions (factors). The first factor represents Perceived Reward, which explains the benefits of good health in general. Examples of items include 'The idea that I can take care of my health by eating functional foods gives me pleasure', 'My performance improves when I eat functional foods', and 'Functional foods help to improve my mood'. The second factor is Necessity for Functional Foods, which measures the perceptions of the role of functional foods in health improvement. Examples of used items include 'Functional foods are completely unnecessary', 'The growing number of functional foods on the market is a bad trend for the future', and 'For a healthy person it is worthless to use functional foods'. The third factor indicates Trust and Credibility, which measures perceptions of the credibility of claims made by functional foods. Examples of used items are 'The safety of functional foods has been very thoroughly studied', 'I believe that functional foods fulfil their promises' and 'Functional foods are science-based top products'. The fourth factor indicates consumers' perceptions of Safety of functional food ingredients. Examples of items are 'If used in excess, functional foods can be harmful to health', 'In some cases, functional foods may be harmful for healthy people', and 'Using functional foods is completely safe'.

Besides that, in a recent study conducted in Croatia, Brecic et al., (2014) assessed the influence of functional food consumption in four sets of factors, (i.e. food choice motivations, demographic and socio-economic characteristics, knowledge of functional food and health status). The findings indicate that there are three factors that significantly influence food choice motives, which includes health, convenience and familiarity. In relation to this result, the study also found that individuals with a high consideration of health and food-convenience and females with higher educational level are significantly heavier user of functional food products. Thus, in order to improve the consumer consumption of functional foods, the marketers are facing challenges as to educate consumers with the knowledge of the health benefits of the products and at the same time to satisfy the regulatory requirements. In other word, it is suggested that higher knowledge of health benefits may positively impact the consumption.

In other perspective of Canadian population, Stratton et al., (2015) concluded that the older people (over 70 years of age) have a higher degree of food neophobia that become their barriers, significantly reflect to a lower willingness to try new functional foods. The Food

Neophobia Scales of Pliner and Hobden (1992) were used. Utilising 10 questions, the scale assesses dimensions of functional foods consumption, attitudes towards functional foods, general health, medical and demographic data, and degree of food neophobia. The ten questions of the original scales include ‘I am constantly sampling new and different foods’, ‘I do not trust new foods’, ‘If I do not know what is in a food, I will not try it’, ‘I like foods from different countries’, ‘Ethnic food looks too weird to eat’, ‘At dinner parties, I will try a new food’, ’I am afraid to eat things I have never had before’, ‘I am very particular about the foods I will eat’, ‘I will eat almost anything’, ‘I like to try new ethic restaurant’. In relation to the result, it is suggested that higher food neophobia (higher barrier) would negatively impact the consumer willingness to consume functional foods.

In a more recent study in Italy, La Barbera et al., (2016) conducted a study to assess the role of knowledge and food technology neophobia in affecting consumer intention towards functional foods. One hundred undergraduate Italian universities were participating in the study utilising The Food Technology Neophobia scale (FTNS), in the context of tomatoes enriched with lycopene (functionalised product). The finding suggests that Knowledge has a significant impact to influence consumer intention.

In summary, there is a necessity to give higher emphasis for the study on UK consumer and the reason is justified. In addition, an investigation of consumer behaviour towards functional foods is essential as the popularity differs among countries (Ozen et al., 2014). Hence, in order to understand complex consumer behaviour, the focus should be given to appropriate and relevant determinants.

2.8 The determinants of consumer behaviour towards functional foods and other related healthy foods

In relation to understanding the consumer behaviour towards healthy food products, Kaur and Singh (2017), suggested there are various recent studies focusing on consumer behaviour towards functional foods. Precisely, the concept or focus context of previous studies can be divided into four categories. The first category focuses on personal factors. The second category deals with psychological factors. The third category can be classified as cultural and social factors. The fourth category engaged with factors relating to the product itself.

2.8.1 Personal factors

The relevant determinants in the classification of Personal Factors include age, gender, income, marital status, health status, willingness to use functional foods, purchase intention, knowledge about functional foods, pleasure in eating, health consciousness/ healthiness, health and nutritional information, experience/ consumption frequency, information about functional foods manufacturing process, novelty and fashion orientation, satisfaction with food related life, satisfaction with life, diversification of meals, and weight loss/ dietary concerns (Kaur and Singh, 2017). Table 2.2 summarises selected studies concerning the demographic and socio-economic characteristics of functional foods and other related healthy food consumers.

Table 2-2 Demographic and Socio-Economic Characteristics of Functional Foods Consumers (Gender, Age, Education, and Income)

Author(s)	The research aims	Research context (sample, country)	Conceptual model & research methodology	Results (Characteristics)			
				Gender	Age	Education	Income
Vecchio et al., (2016)	To investigate consumers' willingness to pay (WTP) for yoghurts	Sample of n=100 Italian consumers Willingness to pay (WTP) of conventional, organic and functional yoghurts in the context of two different information treatments. The first based on basic information, i.e. yoghurts labelled conventional, organic or functional. The second based on additional product information.	An experimental auction using the Vickrey fifth-price sealed-bid mechanism, using exploratory study. *Independent variables:* Health, Mood, Convenience, Sensory appeal, Natural content, Price, Familiarity, Ethical concern *Dependent variable:* Willingness to Pay (WTP)	Functional yoghurt: Additional product's information significantly affects positive consumer's perceived value. Organic yoghurt: Additional product's information, i.e. organic regulation, does not significantly affect consumer's perceived value. Socio-demographic factor: Gender has a significant positive effect on the WTP for functional and organic yoghurts. Precisely, higher WTP among female. Other significant socio-demographic factors: Age, presence of kids in the household and the need to follow a specific diet.	Significant positive correlations between young age group to the willingness to pay for functional and organic yoghurts.	n/a	n/a
Hung et al., (2016)	To assess consumer attitude and purchase intention towards functional	The assessment made on consumers of Belgium, Netherlands, Italy and Germany	Independent variable: Attitude, Preference for natural over chemical additives, Perceived harmfulness of chemical additives, Risk, Innovativeness,	n/a	n/a	Higher education level has a significant impact on the Purchase Intention	n/a

	processed meat	with sample n=2057	Awareness of nitrite, General health interest, and Age				
Schnettler et al., (2015)	The impact of satisfaction of food- related life to the attitude towards functional foods	Chile Sample size n= 372 university students	The attitude towards functional foods (AFF) scales developed by Urala & Lahteenmaki (2007) were used. AFF consists a total of 25 items that represent four factors, i.e. Reward, Necessity, Confidence and Safety.	n/a	n/a	Higher education level has a significant impact on attitude towards functional foods.	n/a
Jezewska and Krolak (2015)	To assess willingness to consume functional cereal	Sample of 1000 Polish consumer	The assessment uses Food Technology Neophobia Scale (FTNS), motives of food, i.e. Health, Quality, and Hedonic value. Dependent variable: Intention to consume functional cereal products.	Women have a higher level of intention	n/a	Higher Education level has a significant impact towards intention	n/a
Stratton et al., (2015)	To assess the impact of food neophobia on functional food consumption in older adults	Sample of n=200 older adults (over 70 years old) in Canada	10 food neophobia scale taken from Pliner and Hobden (1992). The scale was rated using 7-point Likert scale ranging from “strongly disagree” to “strongly agree”.	n/a	Significant negative correlation for older age group (with food neophobia) to the consumption of functional foods. Four impacts are identified. Those with food neophobia- firstly, less likely to consume functional foods. Secondly, they are less willing to try new functional foods. Thirdly, they perceive more barriers to functional food consumption. Fourthly, they perceive more risk to functional food consumption. *Food neophobia can be described as one’s reluctance to consume novel or newly created types of foods such as new functional food products (Dovey et al., 2008)	n/a	n/a
Kraus (2015a)	To assess the most important characteristic	Sample of n=200 (137 women, 63 men age of	Four main components were investigated, i.e. quality attributes, healthful properties, functional	The study found a higher positive effect on the acceptance of functional foods among female.	No significant difference between age groups as to the acceptance of functional foods, based on principal	n/a	n/a

	of functional foods and the motives of consumption	18-60 years) in Poland	components and carriers, the motives for purchasing functional food, demographic (gender, age and education). The research utilises descriptive study.		components of functional food products (quality attributes, healthful property, functional component and carrier/ based product)		
Kraus (2015b)	To examine the motivators of the consumption of functional products	Sample of n=200 in Poland	Four main components were investigated, i.e. quality attributes, healthful properties, functional components and carriers, the motives for purchasing functional food, demographic (gender, age and education).	The study found a significant higher motivation on the consumption of functional foods among female.	No significant different between age groups to the acceptance of functional foods which based on quality attributes, organoleptic attributes, packaging and labelling attributes, healthful properties, functional components, carrier (base product).	Higher level of education has a positive impact	n/a
Hur and Jang (2015)	To investigate consumers' affective responses in the context of healthy food consumption.	Sample n=809 Population= restaurant consumers in the U.S.	Assessment of the relationships of independent variables of perceived healthiness, anticipated guilt, anticipated pleasure, and dietary concerns towards dependent variable of behavioural intentions (i.e., purchase, spreading positive word-of-mouth, and recommending the food) in a quick service restaurant setting. The research utilises exploratory study.	Female positively have high dietary concerns.	No significant differences between age group towards healthy food consumption	Higher level of education has a positive impact	Higher income positively impacts behavioural intention
Collins and Bogue (2015)	To design health promoting foods targeting the ageing population	Selected participants were from Ireland and Japan	A qualitative study utilising 16 in-depth semi-structures one to one interview to identify key product design attributes of health promoting food in an ageing group of population.	n/a	Significant positive relationship between the ageing and the acceptance of health promoting food products (the acceptance rate is likely to be greater for food carriers that consumers perceive as containing positive health benefits)	n/a	n/a
Salleh et al., (2015)	To study the profiles of functional foods consumers	A sample of n=452 taken from consumers in 12	Assessments conducted in three phases. First, on the respondents' familiarity of selected 10 products of functional foods. Second, it followed by obtaining	Female positively have high Behavioural Intention towards functional foods consumption.	Significantly different between the age group with the intention to consume functional foods (i.e. the older group tends to have	Higher level of education has a positive impact	n/a

		hypermarkets in Malaysia	respondents' opinion on functional foods, and sources of information regarding functional foods. Third, the major analysis focuses on consumers' behavioural intention towards functional foods according to gender, age, marital status, ethnicity, religion, level of education and income. The research utilises descriptive study.		higher intention to the consumption) Such results show the older population is more attentive towards the functional food consumption. This is due to the greater probability of disease being diagnosed to older respondents and association with illness experience. In addition, a higher potential of risk aversion in the consumption of functional foods contributed to the positive result.		
Irene and Spiller (2014)	To compare between consumers of organic foods and functional foods, whether having a similar understanding of health improving lifestyle	Online survey of n=500 German consumers	The assessment utilising wellbeing and health-lifestyle measure adapted from AIO dimensions of the theoretical wellness concept on two different dependent variables, i.e. functional foods, and organic foods.	Women have a higher level of understanding of health improving lifestyle	No significant differences of the correlation between age groups and the functional foods purchase determinants (based on several identified factors such as health care and disease prevention, beauty and appearance)	Higher education positively impacts behaviour	Higher level of income impacts positive understanding of health improving lifestyle
Brecic et al., (2014)	To identify determinants of functional food consumption	Croatia	Face to face interview conducted in respondents' home Bootstrapped ordered probit model is used for the analysis	There is a significant influence of functional food consumption in four sets of factors, (i.e. food choice motivations, demographic and socio-economic characteristics, knowledge of functional food and health status). Health, convenience and familiarity are the three factors that significantly influence food choice motives.	n/a	Higher level of education has a positive impact behaviour	n/a

				Individuals with a high consideration of health and food-convenience and females with higher educational level are significantly heavier user of functional food products.			
Ares and Gambaro (2007)	Willingness to try functional foods.	Uruguay N=200 (103 Females, 97 males)	The Food Choice Questionnaire (FCQ) developed by Steptoe, Pollard, & Wardle, (1995) was used. 36 original items of FCQ used together with 14 newly developed items derived from literature reviews. A 7-point scales applies.	Ares and Gambaro (2007) argued that gender has different impacts to types of characteristic concept of functional foods. In general, high concern about healthy eating and health conscious is more associated with females.	n/a	n/a	n/a
Verbeke (2005)	Assessment of socio demographic factors towards consumer acceptance of functional foods	Belgium N= 251	A 5-point scale to assess consumers' acceptance.	No significant impact	Older people have a lower level of acceptance	Individual with higher health related knowledge positively impacts the acceptance	n/a
Urala (2005)	Investigation on consumer perception towards functional foods	4536 Finnish participants	Evaluated factors, i.e. Reward, Necessity, Confidence, and Safety	Females have a higher positive perception towards functional foods	n/a	Higher knowledge positively affects consumer perception	n/a

Age

The findings of factor of Age, are mixed amongst the studies. Among the recent studies utilising personal factor represented by the antecedent of Age in understanding consumer behaviour towards functional foods includes the study by Vecchio et al., (2016) confirmed that the positive behaviour towards functional yoghurt exists among young age group. Meanwhile, Stratton et al., (2015) also confirmed the influence of food neophobia to the consumption of functional foods is significant among the older people. Furthermore, the significant differences between age groups also confirmed by other studies such as in the context of ageing and the acceptance of health promoting food products, by Collins and Bogue (2015), and the study by Salleh et al., (2015) confirmed that the older age has a greater significance to the intention to consume functional foods.

Contrary to that, Kraus (2015a), Kraus (2015b) found there is no significant different between age groups in relation to the acceptance of functional foods based on several attributes assessed such as quality, organoleptic, packaging and labelling, healthful properties, functional components, and carrier (base product). Such insignificant results supported by another study that produces similar outcome, i.e. in the context of healthy food consumption by Hur and Jang, (2015), and in the study of purchase determinants of functional foods (health care and disease prevention, beauty and appearance) assessed by Irene and Spiller (2014). In summary, the factor of Age has attracted the attention of many scholars.

Gender

Another determinant in Personal Factor is Gender. Table 2.2 summarises selected studies concerned with Gender.

Among the recent studies utilising Gender presented by Vecchio et al., (2016), Kraus (2015a), Kraus (2015b), Hur and Jang (2015), Salleh et al., (2015), Brecic et al., (2014), Bechtold and Abdulai (2014), Irene and Spiller (2014), Ong et al., (2014), Loizou et al., (2013), Verbeke (2005), and Urala (2005). The previous findings related to gender are mixed. For example, Verbeke (2005) found that demographic profiles do not have a significant impact on consumer perception of functional foods. Contrary to this, Urala (2005) contended that the consumption of functional foods is only partially associated with gender demographic features, with females showing more enthusiasm for health and food issues. Similarly, a positive correlation between women and the consumption of functional foods are proven (Hur and Jang (2015).

Education

Education is another determinant in the Personal Factor group. Table 2.2 provides a summary of studies concerned with the impact of Education on the consumption of functional foods. Recent studies conducted by Hung et al., (2016), Schnettler et al., (2015), Jezewska and Krolak (2015), Hur and Jang (2015), Kraus (2015b), Salleh et al., (2015), Irene and Spiller (2014), Bornkessel, Broring, Omta, and van Trijp (2014), Brecic et al., (2014), Büyükkaragoz et al., (2014), Bechtold and Abdulai (2014), Ong et al., (2014), Yu and Bogue (2013), Loizou et al., (2013), Krystallis and Chrysochou (2012). The findings related to education are mixed, for example, De Jong et al., (2003) suggested that higher educated consumers would more likely to consume functional foods. Nevertheless, Niva and Makela (2007) suggested that consumers with lower levels of education are more concerned and requested firmer rules on functional foods than those with higher levels. It can be concluded that, most of recent studies show a trend of positive significant correlation of higher education to the consumption of healthy food products such as functional foods.

Income

The impact of the Personal Factor represented by the antecedent of Income is assessed in recent selected studies and summarised in Table 2.2. The result shows a significant positive relationship between higher incomes to the consumption of functional foods. Such positive sign indicates the consumers with higher income are interested to purchase these premium product classifications as it provides greater value to them despite these products are higher in price (Hur and Jang, 2015).

Awareness/ Familiarity

Furthermore, recent selected studies have examined the Personal Factor represented by the antecedent of Awareness/ Familiarity with functional foods. Table 2.3 provides details of the results. The results indicate that the significant positive impact of higher awareness / familiarity on the consumption of functional foods. It can be concluded that those who have experience or used to consume the functional food products are likely to have a consistent positive view towards the products.

Table 2-3 The Personal Factor of Awareness/ Familiarity

Author(s)	Key Results
Annunziata et al., (2016)	Significantly positive*
Sandmann et al., (2015)	Significantly positive*
Dobrenova et al., (2015)	Significantly positive*
Collins and Bogue (2015)	Significantly positive*
Gajdos et al., (2015)	Significantly positive*
Vella et al., (2014)	Significantly positive*
Bornkessel et al., (2014)	Significantly positive*
Markovina et al., (2011)	Significantly positive*
Annunziata and Vecchio (2010)	Significantly positive*
Annunziata and Vecchio (2011)	Significantly positive*

Note: *significant at 5% level

Knowledge about Functional Foods

Several studies have researched the impact of the Personal Factor represented by the antecedent of Knowledge of Functional Foods. A summary of relevant studies is presented in Table 2.4. Knowledge of functional foods positively impacts the consumer behaviours. In particular, a higher level of knowledge positively affects the consumption. Among the studies that produce a positive significant results, including by Schnettler and Grunert, (2016), Annunziata et al. (2016), *La* Barbera et al., (2016), Hung et al., (2016), Schnettler et al., (2015), van der Zanden et al., (2015), Dolgopolova et al., (2015), Lu (2015), Brecic et al., (2014), Cazacu et al., (2014), Senadisai et al., (2014), Ong et al., (2014), Loizou et al., (2013), Spiroski et al., (2013), and Tu et al., (2012). Such positive results in many recent studies confirm the significant role of Knowledge in developing consumer confidence by comprehending the health benefits of functional food products.

Table 2-4 The Impact of Personal Factor of Knowledge about Functional Foods

Author(s)	Key Results
Annunziata et al., (2016)	*Significantly positive to affect parents' choices of suitable functional foods for their children.
Brecic et al., (2014)	*The knowledge about functional foods has a positive and significant impact on the consumption of functional foods. The study in Croatia also identified other factors such as food choice motivations, demographic and socioeconomic characteristics, and health status.
Dolgopolova et al., (2015)	*Result of exploratory study indicates consumers' dietary preferences (their opinions about the connection between food and health), knowledge and attitude positively impact consumer perception on functional food in a cross-cultural context.

Note: * significant at 5% level

Health Consciousness/ Healthiness

Table 2.5 summarises the details of selected studies. Next, the assessment of the Personal Factor represented by the antecedent of Health consciousness/ healthiness reveals a positive impact on the consumption of functional foods. Such positive findings from recent studies provide guidance to the success of marketing functional food products. Precisely, in order to increase the demand of functional food products in the market, comprehensive awareness programmes should be delivered extensively to the community. Such programmes would increase the level of health consciousness of people.

Table 2-5 The Impact of Personal Factor of Health Consciousness/ Healthiness

Author(s)	Key Results
Hung et al., (2016)	Significantly positive*
Annunziata et al., (2016)	Significantly positive*
Vecchio et al., (2016)	Significantly positive*
Kraus (2015a, b)	Significantly positive*
Dolgopolova et al., (2015)	Significantly positive*
Brecic et al., (2014)	Significantly positive*
Tobin et al., (2014)	Significantly positive*
Hirogaki (2013)	Significantly positive*
Carrillo et al., (2013)	Significantly positive*
Chen (2011)	Significantly positive*
Menezes et al., (2011)	Significantly positive*
Koteyko (2010)	Significantly positive*

Note: * significant at 5% level

Other Personal factors

Several studies have explored the impact of Other Personal Factors in consumer intentions towards functional foods. Table 2.6 summarises the results of selected studies. These studies include factors such as health and nutritional information, experience/ consumption frequency, novelty and fashion orientation, satisfaction with life, satisfaction with food related life, and weight loss/ dietary concern. Whilst other Personal factors that produced mixed results, including lifestyle, self-efficacy, Information about the functional food manufacturing process and diversification of meals.

Table 2-6 Other Personal Factors

Antecedent	Author(s)	Key Results
Health and nutritional information	Bruschi et al., (2015)	Significantly positive*
	Hellyer et al., (2012)	Significantly positive*
	Naylor et al., (2009)	Significantly positive*
Experience/ consumption frequency	Hung et al., (2016)	Significantly positive*
	Chung et al., (2011)	Significantly positive*
	Saaksjarvi et al., (2009)	Significantly positive*
Novelty and fashion orientation	Carrillo et al., (2013)	Significantly positive*
	Loizou et al., (2013)	Significantly positive*
	Cranfield et al., (2011)	Significantly positive*
Satisfaction with life	Schnettler et al., (2015)	Significantly positive*
Satisfaction with food related life	Schnettler and Grunert (2016)	Significantly positive*
	Schnettler et al., (2015)	Significantly positive*
Weight loss/ dietary concerns	Hur and Jang (2015)	Significantly positive*
	Nolan-Clark et al., (2011)	Significantly positive*
Lifestyle	Irene and Spiller (2014)	Mixed results
	Chen (2011)	Mixed results
Self-efficacy	Cranfield et al., (2011)	Significantly positive*
	Vassallo et al., (2009)	Mixed results
Information about functional food manufacturing process	*La* Barbera et al., (2016)	Mixed results
	Dean et al., (2007).	Mixed results
Diversification of meals	Tu et al., (2012)	Mixed results
	Labrecque et al., (2006)	Mixed results

Note: * significant at 5% level

2.8.2 Psychological factors

Psychological factors have been represented by several constructs. Table 2.7 provides a summary of some relevant studies. Among the relevant factors in this category are represented by antecedents such as General Perception and Attitude, Beliefs and Values, Motivation, Cognitive Structures, Trust/Confidence, Neophobia, Anxiety, Perceived Quality, Perceived Benefits, Perceived Healthiness, Perceived Risk, Perceived Susceptibility, Perceived Safety, Perceived Pleasantness, and Perception about Technology used in Functional Food production, (Kaur and Singh, 2017).

Table 2-7 Summary of Selected Studies that Include Psychological Factors

Antecedent	Selected author(s)	Key Results
General Perception and Attitude	Schnettler et al., (2016)	Positive The study on university students' satisfaction with food-related life reveals the antecedent of general perception significantly affects positive attitudes towards functional foods (with a prior assumption that attitudes towards functional foods are not homogeneous among consumers).
	Hung et al., (2017)	Positive The result implies the consumers' motivation and ability to process health claims on food products as well as attitudinal and cognitive determinants positively impacted by the general perception and attitude.
Beliefs and Values	Ding, Veeman, and Adamowicz (2015)	Positive Belief and value positively significant as determinants of consumers' choices of functional canola oil products with enhanced omega-3 content. In particular, negative perceptions of such food are offset by both generalized trust and trust in the food system. The purchase of functional foods is more likely for consumers with a positive belief in internal control over their health.
Motivation	Siegrist et al., (2015)	Positive A comparative study using samples of consumer from Germany and China. It investigates the consumers' willingness to buy functional foods. The study reveals that consumer from both countries with higher motivation on health tend to have a positive trust in the food industry.

Cognitive Structures	Barrena and Sanchez (2010)	Positive Using a means–end chain approach, the study investigates the consumer cognitive structure of a functional food among two different categories of household structure, (i.e. children vs. no children). The result suggests that households with children having a higher degree of abstraction in the cognitive structure. A stronger confidence- seeking tendency is also confirmed by the result.
Trust/ Confidence	Annunziata et al., (2016)	Positive A multivariate analysis on the investigation of behaviour of the parent's choice to purchase functional foods for their children confirms the positive effect of trust as one of the significant factors.
Neophobia	Siegrist et al., (2015) .	Negative The result suggests that a higher food neophobia among consumer in China significantly and negatively impacts on the acceptance of functional foods and beverages
Anxiety	Koteyko (2010)	Negative The study confirms the negative elements of diseases explained by health anxiety significantly influence the motivation towards the consumption of probiotic products as a preventative measure.
	Tu et al., (2012)	Negative The assessment of cultural influence on belief and attitude towards functional soy foods evidenced the negative impact of anxiety towards the consumption.
Perceived Quality	Jezewska and Krolak (2015)	Positive Using the Food Technology Neophobia Scale (FTNS), Perceived Quality is proven as one of the significant factors that positively impact the willingness to eat cereal products fortified with fibre.
Perceived Benefits	Dobrenova et al., (2015)	Positive The ingredient healthiness perception roles as a Perceived Benefit, positively affects consumer acceptance on functional foods. It is delivered through the promotion of functional ingredients and functional foods of Japanese products with probiotics.
	Cazacu et al., (2014)	Positive The nutritional benefits are one of the factors to positively impact the purchase intention of water buffalo milk products in Greece. The study utilised Theory of Planned Behaviour (TPB) as its framework.

	Rezai et al., (2014)	Positive The study utilised a structural equation modelling in an investigation of the influencing factors of purchase synthetic functional foods in Malaysia. The results from 2004 respondents reveals that the most significant factor to positively impact the purchase intention is perceived benefits followed by attitude and subjective norms.
Perceived Healthiness	Hung et al., (2017)	Positive The data collection from ten European countries: United Kingdom, Germany, The Netherlands, Spain, Slovenia, Czech Republic, France, Denmark, Greece, and Lithuania were used to assess the impact of health claim to the purchase of food products. With respondents of n = 5337, the result suggests that Perceived Healthiness provide a significant positive impact to the purchase intention.
Perceived Safety	Marina et al., (2014)	Positive The investigation of the buying behaviour and attitudes of young consumers (18-30 years old) suggests that Perceived Safety of functional foods has a positive impact. In particular, the study indicates that the belief of elements of healthier and safer to the functional foods than other products produce a significant positive result.
Perceived Pleasantness	Vassallo et al., (2009)	Positive The study assesses consumer willingness to use functional breads across four European countries. Perceived pleasantness is proven to provide positive impact as a predictor of such behaviour. Important findings from this study suggests that consumer view functional food product that associated with health claim to lower risk of diseases as just an ordinary food domain rather than alternatives to medicines.
Perception about Technology	*La* Barbera et al., (2016)	Positive The scales of assessment were taken from Food Technology Neophobia Scales (FTNS) for tomatoes enriched with lycopene. The positive results of willingness to pay for the functional food product, indicate that the technology together with a high level of knowledge are very effective.
Perceived Risk	Rezai et al., (2014)	Negative Perceived Risk is the manifestation of both perceived susceptibility and perceived severity from the Health Belief Model (HBM) constructs. The result suggests the consumer's intention to consume synthetic functional foods were significantly affected by the negative elements explained by the Perceived Risk.

Perceived Susceptibil ity	Vassallo et al., (2009)	Negative The result shows the negative elements in the Perceived Susceptibility of the Health Belief Model (HBM) significantly affect the consumer's willingness to use functional breads.

The Psychological Factor of General Perception and Attitude were investigated in many studies related to consumer behaviour towards healthy food, which among others include functional foods. Among the studies that produce a significant positive impacts of General Perception towards the consumption of functional foods, including by Schnettler and Grunert (2016), Hung et al., (2016), van der Zanden et al., (2015), Gajdos et al., (2015), Jezewska and Krolak (2015), Salleh et al., (2015), Büyükkaragoz et al., (2014), Marina et al., (2014), Cazacu et al., (2014), Tobin et al., (2014), Bechtold and Abdulai (2014), Ong et al., (2014), Rezai et al., (2014), Spiroski et al., (2013), Hirogaki (2013), Lau et al., (2012), Cornish (2012), and Carrillo et al., (2013). The positive impact of General Perception and Attitude in many previous recent studies implies that this factor can be used further in other contexts of investigation related to consumer behaviour towards functional foods.

Other Psychological Factors described in Table 2.7 also include Beliefs and Values. The related studies that employed this factor, found that it had a positive impact on consumer intentions. For example, Ding, Veeman, and Adamowicz (2015), found Belief and Value had a significant positive role as a determinant of consumer choice of functional canola oil products with enhanced omega-3 content. Other studies with positive results include Kraus (2015a, b), Hassan (2011a), Hassan (2011b), Pothoulaki and Chryssochoidis (2009), Verbeke (2006), Verbeke (2005).

The Psychological Factor of Motivation in functional food studies has revealed a positive impact on consumer intentions. This finding similarly obtained by Siegrist et al., (2015), Jezewska and Krolak (2015), Kraus (2015a, b), Brecic et al., (2014), Messina et al., (2008), Cornish (2012), Sparke and Menrad (2009), Krystallis et al., (2008), Ares and Gambaro (2007).

Studies that have included the Psychological Factors of Cognitive Structures have also revealed signs of a positive impact. For example, Barrena and Sanchez (2010) conducted a study to compare the outcome between household with children and no children towards the consumption of functional foods. The findings indicate positive results in both categories. Another positive outcome results also evidenced by Krystallis et al., (2008).

Next, the Psychological Factor of Trust/Confidence has been utilised by Siegrist et al., (2015), Annunziata et al., (2016), Dolgopolova et al., (2015), Gajdos et al., (2015), Ding et al., (2015), Spiroski et al., (2013), Loizou et al., (2013), Lalor et al., (2011a), Barrena and Sanchez (2010), Annunziata and Vecchio (2010), Pothoulaki and Chryssochoidis (2009), Sparke and Menrad (2009), Urala and Lahteenmaki (2007) and Siegrist et al., (2008). For example, Annunziata et al., (2016) suggested that Trust/ Confidence positively affects the parent's choice to purchase functional foods for their children. Hence, it can be concluded that further assessment of this factor to various types of functional foods may necessary.

Studies that have included the Psychological Factor of Neophobia have revealed that it has a negative impact on the consumption of healthy food. These studies include *La* Barbera et al., (2016), Stratton et al., (2015), Siegrist et al., (2015), Jezewska and Krolak (2015), Dolgopolova et al., (2015), Menezes et al., (2011), Siegrist et al., (2008). Therefore, future studies should look into this psychological barrier and to find a solution to minimize the impact of neophobia.

A summary of the impact of the Psychological Factor of Anxiety on the consumption of functional foods has been included in some studies. These include Tu et al., (2012), and Koteyko (2010). The summary is described in Table 2.7. The study by Koteyko (2010) confirmed the negative impact of disease explained by health anxiety significantly influences the motivation towards the consumption of probiotic products.

Studies that have investigated the Psychological Factor of Perceived Quality reveal both positive and negative results impacted on consumer behaviour. Table 2.7 summarises the results of selected studies by Kraus (2015a, b), Jezewska and Krolak (2015), Loizou et al., (2013), Markovina et al., (2011), Krystallis et al., (2008), and Cox et al., (2004).

Interestingly, positive results have been obtained utilising Perceived Benefits in several consumer behaviour studies as summarised in Table 2.7. Among the studies that have found a positive impact is that of Dobrenova et al., (2015). The findings suggest that the perceived benefit of ingredient healthiness positively affects the promotion of functional ingredients and functional foods of Japanese products with probiotic properties. Other studies with positive results include Cazacu et al., (2014), Annunziata and Vecchio (2010), Labrecque et al., (2006), Rezai et al., (2014), Markosyan et al., (2009), Verbeke (2006), Lyly et al., (2007) and Niva and Makela (2007). Such positive results of Perceived Benefits indicated that this factor is a significantly important determinant of the consumption of functional foods. Hence, the results suggest that further research on functional food should include the construct of Perceived Benefits.

An additional Psychological Factor is Perceived Healthiness. Table 2.7 summarises previous studies utilising this factor. Among the scholars that assessed this factor and found a positive impact are Hung et al., (2016), Hur and Jang (2015), Je zewska-Zychowicz and Krolak (2015), Rezai et al., (2014), Marina et al., (2014), Cornish (2012), Annunziata and Vecchio (2011), Saba et al., (2010), Vassallo et al., (2009), Ares and Gambaro (2007). In summary, Perceived Healthiness has a significant positive impact on the consumption of functional foods in several studies.

The Psychological Factor of Perceived Safety also provides significant positive results as indicate in Table 2.7. Such studies include Kraus (2015a, 2015b), Rezai et al., (2014), Marina et al., (2014), Urala and Lahteenmaki (2007), Wilcock et al., (2004), Urala and Lahteenmaki (2003). In summary, Perceived Safety positively influences consumer intentions towards functional food.

Table 2.7 also summarises studies that have included the Psychological Factor of Perceived Pleasantness. These include Vassallo et al., (2009) and Krystallis et al., (2008). The results indicated that Perceived Pleasantness has a significant positive impact on the consumer. For example, Vassallo et al., (2009) suggested Perceived Pleasantness has a positive impact on the consumption of functional breads. Such a positive result can be used to compare with other types of functional foods in future studies.

The assessment of the impact of Psychological Factors of Perception of Technology used in functional food production, was conducted by *La* Barbera et al., (2016), Masson et al., (2016), Bruschi et al., (2015), Jezewska and Krolak (2015), Krystallis and Chrysochou (2012). The results summarised in Table 2.7 indicate Perception of Technology has a positive impact on the consumption of functional foods.

With respect to the Psychological Factor of Perceived Risk, the results suggest it has a significant negative impact. Table 2.7 summarises selected studies that have utilised this factor. These include studies by Rezai et al., (2014), Markosyan et al., (2009), Vassallo et al., (2009), O'Connor and White (2010), Niva and Makela (2007). For example, Rezai et al. (2014) found Perceived Risk associated with a certain disease, has s significant negative impact on the consumption of synthetic functional foods.

A similar outcome has been established in the case of the Psychological Factor of Perceived Susceptibility. For example, in Table 2.7, the assessment by Vassallo et al., (2009) found the Perceived Susceptibility of risk of disease has a significant negative effect on the consumption of functional bread. Therefore, Perceived Susceptibility is a relevant construct to be employed in further research into functional foods. Perceived Susceptibility is one of the main constructs in the Health Belief Model (HBM). A review of other constructs in the HBM is further discussed in Section 2.10.5.

2.8.3 Cultural and Social factors

The relevant Cultural and Social factors include Role of doctors/dieticians, Role of family and friends, and Cultural and Social norms (Kaur and Singh, 2017). The related selected studies that include the Cultural and Social factor is summarised in Table 2.8.

Table 2-8 Cultural and Social Factors

Antecedent	Key Results
The role of doctors/ dieticians	Positive The study examined consumer confidence towards the effort to enforce the fortification of vitamin D in food products. The role of physician/ doctor in acknowledging such an effort to positively impact consumer acceptance (Sandmann et al., 2015). Other studies with positive result Patch et al., (2005), Loizou et al., (2013).
Role of family and friends	Positive The study assesses the consumer acceptance of Omega-3 enriched functional food product in Australia. The focus on overweight consumer in order to correct their daily diet by encouraging them to consume functional foods. The findings indicate that the family and friends are important to positively influence the consumer (Patch et al., 2005). This positive result also supported by Schnettler et al., (2015).

Cultural and Social norms	Positive The study assesses the willingness to buy functional foods based on its health benefits. The survey in one of South American countries, Chile, found that the culture of ethnic origin in the country has a positive response towards the satisfaction with functional food products related life. In particular, they are more inclined to enjoy the food-related life (Schnettler et al., 2015). Negative Using a psychosocial-anthropological approach, the study assesses the French consumers' perceptions of nutrition and health claims. The result shows the French consumer has negative views on food fortification in products such as yoghurt and fortified milk. Typically, the French culture sees the health claim on functional food products is less credible, as oppose to American (Masson et al., 2016).

Among previous studies that found a positive impact for the Role of family and friends were Schnettler et al., (2015) and Patch et al., (2005). The results suggest that the encouragement and recommendation of family and friend positively impact the acceptance of functional foods. Thus, in relation to the present study, the Role of family and friend would be suitable to be further assessed as this element is included as one of the items in the construct of Cue to Action.

A positive impact also identified for the Role of doctors/dieticians in studies by Sandmann et al., (2015), Loizou et al., (2013), Patch et al., (2005) in Table 2.8. The findings suggest that the role of doctors/ dieticians would positively influence the consumption of functional food. This element also suitable to be included in the present study as it is one of the items that explain the construct of Cue to Action.

The studies that include the factor of Cultural and Social Norms produced mixed positive and negative results. The studies include Masson et al., (2016), Salleh et al., (2015), Tu et al., (2012), Hassan (2011a), Hassan (2011b), Saba et al., (2010), Wilcock et al., (2004), Frewer et al., (2003). For example, Schnettler et al., (2015) found that the culture of ethnic origin in the country has a positive impact on satisfaction with functional food products.

Besides that, Geographic location also relevant under the factor of Cultural and Social Factor. Several studies have examined the impact of Geographical Location. This is included in studies by Gajdos et al., (2015), Loizou et al., (2013), Hirogaki (2013), Sparke and Menrad (2009), Van Wezemael et al., (2014). The results suggest that different geographic location may produce different outcomes in terms of consumer acceptance of the consumption of functional foods. In some cases, Gajdos et al., (2015) has proved that different responses may occur in different regions of the same country.

In a related development, the factor of Social Status has been included in studies by Schnettler et al., (2015), Cazacu et al., (2014), Wilcock et al., (2004), Frewer et al., (2003). The results are mixed. For example, Hassan (2011b) suggested that perceptions of functional foods vary according to the social status of individuals. The assessment of the influence of social status is important to understand consumers' perceptions, particularly for those living in multicultural societies since their personal values are shaped by their culture and social status. The result concludes that different social status may translate into different perceptions of functional food products.

In summary the Culture and Social factors have revealed various outcomes. Thus, it is essential to consider these elements in further research on consumer behaviour in the context of functional foods. For example, in relation to the context of the present study, the role of doctors, family and friends would be suitable to be further investigated, utilising a construct of Cues to Action.

2.8.4 The Product factors

The product factors include Ingredients/Functional Components, Base/Carrier Product, Convenience, Taste and other sensory measures, Naturalness, Healthful Properties, Brand, Labelling, Packaging, Health Claims, Regulation, Domestic Production, Communication Channel, Innovativeness (Kaur and Singh, 2017). The summary of studies of the Product factors is presented in Table 2.9.

Table 2-9 The Product Factors

Antecedent	Key Result
Convenience	Positive In the study that focuses on ageing consumer, the research suggests that convenience and affordability are identified as important elements to associate with healthy products. The integration of these attributes would positively improve the product acceptance in the market (Collins and Bogue, 2015) This outcome also corroborated by similar results of Marina et al., (2014), Labrecque et al., (2006), Krystallis and Chrysochou (2012), Tu et al., (2012).
Naturalness	Positive The assessment gathers the data from four different countries, Belgium, The Netherland, Italy and Germany (n=2057). The study of consumer attitude and attention towards novel food is assessed. In this study, a novel product of a new type of processed meat reveals that the consumers purchase intention positively influenced by the preference for naturalness over chemical additives, together with other identified attributes Hung et al., (2016). This positive result corroborated by other studies with similar positive results/ outcomes by Loizou et al., (2013), Carrillo et al., (2013). .
Healthful Properties	Positive The study by Kraus (2015a) suggests the attribute of 'healthful properties' positively able to influence the decision to buy and consume functional foods. The items are divided into two groups. The first group consists of items that explain the prevention of health problem. They include "reduces the risk of cardiovascular diseases", "reduces the risk of diseases of the stomach and intestines", "reduces the risk of certain cancers", "reduces the risk of osteoporosis", "and reduces the risk of dementia". The second group consists of items that explain the improvement of the body functions. It's represented by items such as "strengthens hair and nails", "helps to maintain a youthful appearance", "improves memory", "helps to maintain correct body weight", "improves physical condition", "improves the functioning of motor system", "strengthens eyesight". The findings suggest the attribute of 'healthful properties' significantly influence positive responses from the consumers. The positive impact of the factor of Healthful Properties towards consumption of functional food also evidenced similarly in other studies by Kraus (2015b), Loizou et al., (2013), Larue et al., (2004), Marette et al., (2010), Krystallis and Chrysochou (2012).
Brand	Positive Oliveira et al., (2016) investigated the consumer attention to the functional food product label (probiotic milk). The findings suggest the area of interest (AOI) among consumer to the label can be ranked accordingly. The first identified attribute in the rank is brand, followed by nutritional label, recommendation, type of product, net content, health claim, manufacturer, and lastly, the shell life date. Such findings provide information to the manufacturers to review their product label. Based on these results, more priority should be given to brand. Hence extensive research should be considered for other categories of functional food products as well. The similar positive findings obtained by Annunziata and Vecchio (2013), Hassan (2011b), Krystallis and Chrysochou (2011).
Packaging	Positive Fiszman et al., (2015) investigated consumers' perceptions of the packaging of healthy products. In particular, the assessment focuses on package image and weight loss-related information. The findings reveal that sufficient information is a must as the consumer formed negative perceptions towards the product when the information is insufficient. In particular, health benefit-related image on the product's package rather than verbal information positively influence good perception among consumer. This result informs the marketing manager of the importance of the good product package. Other related recent studies corroborate with positive results/ outcomes Kraus (2015a, b), Yu and Bogue (2013).
Innovativeness	Positive The study assesses consumer motivation to use health claims in considering their food choices. The findings suggest utilising innovative ways, hence would positively change the consumer perception and would eliminate negative association between healthiness and tastiness of healthier food products such as functional foods (Hung et al., 2016).
Ingredients/ Functional Component	Mixed Lu (2015) assesses perceived carrier ingredients towards purchase intention of functional food product. The moderator to predict the consumers' purchase intentions are nutritional knowledge and health claim. The analysis utilised experimental studies applied on 30 types of functional foods. The findings suggest that consumer with higher nutritional knowledge would less rely on information on carrier ingredients

	when deciding to purchase functional food products. Whilst consumers with a lack of nutritional knowledge are heavily reliant on perceived carrier ingredients prior to make a decision. Such findings would urge marketers to differentiate their strategies towards different levels of nutritional knowledge among consumers. In addition, more emphasis should be given to the information on carrier ingredients as to help and encourage consumer with less nutritional knowledge, particularly in their decision-making process of purchase intention. This finding corroborated by similar results by other related recent studies concerning ingredients/ functional component by Bitzios et al., (2011), Kraus (2015a, b), Hellyer et al., (2012), Bechtold and Abdulai (2014), Ding et al., (2015), Krystallis and Chrysochou (2012), Cornish (2012),
Base/Carrier Product	Mixed Yu and Bogue (2013) utilise the sequential mixed research approach, which combined of qualitative and quantitative methods, the study of market-oriented knowledge conducted to develop new fermented cereal beverages functional food products. The findings indicate the consumer positively gives their concern on attribute of a base / carrier product (i.e. oats, wholegrain oats, organic oats, rice) together with other attributes such as product description, flavour, health/nutrition claim, packaging and price.
Taste and other sensory measures	Mixed Marina et al., (2014) examined the attitude and buying behaviour of consumer (aged 18-30) to the purchase of functional foods. The young consumer believes that the functional food products are safer and healthier than ordinary food products. The findings from a survey of 570 respondents suggest that factor such as taste significantly important in their consideration to purchase the functional food product. Besides that, the price / quality ratio also essentially matters to the respondents. Other related recent studies concerning taste/ other sensory measures produced mixed positive and negative impacts by Gajdos et al., (2015), Yu and Bogue (2013), Loizou et al., (2013), Lawless et al., (2012), Tu et al., (2012), Krystallis and Chrysochou (2012), Cornish (2012), Chung et al., (2011), Markovina et al., (2011), Menezes et al., (2011).
Labelling	Mixed Dolgopolova et al., (2015) in their study assesses consumers' perceptions of functional foods in a cross-cultural context. The findings suggest that consumer in Germany has a mistrust towards the functional food label. This is due to their experiences with several food scandals which happen in the country such as, salmonella in chicken products (Poppe and Kjarnes, 2003). Nevertheless, in order to overcome this issue, the research found that instead of solely relying on the food label information, highly respected stakeholders should come forward to support and build consumer confidence. These would include an acknowledgement of healthier nutrition ingredients of functional food product by medical doctors, nutrition advisors, consumer groups and research institutions. Meanwhile, the utilisation of the factor of Labelling produces mix result in various other studies by Hirogaki (2013), Oliveira et al., (2016), Kraus (2015a, b), Gajdos et al., (2015), Colby et al., (2010), Nolan et al., (2011).
Regulation	Mixed The marketing of functional food products is challenging as the EU legislation is yet to recognise the health claim of the products. Thus, the future of functional foods is at stake as it is struggling to convince the consumer. Such situation makes the needs to extensive research on the factors that would influence the consumption of the functional food products (Bech-Larsen and Scholderer (2007). Other related recent studies concerning regulation assessed by Niva and Makela (2007).
Communication Channel	Mixed Vella et al., (2014) suggest that in order to promote functional food consumption, the awareness and knowledge of the health claim should be improved. In achieving such objectives, related information of the products should be informed and communicated widely to the consumer. To be effective, extensive communication channels should be considered, i.e. through newspapers, magazines, books, food labels. Other related recent studies concerning communication channel Bruschi et al., (2015), Sandmann et al., (2015), Salleh et al., (2015), Bornkessel et al., (2014), Loizou et al., (2013), Krystallis and Chrysochou (2012)
Health Claims	Mixed The research investigates consumer attention to the functional food label. The findings suggest that the health claim of the product was not comprehensively viewed by the buyers. Instead, the consumers are more prioritised the brand familiarity rather than the health claim, (Oliveira et al., 2016). Meanwhile, Vecchio et al., (2016) assesses consumers' willingness to pay for conventional, organic and functional yoghurt. The findings suggest that additional information on health claim will improve perceived value for the yoghurt functional food.

	The study assesses consumer willingness to pay for functional food in Germany. The findings reveal that consumers are sceptical of the health claims of functional dairy products (Bechtold and Abdulai, 2014) The study assesses the possibility of products' health claim to influence the price and product choice among consumers. Despite the product's health claims potentially effective as a cue to attract consumers in many developed countries, its application is subject to government regulation which involve a long process of certification which is time consuming and very costly. The findings suggest that a certified health claim will affirmatively strengthen the purchase intention, thus would increase the value and the price of the food products. Such findings imply that health claims should be certified prior to the entrance in the international market, (Hirogaki, 2013). In a related development, mixed results can be found in various studies concerning the impact of Health Claim, i.e. Masson et al., (2016), Lu (2015), Vella et al., (2014), Van Wezemael et al., (2014), Annunziata and Vecchio (2013), Spiroski et al., (2013), Yu and Bogue (2013), Lawless et al., (2012), Lalor et al., (2011a), Lalor et al., (2011b), Krystallis and Chrysochou (2011), Bitzios et al., (2011), Saba et al., (2010).

From Table 2.9, the studies reveal a positive effect in the case of Convenience, Naturalness, Healthful Properties, Packaging, and Innovativeness. For example, the factor of Convenience, assessed by Collins and Bogue (2015) revealed a positive effect on consumer acceptance of functional foods. Other similar positive results also obtained by Marina et al., (2014), Labrecque et al., (2006), Krystallis and Chrysochou (2012), Tu et al., (2012).

The factor of Naturalness was examined by Hung et al., (2016), Loizou et al., (2013), and Carrillo et al., (2013). The findings suggested that the factor had a significant positive impact on consumers' purchase intentions towards functional foods.

The factor of Healthful Properties was revealed to have a significant positive impact in many previous studies such as those by Kraus (2015b), Kraus (2015a), Loizou et al., (2013), Larue et al., (2004), Marette et al., (2010), Krystallis and Chrysochou (2012). Since functional foods are associated with health claims, this outcome suggests that the factor of Healthful Properties should be given more attention by researchers.

The factor of Brand has also been found to have a positive impact on consumer purchase intentions in the studies of Oliveira et al., (2016), Annunziata and Vecchio (2013), Hassan (2011b), Krystallis and Chrysochou (2011). Specifically, an established brand is proven to attract positive attention as the consumers trust well known and established brands.

Another positive outcome is revealed in the case of the factor of Packaging. In studies by Fiszman et al., (2015), Kraus (2015b), Kraus (2015a,2015b) and Yu and Bogue (2013). Literally, consumers place a high degree of confidence in a product with a good appearance in terms of informative and attractive packaging.

The assessment conducted by Hung et al., (2016) identified the positive impact of Innovativeness on consumer acceptance of functional food products.

Meanwhile, Table 2.9 also provides evidence of mixed results. The mix of positive and negative outcomes includes the factor such as, Ingredients/Functional Component, assessed by Kraus (2015a, b), Lu (2015), Bitzios et al., (2011), Hellyer et al., (2012), Bechtold and Abdulai (2014), Ding et al., (2015), Krystallis and Chrysochou (2012), Cornish (2012), Cranfield et al., (2011). For instance, Lu (2015) found that consumer with higher nutritional knowledge are not influenced by the information of the ingredients provided by the products. Instead, they are more reliant on scientific information from professionals.

Mixed results also occur in the case of the factor of Base/Carrier Product. Among the previous studies conducted by Fiszman et al., (2015), Bruschi et al., (2015), Kraus (2015a), Kraus (2015b), Lu (2015), Yu and Bogue (2013), Annunziata and Vecchio (2013), Krystallis and Chrysochou (2012), Cornish (2012). For example, Yu and Bogue (2013) suggested that types of base/carrier of functional food products such as wholegrain or other types of cereal would determine the level of acceptance among consumer towards the functional food products.

In the case of Taste and other sensory measures, the results also mixed. Among others, it was assessed by Gajdos et al., (2015), Marina et al., (2014), Yu and Bogue (2013), Loizou et al., (2013), Lawless et al., (2012), Tu et al., (2012), Krystallis and Chrysochou (2012), Cornish (2012), Chung et al., (2011), Markovina et al., (2011), Menezes et al., (2011). For example, Marina et al., (2014) found that good taste is one of the main concerns of young consumers when considering to purchase functional foods. Contrary to this, Tu et al. (2012) found that taste does not influence the consumption of functional foods.

Furthermore, the factor of Labelling also produces mixed results. Studies on this factor, in the context of the consumption of functional foods, have been conducted by Oliveira et al., (2016), Kraus (2015a, b), Dolgopolova et al., (2015), Gajdos et al., (2015), Hirogaki (2013), Nolan et al., (2011), Colby et al., (2010). In the case of functional food informative labelling with detailed information on the product such as ingredients and nutritional data are provided to develop higher confidence among consumers. However, Dolgopolova et al., (2015) found that consumers in Germany are yet to rely on labelling in deciding the purchase of functional foods.

Studies on the factor of the Regulation was conducted by Bech-Larsen and Scholderer (2007) and Niva and Makela (2007). The conclusion can be made that Regulation has a significant role in building consumer trust towards functional food products. This issue is sensational because much scientific research has supported the health claims of functional food products. Nevertheless, the EFSA has yet to certify health claims of the functional ingredients in the products.

Studies of the factor of Communication Channel have produced mixed results. This factor has been assessed by Bruschi et al., (2015), Sandmann et al., (2015), Salleh et al., (2015), Vella et al., (2014), Bornkessel et al., (2014), Loizou et al., (2013), Krystallis and Chrysochou (2012). For example, Vella et al., (2014) suggested that communication channels to deliver health related information on the functional food products should be communicated using a wider selection of various media channels.

In the case of the factor of Health Claims, the results are mixed. The studies include Masson et al., (2016), Oliveira et al., (2016), Vecchio et al., (2016), Lu (2015), Bechtold and Abdulai (2014), Vella et al., (2014), Van Wezemael et al., (2014), Annunziata and Vecchio (2013), Spiroski et al., (2013), Hirogaki (2013), Yu and Bogue (2013), Lawless et al., (2012), Lalor et al., (2011a), Krystallis and Chrysochou (2011), Bitzios et al., (2011), Lalor et al., (2011a), Lalor et al., (2011b), Saba et al., (2010). For example, Oliveira et al., (2016) found that consumers are not concerned about the health claim of functional food products, rather they focus more on the brand. Inversely to that, Vecchio et al., (2016) found that the factor of Health Claim positively influenced the consumption of yoghurt. However, Bechtold and Abdulai (2004) contradicted this result by suggesting that consumers are sceptical about the Health Claim of functional food products.

2.9 Dependent variables

Table 2.10 presents a list of studies on the Personal Factor represented by the antecedent of Willingness to Use functional foods. The results indicate that several studies reveal significant positive results. For example, the study by *La* Barbera et al., (2016) indicated that a higher willingness to pay for functionalised healthy food such as tomatoes enriched with lycopene than for conventional. While in another study by Vecchio et al., (2016) revealed that the consumer perceived value of the functional yoghurt increases with the additional information about a specific health claim attached to the functional food products, thus positively impacts the willingness to pay.

Table 2-10 The Willingness to Use/ Pay

Author(s)	Results
La Barbera et al., (2016)	Positive
Vecchio et al., (2016)	Positive
Van Wezemael et al., (2014)	Positive
Lawless et al., (2012)	Positive
Hellyer et al., (2012)	Positive
Dobrenova et al., (2015)	Positive
Gajdos et al., (2015)	Positive
Jezewska and Krolak (2015)	Positive
Markovina et al., (2011)	Positive
Loizou et al., (2013)	Positive

Meanwhile, there are many studies in the context of functional foods assessed the dependent variable of Intention. Table 2.11 provides a summary of the results of related selected studies concerned with the Personal factor of Purchase Intention. Among the recent studies assessing the Purchase Intention includes Hung et al., (2016), Kraus (2015a, b), Lu (2015), Irene and Spiller (2014), Van Wezemael et al., (2014), Lau et al., (2012), Hirogaki (2013), Chung et al., (2011), Labrecque et al., (2006), Hur and Jang (2015), Siro et al., (2008), Tobin et al., (2014). Previous findings of many recent studies showed various factors contributed to a significant result of the Purchase Intention. Based on these facts, further investigation of other factors that possibly influence the consumer Purchase Intention is needed. It can be summarised that the gaps of investigation to understand the impacts of various psychological factors towards Purchase Intention, is still huge and may produce a variety of significant impacts. Thus, it is relevant to further utilise the dependent variable of Intention in the present study.

Table 2-11 The Purchase Intention

Author(s)	Results
Hur and Jang (2015)	The assessment of relationship between perceived healthiness, anticipated guilt and pleasure, and behavioural intentions (e.g. purchase, spreading positive word-of-mouth, and recommending the food). The results suggest that behavioural intention is significantly influenced by the anticipated pleasure. While the relationship of perceived healthiness and behavioural intentions mediated by the anticipated pleasure.
Kraus (2015a)	The consumer intention towards the consumption of functional foods positively affected by factors such as quality attributes (information on healthful properties and nutritional value of the product, attributes of taste, health and safety, practical packaging, freshness, purity and naturalness. In addition, other significant factor is health benefits (prevention of health problems, strengthening of the body and improvement of its functions). Furthermore, the study suggests that functional components (vitamins and minerals, dietary fibre and Omega-3 fatty acids) also impacted positive behavioural intention to the consumer. The study also reveals the best carriers of functional ingredients that positively impact purchase intentions are cereal products, dairy products and meat products.
Lu (2015)	The results suggest the perception of functional carrier-ingredient such as antioxidant, mineral, omega 3, probiotic and vitamin, positively impact to the consumer purchase intention towards functional food products. Other factors such as consumers' prior nutrition knowledge and provided health claim, roles as moderators to the significant result.

In summary, the related various factors which have been discussed in this section provide various mixed results among studies. Such findings are interesting as the validity of the results of the attributes can further re-examined to establish its consistency over the time. In other perspective, determinants/ antecedents with significant results can also be considered in the current study.

2.10 Selected consumer behaviour models of consumer behaviour applied to food

Based upon the discussion made earlier in the previous section that elaborates four categories of relevant determinants, the emphasis of this study is given to focus on psychological factors. The focus on psychological factor is justified by the earlier discussion which emphasis on the health properties of the functional food products which act as preventative elements towards certain disease. The individual perceptions towards related diseases should be comprehended psychologically. In studying consumers' behaviour towards functional food products, several frameworks could be followed, derived from attitudinal and health-related research. In particular, it would be advantageous for adapting to the double perspective of functional foods (as food items and bearers of pharmaceutical-health promises) to recognise both health and non-health related aspects. Among the theories that draw upon the social psychology literature are the Expectancy Value Theory (EV), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Protection Motivation Theory (PMT) and the Health Belief Model (HBM), and a recent model which developed by Boluda and Capilla (2017).

2.10.1 Expectancy Value Theory (EV)

The Expectancy Value (EV) theory was created by Martin Fishbein (1967) to predict individual response towards objects or actions. This theory has been widely used to study consumer behaviour on food choice in general (e.g. Peak, 1955; Fishbein, 1967). The assumption of the EV theory is that in the event of a person given a choice between two objects, the person would likely to maximize and to choose the desirable potential outcome and at the same time to minimize an undesirable potential outcome. The benefits of the product would stimulate the product choice.

Fishbein (1967) suggested that a smaller part of the object would provide a large perceived importance of the object. This approach suggests that an individual's attitude towards a certain object, i.e. food product, is determined by the importance/ salient underlying belief towards that object (Ajzen and Fishbein, 2000). It can be calculated by multiplying (weighting) the perceived likelihood of important/ salient outcomes occurring with the attached value of the outcomes. The model is presented in Equation 2.1.

Equation 2-1 The Expectancy Value Model

$$\textbf{Attitude} = \sum_{i=1}^{n} b_i e_i$$

With reference to the equation 2.1, b represents the outcome belief, whilst e represents the evaluation of the belief. The multiplication of these two elements determines the weighted behavioural beliefs. Furthermore, i refers to a particular attribute, whilst n refers to the number of attributes which is important or salient at any one time. The overall evaluation or attitude is the sum of important or salient beliefs (Shepherd and Raats, 2006).

In applying this formula, an example is when a person is given choices between two types of yoghurt (i.e. A and B), the person might judge the yoghurts having great taste, rich with beneficial healthy live cultures and being an established brand. Each of these attributes would then be judged and weighted by the person for a total evaluation between these two products. The product with high positive weightings will be chosen by the person. At this juncture, it can be concluded that, instead of a realistic description of the processes, the formation of individual attitude is just a representation. In this sense, “in actuality, although the investigator does perform these computations, people are not assumed to do so. We merely propose that attitude formation may be modelled in this fashion” (Ajzen and Fishbein, 2000, pp. 7–8).

With respect to understanding consumer behaviour towards food, since it is understood that the outcome of consumer behaviour may influenced by the salient judgement at the time, which the person might consider (Fishbein and Ajzen, 1975), it is important to note that such behaviour or perception also influenced by socially transmitted information apart from the person experience with the food. For example, social information about healthy food may also be considered in a person’s perception / evaluation process. Another factor that would also influence an individual is based upon the culture associated with the food. The theory provides general thought of the psychological process of how an individual makes a decision and several studies have employed this theory. For example, a study by Towler and Shepherd (1992) utilised EV for a feedback on four groups of food that contain excessive fat (i.e. fried foods, dairy products, meat products, and meat). The important/ salient belief from the study that derived the perception is ‘healthy’, ‘fat’, ‘good taste’, ‘expense’ ‘protein’ and ‘convenience’. Among these underlying salient elements, ‘taste’ and ‘health’ were given high priority by individuals. Such outcome evidenced that in understanding consumer behaviour towards food products, behavioural beliefs would underpin individual attitudes.

The conclusion from the study by Towler and Shepherd (1992) was also supported by other similar research conducted by the UK government. The research reveals that salient beliefs have influenced individuals in their food choice (Department of Health, 1992).

The indirect effects of attitudes on behaviour

After EV theory was utilised in many subject areas, Conner and Armitage (1998) extended the findings about the indirect effects of attitudes on behaviour.

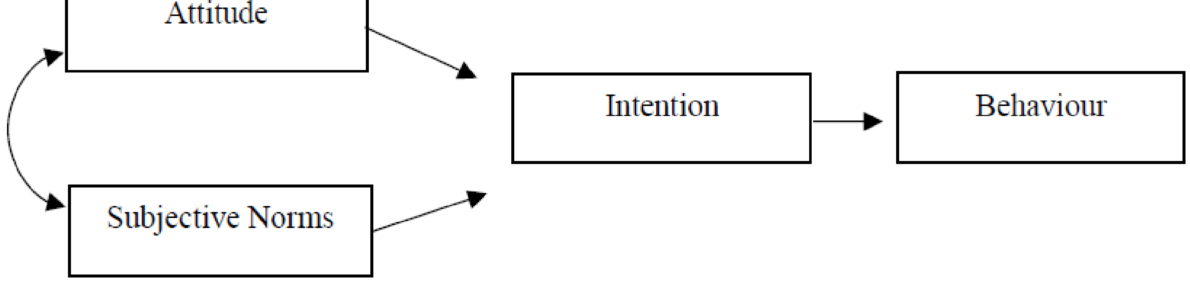
> "It suggests an indirect link between attitudes and behaviour, proposing behavioural intention as a mediating variable. Behavioural intention is defined as the motivation required to perform a particular behaviour: the more one intends to perform behaviour, the more likely will it be undertaken".
>
> (Shepherd and Raats, 2006, p. 46)

The causal link between the salient behaviour beliefs, intention, behaviour and attitude, explicitly conceptualised the idea in a theoretical framework of studies to understand consumer behaviour on food which applied elements from the Theories of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). Hence, these theories are discussed in the material that follows.

2.10.2 The Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) was developed by Ajzen and Fishbein in 1980. The theory is created by expanding the element of attitude which has been studied in the Expectancy Value Models previously. The formulation of TRA is based on solution of finding the discrepancy between attitude and behaviour of an individual. In particular, the TRA has a capacity that able to see an individual voluntary behaviour. Figure 2.3 presents the schematic diagram of the TRA.

Figure 2-3 The Theory of Reasoned Action (TRA)



Source: Ajzen and Fishbein, (1980)

The TRA has been applied in various research related to consumer behaviour and food. Lennemas et al., (1997) utilised TRA and described factors perceived as important in their food choice includes quality/ freshness, price, taste, healthy eating and family preferences. Petrovici et al., (2004) found that beliefs about health and quality significantly correlated with the attitudes towards food choice. Prior to that, many previous research also successfully applied TRA in various contexts of social psychology and food choice (Shepherd and Stockley, 1985, 1987; Tesser and Shaffer, 1990; Tuorila and Pangborn, 1988; Shepherd, 1988, 1989; Tuorila, 1987).

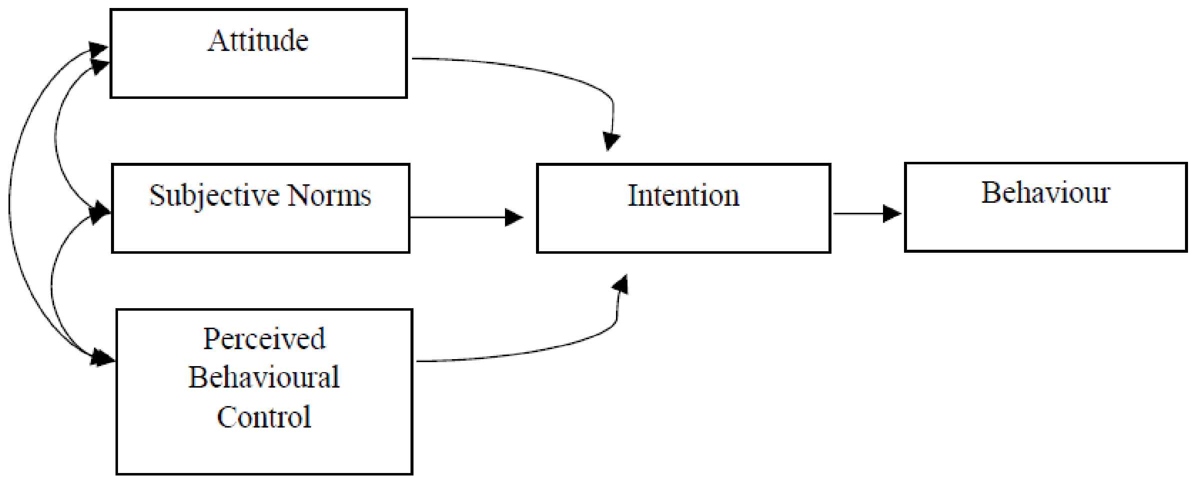
In the specific context of functional foods, the utilisation of TRA as a base framework by previous study is very limited. For example, Poulsen (1999) utilises TRA in the assessment of Danish consumer attitude towards functional food product (a dairy product and a bread product, enriched with three different substances i.e. soluble food fibre, calcium and vitamin D, and omega- 3.

Since the dimensions of the independent variable of the TRA are limited to Attitude and Subjective Norms that effect the Intention and Behaviour, a single application of this theory may not provide wider consumer perceptions. Nevertheless, the attributes of this theory can be useful by incorporating them with other attributes from other selected theory. In the related development of the TRA, such limitation has contributed to the creation of the Theory of Planned Behaviour (TPB) which offers wider perspectives.

2.10.3 Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (Ajzen, 1991) derived from the extended version of the Theory of Reason Action (TRA). The major weakness of TRA is identified by the manifestation of individual behaviour which is not fully voluntary and in control. Due to this issue, the Perceived Behavioural Control has been included in the TRA model to form the Theory of Planned Behaviour (TPB). Precisely, the properties of the TPB try to get a deliberate behaviour of an individual. Figure 2.4 presents the schematic diagram of the Theory of Planned Behaviour.

Figure 2-4 The Theory of Planned Behaviour



Source: Ajzen, (1991)

The TPB has widely been used in previous research related to consumer behaviour on foods and health. For example, Patch et al., (2005), used the TPB represented by the constructs of - Attitudes, Perceived Behavioural Control, Subjective Norms and Intention. The study used the TPB framework to measure intentions to the consumption of omega-3 enriched novel foods. Significant determinants of Attitude were found in the model that significantly influenced individual' intention to the consumption of such foods, whilst Subjective Norms and Perceived Behavioural Control were not significant. Anderson et al., (1998) argued that although the application of the TPB theory in the context of food choices are widely used, its utilisation in health/wellbeing related circumstances is limited. Specifically, it does not capture the health psychological dimensions related to health claims of many food products.

Therefore, by considering the weakness of the TPB in studying consumer health behaviour, it is more appropriate to utilise the Health Belief Model (HBM) of Rosenstock (1974), which addresses components of the health wellbeing. The use of HBM would complement much of the previous research which relies only on the TPB framework to study consumers' behaviour in many areas. Precisely HBM complements as it contains attributes that suitable to explain food and health claim.

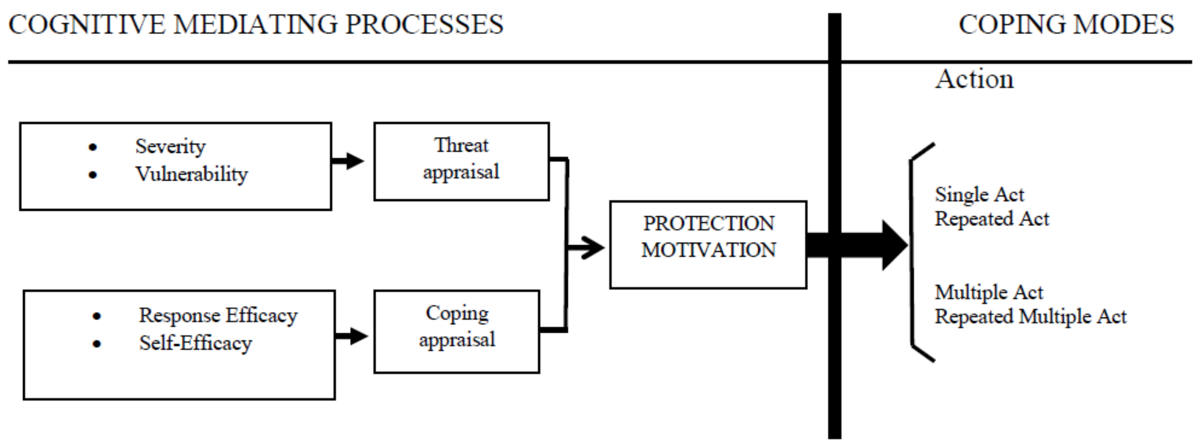
2.10.4 Protection Motivation Theory

As functional foods deliver health benefits to consumers, another relevant theory that focusses on psychological aspects is Protection Motivation Theory (PMT). The model is presented in Figure 2.5. The theory was formulated by Rogers (1975) initially, to predict how individuals respond to threats. Precisely, the core assumption of PMT is explained by three important components of fear, i.e. firstly, the magnitude of noxiousness of a depicted event, secondly, the probability of the event to occur, and thirdly, the efficacy of having a protective response to such fear. These attributes create the corresponding cognitive appraisal processes. Consequently, it will mediate the changes of individual attitude. Since the theory is very conservative with lack of generality, the theory was then being revised.

There are four factors being used to explain individual behaviour in the PMT. The first one is Severity of a threatening event. The second one is the perceived probability of the occurrence, or Vulnerability. The third one is the efficacy of the recommended preventive behaviour, known as the Response Efficiency. Whilst the fourth factor is perceived Self-Efficacy.

The PMT theory was extended in 1983 in order to make it generally applicable which roles may communicate persuasively which emphasis on the cognitive processes to mediate change in individual behaviour. The fundamental ideas in the revised version of the PMT were developed by Lazarus and Folkman (1984).

Figure 2-5 The Protection Motivation Theory (PMT)



Source: Rogers (1983)

Two main elements in this theory are Threat appraisal and Coping appraisal. The dimension of Threat appraisal explains the level of seriousness/ severity of a certain condition or situation. The second dimension Coping appraisal explains the individual behaviour feedback or response to the situation or condition. Coping appraisal involves two determinants: Response Efficacy and Self-efficacy. The Response Efficacy measures an individual level of expectation or trust on certain recommendations with the probability of removing the existing threat. Self-efficacy measures the level of confidence to successfully execute a course of action by an individual. Psychologically, the PMT is used to educate and motivate an individual. The utilisation of the PMT would understand the individual's unhealthy behaviour and provides suggestions for changes by engaging in healthier behaviour. It also can be used as a primary prevention to reduce the risk of getting certain disease, i.e. consume a food that lowers cholesterol to avoid cardiovascular disease. Furthermore, it also can be used as a secondary prevention for an individual who already diagnosed as having a health problem, i.e. to follow the daily medical prescription for recovery.

The application of the PMT as a theoretical concept has been widely used in many studies, particularly in a health context. Among them related to diet and healthy lifestyle, reducing the alcohol consumption, reducing the smoking habit, cancer prevention, compliance with medical treatment prescriptions (Floyd et al., 2000). In a recent study, apart from health behaviour context, this theory was also applied to other area such as to measure fear related to organizational security (Boss et al., 2015).

In relation to the context of consumer behaviour on functional foods, despite the theory may suitably to measure the impact of fear (of disease as a consequence to not engaging with functional food) to the likelihood of the product consumption, nevertheless, it still has limitation as it does not provide the attribute to measure the consumer respond towards health claims or health benefits of the products to the purchase intention.

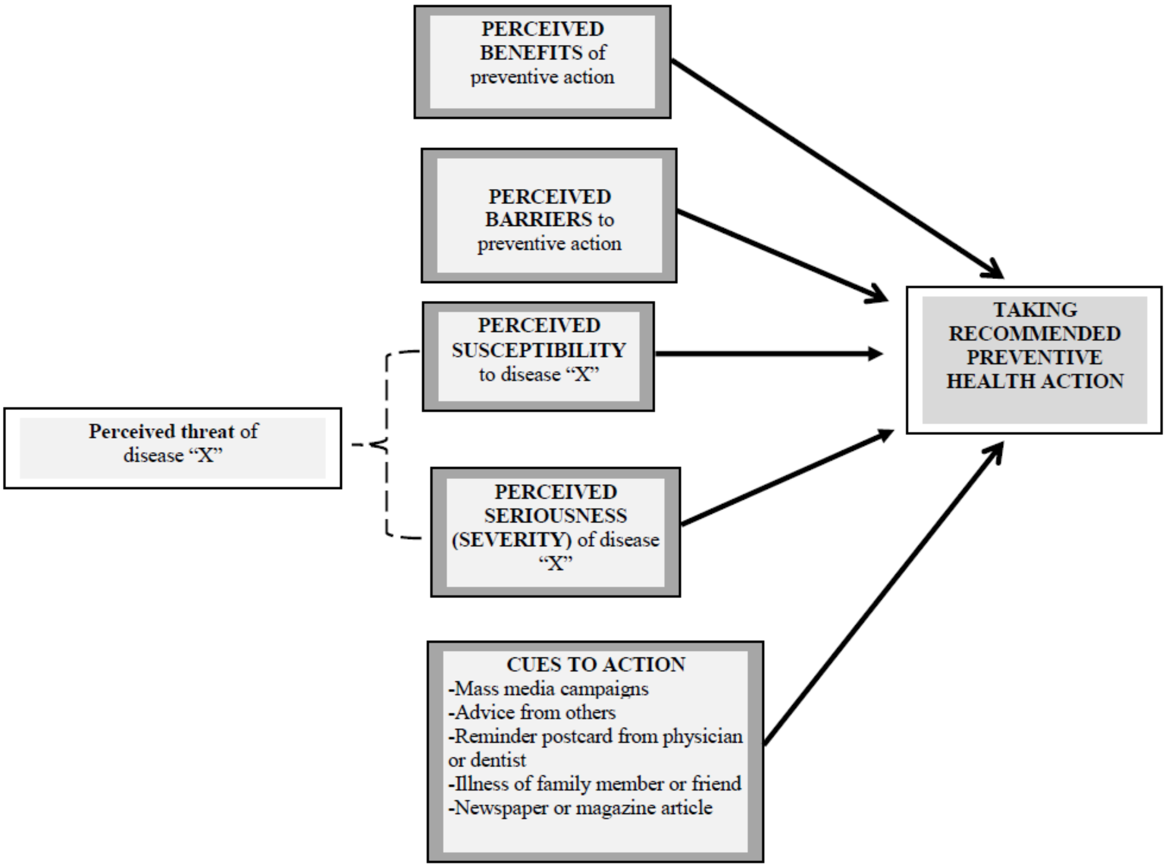
2.10.5 The Health Belief Model (HBM)

Consumer access to healthy food is crucial in developing a healthy nation. However, many consumers are unaware of food contents or ingredients and hence may suffer from various food-related diseases. In other words, people might suffer a disease caused by consuming unhealthy food together with an unbalanced diet. Functional foods have been introduced in the market to solve and overcome this consumer health issue. Therefore, the

HBM can be an effective framework to be used for motivating consumer's intention towards healthy food, i.e. functional foods, with a special function to prevent diseases. This idea is supported as the HBM have been proven its effectiveness in 46 studies (between 1974 and 1984) related to disease prevention programs. The results establish the significant effectiveness of the HBM (Becker, 1974).

Rosenstock (1974) elaborates that the HBM is a psychological model. HBM constructs were established as a predictor of preventive health behaviour. The focus of attitudes and beliefs in the HBM endeavours to clarify and anticipate individual's health behaviour. The model was initially created in the 1950s by a social psychologist. During those days, these psychologists were working at the U.S. Public Health Service to clarify the reason why numerous individuals did not partake in public health programmes, for example, health screening and disease prevention programmes, i.e. TB or cervical cancer screening (Rosenstock, 1974). From that point forward, the HBM has been used to investigate an assortment of health practices. In this manner, it was extended by Rosenstock et al., (1988) to discover varying responses to symptoms and to understand variations in treatment compliance. It has in this way been utilised to direct interventions to improve compliance with preventive strategies (Janz, 2002). Figure 2.6 demonstrates the fundamental components of the HBM and its constructs.

Figure 2-6 The Health Belief Model (HBM)



Source: (Rosenstock, 1974)

Description of determinant and the dependent variable of the HBM model

The HBM incorporates five constructs that affect health action. In the HBM, the probability that an individual will adopt a preventive behaviour or conduct is affected by their subjective weighing of the costs and benefits or advantages of activity, whereby perceptions are represented by the following components:

Perceived Susceptibility alludes to, "one's subjective perception of the risk of contracting a health condition" (Rosenstock, 1974, p. 330). This is a perception of the individual's belief in their level of vulnerability for a certain condition affecting health. Various health-protective practices have been observed using Perceived Susceptibility. In one example, Perceived Susceptibility may be effective to encourage a consumer to engage in the preparatory practices to avert cancer (healthy behaviour, i.e. get a mammogram or prostate exam, consume low fat diet, quit smoking and do frequent exercise) is subjected upon the degree of vulnerability to the risk of cancer disease of the individual believes that they may have (Rosenstock, 1974). Colleen et al., (2000) found Perceived Susceptibility to be an effective predictor of various health-protective behaviour practices.

Perceived Severity/ Seriousness measures convictions about the results of suffering from the condition (Rosenstock, 1974). It investigates emotions concerning the seriousness of getting sick or of abandoning treatment (counting assessments of both medical and clinical results and conceivable social outcomes). For example, an individual will probably take an action to forestall coronary illness if they trust that a conceivable negative physical, mental, and/or social impacts of contracting the disease poses serious consequences (e.g. adjusted social connections, lessened freedom, torment, suffering, disability, or even death).

Perceived Benefits represent the perceived effectiveness of strategies designed to diminish the danger of disease. This construct measures the benefits of participating in defensive or protective behaviour. Inspiration to act to change conduct requires the conviction that the preparatory conduct successfully prevents the condition. Individual's "behaviour was thus thought to depend on how beneficial he or she believed the various alternatives would be in his or her case" (Rosenstock, 1974, p. 331). For example, some people might not be persuaded to stop smoking if they believe that such an action is unable to prevent cancer.

Perceived Barriers measures the barriers or losses that avert health behaviour change. In this relation, a person may think that it is essential to uptake certain action to reducing the certain health threat. Nevertheless, the person might see the necessary actions are sometimes painful, expensive, upsetting, inconvenient or unpleasant. This conflicting perception become barriers to action (Rosenstock, 1974). The different level combination of this construct constitutes the expectation of a positive result (i.e. higher level of Perceived Benefits and lower level of Perceived Barriers). Belief alone is insufficient to persuade a person to take action. Prior to taking action, it includes a psychological measure of the net benefits of acting so that action requires that the benefits should exceed the costs.

The costs may incorporate physical impediments, for example, distance, money, time, convenience and physical accessibility (Rosenstock et al., 1988). Besides, Rosenstock et al., (1988) additionally included a psychological barrier to this measurement, including humiliation, comprehension, lacking belief in the legitimacy of a specific risk or the individual worthiness of suggested conduct. For an action to occur Perceived Benefits must outweigh Perceived Barriers.

Regardless of the fact that an individual’s Perceived Susceptibility to a health threat is severe, whether the individual will change unsafe practices is affected by the view of the benefits that stem from the changes made. These two constructs (Perceived Benefits and Perceived Barriers) have regularly appeared to be more significant and noteworthy than the others, with Perceived Barriers frequently the critical construct for understanding the execution or not of specific health behaviours (Janz and Becker, 1984; Norman and Brain, 2005; Carpenter, 2010).

Cues to Action include stimuli that motivate a person to take part in preventative behaviour (Rosenstock, 1990). Internal or external stimuli might trigger action. Precisely, the internal Cues to Action include personal physical experiences such as pain or the onset of illness. External Cues to Action such as a doctor's guidance, a life partner's ailment or the demise of a guardian or companion may likewise trigger a change in health behaviour.

The dependent variable for original HBM is Taking Recommended Preventive Health Action” (Rosenstock, 1974, p. 334). Rosenstock (1974) explains it as the individual’s behaviour towards engaging in healthy behaviour (i.e. acceptance or rejection on preventative health services). This outcome is used to comprehend the individual’s inspirations and motivations in engaging certain behaviour.

According to the HBM model, Rosenstock (1990) explained that the probability that someone will take action to avert disease relies on the perception of whether they are vulnerable to a certain condition that could be severe and that there is a preventative action to avoid the condition, and that the perceived advantages of decreasing the threat of the condition exceeds the costs of action. These constructs impact on the likelihood of performing protective health behaviour and practices by affecting the perceived threat of the disease and assumptions about the result. In relation to this, an individual would take the action if the readiness to act is strong towards the importance of the recommended preventive health behaviour.

The original HBM study was established to integrate a stimulus-response theory with a cognitive theory in clarifying behaviour conduct. The logic of the HBM derived from Lewin's (1939) theories which emphasise that perception of reality, instead of target reality, impacted on behavioural conduct. Previously, the stimulus-response theory focused on the significance of the outcomes of conduct in anticipating actions, while the cognitive theory changed this by focusing on the importance of the individual's subjective valuations, and their judgment of the probability of required or the desired results would be obtained in the action. The methodology integration of the stimulus-response theory with the cognitive theory has created a value-expectancy theory. Furthermore, the value-expectancy theory emphasises that incentive would not directly stimulate an individual to undertake specific actions; rather it would affect a person's assessment of the action and its probability of the results (Janz, 2002). From this perspective, health behaviour practices are determined by a person's intention to avoid risk and, and the certainty that the prescribed action would accomplish it (Janz, 2002). This inferred a phenomenological method that implies it is not the "real" world, but rather the individual's view and a perception of it that impacts their behaviour conduct. It was an early endeavour to enhance a behaviourist, explored by a response model and to integrate cognitive components.

Several studies provide evidences of the effectiveness of the constructs to predict behaviour (Janz and Becker, 1984; Mullen et al., 1987). Attention should be given to statistical aspects when using the HBM as the theoretical basis for data collection. In particular, Strecher and Rosenstock, (1997) described that one of the essential components in the HBM is known as Perceived Threat which is a combination of the two constructs of Perceived Susceptibility and Perceived Severity. It is important to note and understand that Perceived Threat is not a construct *per se* in the HBM. Nevertheless, only simple effects of Perceived Susceptibility and Severity establish on model revisions, particularly on the impact of perception of risk (Brewer, et al., 2007). In addition, there are also some issues with other constructs in the HBM. In particular, the limitation of subtracting the rating between the constructs of Perceived Barriers and Perceived Benefits (Mullen et al., 1987). This issue might be reduced if the analysis focuses on separating the roles of each constructs towards health behaviour.

Rosenstock (1974) added a fifth HBM construct, which is Cues to Action. This additional construct does not rely on expectancy or the value rather it captures another influence. Cues to Action could be from medical symptoms, a doctor's recommendation, or alert from a media campaign. The magnitude of the cues required to trigger action depends on the motivation to change and the perceived net benefit of action (Rosenstock, 1974).

This construct has proven significant to influence behavioural changes in many applications of the model. For example, Morowatisharifabad et al., (2014) found Cues to Action (i.e. accurate information from healthcare providers, and veterinary professionals) significantly effective to influence individual behaviour to uptake the rabies preventive measures. The role of Cues to Action in relation to food and healthy behaviour involves social influences (Feunekes et al., 1998). The social support and influences on a healthy diet, such as suggestions from friends and family may escalate an individual's interest and intention to consume healthy foods (Devine et al., 2003). In other previous study, there was evidence that social influences of family and friends have a positive impact towards dietary changes to consume more fruits and vegetables (Cohen et al., 1998). Positive Cue to Action also indicates that an individual is having a feeling of a group belonging in social support and trusting them, thus would encourage healthy behaviour (Berkman, 1995). Anderson et al., (1998) explain that the family is broadly recognised as a significant influence on food choices, hence supporting dietary improvement. Receiving dietary advice which is proper and adequate may benefit the individual and would affect the dietary patterns of others. In a more recent study, Rezai et al., (2017) found that Cues to Action (family members, friends and doctor) are significantly influenced individual attitude and attention to the consumption of synthetic functional foods.

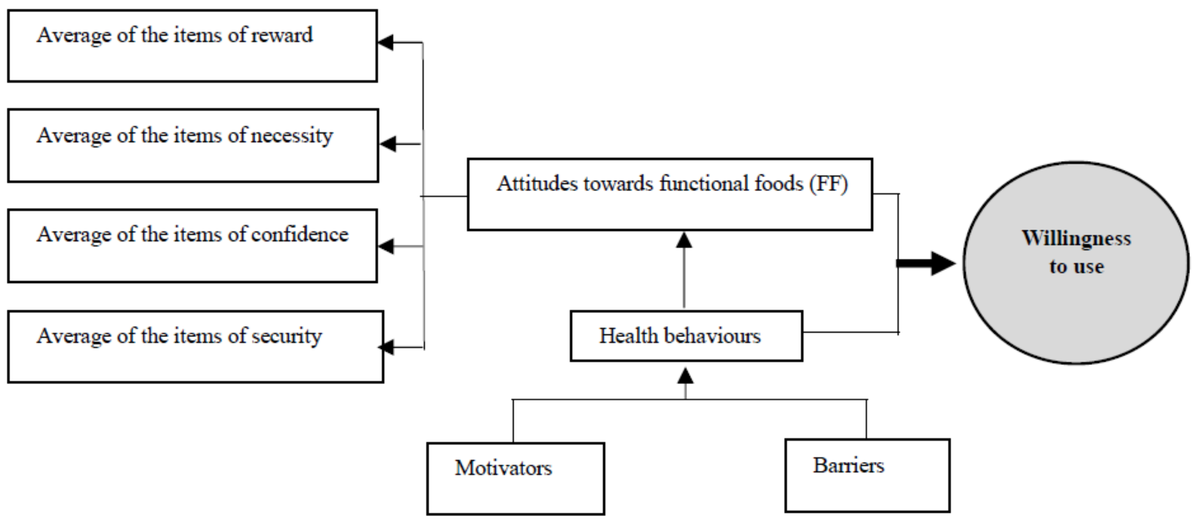
Rosenstock et al., (1988) further extended the HBM, adding a sixth construct, Self-Efficacy. It can be defined as an individual's confidence in the ability to perform certain actions (Rosenstock et al. 1988). Uniquely, this construct does not rely upon expectancy and value; nevertheless, it fits into the framework of expectancy and value. Precisely, the role of Self-Efficacy in the HBM is known as to reflect the outcome of repetitive behaviour i.e. eating, smoking, and physical activity to influence behaviour. In the study of health behaviour which is relatively easy to perform, this construct of Self-Efficacy may not be essential.

2.10.6 A recent consumer behaviour model

One example of recent consumer behaviour study on functional food consumption is by Boluda and Capilla (2017). The study focuses on the health context with four dimensions, i.e. Perceived reward (the influence of health, mood and general well-being). The second dimension is the need for functional foods (the importance of functional foods to improve health. The third factor is the trust and credibility of the promised health benefits. The fourth factor focuses on the safety of the products. It hypothesised that attitudes would influence the willingness, consumer healthy lifestyle would influence positive attitude, motivators would influence healthy lifestyle, and barriers would negatively influence healthy lifestyle, whilst healthy lifestyle would influence willingness to the consumption. Figure 2.7 presents the model of consumer attitude towards functional foods by Boluda and Capilla (2017).

From the factors that have been discussed above, many recent research attempts to assess the consumer behaviour towards functional foods using a combination of selected factors in creating their research framework. One of the examples is conducted by Boluda and Capilla (2017).

Figure 2-7 The Model of Consumer Attitude towards Functional Foods



Source: Boluda and Capilla (2017, p. 38)

According to Boluda and Capilla (2017), the findings from the 333 respondents in Spain suggest there is a direct influence of attitude to the willingness to consume functional foods. In another perspective, motivators positively influence the healthy lifestyle, whilst barriers negatively influence the lifestyle. Nevertheless, the healthy lifestyle has no effect towards the attitude, but it is negatively influencing the willingness to use functional foods. The moderating roles of gender explain the different gender may have different levels of the adoption of healthy lifestyle, hence would provide different attitude towards functional food consumption.

2.11 Theoretical framework adopted in the study

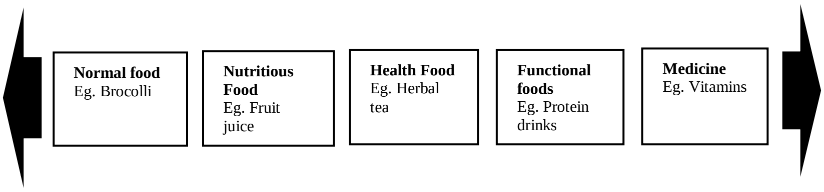
The study is focused on consumers' intentions to purchase and consume functional foods. Based on psychological theories that have been discussed earlier, the most relevant psychology theory to explore consumer behaviour in this food and health context is identified as the Health Belief Model (HBM).

The HBM is adopted to model the determinants of consumers' intention on functional foods. This model consumers' psychological health factors towards these healthy foods. Nevertheless, a modification of the original HBM is necessary prior to the use of this model. The outcome of this research is that using this model would result in a significant change in consumers' behaviour.

2.11.1 Justification of the selection of the HBM as foundation of the theoretical framework

In the realisation of the study of consumer behaviour towards consuming functional foods, the determinants should be related to health (Sánchez and Barrena, 2004). This is logical because consumers prefer products that offer health benefits (Aschemann-Witzel and Hamm, 2010). Therefore, a suitable theoretical framework should be the one that is able to provide information from a health perspective. Such argument for selecting the theoretical foundation based on the concept of health is justified by a schematic representation of the relative position of functional food which show the position of functional foods is in between to the health food and medicine category (Von Alvensleben, 2001). Figure 2.8 illustrates the conceptual market positioning of functional foods.

Figure 2-8 Conceptual Market Positioning of Functional Foods



Source: von Alvensleben (2001)

Figure 2.8 suggests that the characteristic of functional food products is located between Health Food and Medicine. Hence, the health dimensions are much more appropriate to be explored to predict the consumer' intention to functional food products.

In this context past studies showed that the consumer intention to purchase the product are more likely to be positive when health information is understood (Kozup et al., 2003). Such an argument is supported by Van Kleef et al., (2005), that emphasised the importance to communicate the health benefits of the product to influence consumer intentions. Hence the study of current consumer intention towards the purchase and consumption of functional foods is crucial as to get the current position of consumer understanding and further rectification and improvement could be made by the stakeholders in the industry.

The objective of this study is to assess how consumer attitudes on the HBM constructs; that is, Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, and Cue to Actions could influence the choice and consumption of functional foods in the UK.

Wulan (2017) described that knowledge, experience and trust significantly affect the adoption of functional foods. By having such elements, an individual usually may develop their psychological stand related to their intention to consume functional foods. Since these elements are proven to influence consumer behaviour, it is essential to further understand whether psychological factors such as Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers could also influence them. This argument is supported by Moorman and Matulich (1993) that described an individual that has a desire to maintain a healthy body are very particular in their food selection. In other words, an individual with higher concern with health, and the consequences of practicing a healthier diet would be influenced by healthier products such as functional foods.

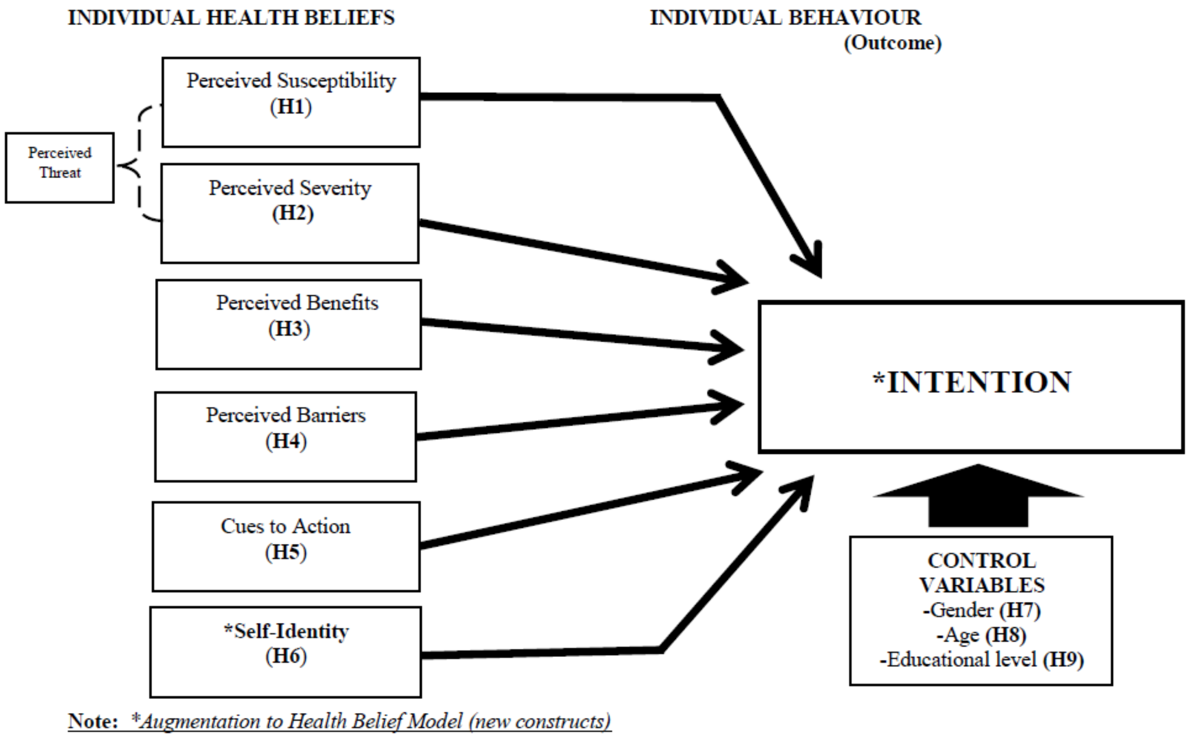
Wider perspectives of health consciousness that affects food choice are explained by factors such as prevention of diseases, staying healthy, quality of life, and medical recommendations (Mai and Hoffmann, 2017). It indicates that an individual with high consciousness would consume more healthy foods such as functional foods. Interestingly, such a finding can be cross checked its validity by others relevant construct. Precisely, the factor of prevention of disease can be explored further by utilising the elements of the Perceived Risk construct in the HBM. This is justified as the construct of Perceived Risk measures the associated risk of diseases that can be reduced by consuming functional foods. A similar treatment can be applied in the case of the Health Consciousness factor, which relates to the Perceived Benefits construct in the HBM.

Furthermore, it is proven that health innovativeness, along with other identified factors such as health motivation are significantly able to impact healthy diet behaviour (Mowen, 2000). Hence, it is essential to complement findings from previous studies by examining whether other associated health factors explained by HBM constructs would also affect consumer intention to practise healthy diet behaviour i.e. consuming functional foods.

The study of the consumer’s intention to consume functional foods is essential as it is one of the larger scopes of preventive health behaviour related to healthy food choice. There are still gaps to fulfil as many previous studies emphasised demographic factors rather than psychological constructs. One of previous studies that examined the psychological construct was conducted by Moorman and Matulich (1993) and found the positive relationship between health motivation on preventive health behaviours (e.g., diet and alcohol use). Nevertheless, as the limited scope of investigation was made, further investigation of other psychological factors is needed.

The present research extends previous study by exploring the impact of the Extended Health Belief Model (EHBM) constructs to the consumer. Figure 2.9 illustrates the elements of EHBM.

Figure 2-9 The Extended Health Belief Model (EHBM)



The novel elements in this newly develop model and its constructs are further discussed in the Chapter 4 (The Conceptual Framework). It asks the question of whether the EHBM approach can account for high levels of variance in different types of functional foods. If the EHBM can successfully predict consumers' intention to engage with a healthy diet behaviour, i.e. consuming functional foods, there are several implications. Firstly, from a marketing standpoint, it may be effective if the products provide more emphasis on its messages by utilising items in significant constructs in the EHBM. Secondly, from the perspective of public-policy, an effective communication strategy which highlights the importance to engage with consuming healthy food products for a healthy lifestyle could be possible to be developed.

2.11.2 Limitations of the HBM model in the context of the study

Based on studies, there are deficiencies and limitations in previous related research which applied the HBM. In distinguishing this research from other relevant consumer research on functional foods, this research will use a different approach and will fill the gaps in previous research.

Several numbers of the limitations of the HBM model in the context of the proposed study have been identified based on literature review. These are identified in the material that follows.

The first limitation concerns the limited context of current literature using the HBM. None of the previous studies apply the HBM in the context of comparative analysis of consumers towards different types of functional foods. Examples of previous studies using HBM such as Gutierrez and Long (2011) focused on diabetes, Asci and Sahin (2011) focused on breast health, and Kim et al., (2012) focused on nutrients belief. Since the present study focuses on the factors to influence the intention of consumption of functional foods, the foods that being promoted as healthier products, therefore it is suggested that the properties of the HBM model are suitable to predict consumer behaviour of different types of functional foods.

The second limitation is that most HBM-based previous research has incorporated only selected components of the original HBM and has not tested the complete model with its four original constructs simultaneously. For example, Vassallo et al., (2009) used only 2 out of 4 original HBM constructs in their study. The original construct of Perceived Benefits and Perceived Barriers was omitted without any justification. As Vassallo et al., (2009) claimed the study was applying HBM as its main framework, they should assess the validity and reliability of all four original HBM constructs prior to omitting two of the original constructs.

In a related development of studies which utilised the Health Belief Model (HBM) in the context of food behaviour, Trenkner et al., (1990) developed a theoretical framework which was based from the HBM to predict individual behaviour towards healthy eating to prevent cancer. It utilised only two original constructs of the HBM, which are Perceived Benefits and Perceived Barrier. Schafer et al. (1993) examined attitudes towards food safety using two original HBM constructs (i.e. Perceived Susceptibility, Perceived Severity). Yazdanpanah et al., (2015) developed a framework with four determinants which only two of its constructs assessed the original HBM constructs (Perceived Benefits and Perceived Barriers) in the study of consumer behaviour towards organic foods. Hanson et al., (2015) only assessed three original constructs of HBM (Perceived Susceptibility, Perceived Severity, and Cue to Action) in the study of food handling behaviour. In a recent study, Perceived Benefits and Perceived Severity are only the original HBM constructs among others in the framework developed by Fathi et al., (2017) to study the consumption of junk foods. Such studies related to food that utilised HBM as their frameworks have an obvious gap when the researchers were not fully utilised all original constructs of HBM (i.e. Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cue to Action).

The third limitation concerns the limited scope of the constructs in the HBM. The emphasis to be highlighted includes reviewing the limitations of the original HBM and to propose an extended model that includes other constructs to improve the model. The original HBM only explores the four constructs of Perceived Susceptibility, Perceived Severity, Perceived Benefits, and Perceived Barriers (Rosenstock 1974). These constructs should be extended further, particularly to explore consumer behaviour towards different types of functional foods. For example, in order to capture the influence of different individual perceptions on the consumption of functional foods, and as discussed in Chapter 3, an additional construct of Self-Identity is to be included.

The fourth limitation concerns the nature of the dependent variable in the HBM. The HBM emphasises the relationship between HBM constructs and the dependent variable of Taking Recommended Preventive Health Action. The deficiency of the current approach is that it does not focus on consumer purchase intentions. Much of the current literature on the behavioural change implications of HBM suggests that HBM has properties that can translate into improving consumer behaviour to engage with healthier health behaviour. Nevertheless, the original dependent variable in the original HBM is still lacking as it does not have its own scales of measurement model to measure the behaviour of Taking Recommended Preventive Health Action" *per se* specifically. Previous studies utilised the HBM model in various contexts translated dependent variable in various forms according to the context of their research. For example, Ghanbari et al., (2014) presented the measurement of the dependent variable of the HBM as "the hand hygiene behaviour".

In a related development, many of recent studies have utilised Intention as the dependent variable of consumer behaviour studies which explained earlier in Section 2.9. Among them include Hung et al., (2016), Kraus (2015a, b), Lu (2015), Irene and Spiller (2014), Van Wezemael et al., (2014), Lau et al., (2012), Hirogaki (2013), Chung et al., (2011), Labrecque et al., (2006), Hur and Jang (2015), Siro et al., (2008), Tobin et al., (2014). Therefore, it is suggested to be more appropriate if the model could predict consumers' purchase intentions. It can be realised by replacing the HBM original dependent variable of Taking Recommended Preventive Health Action" to Intention as to make it more reliable and practical to be measured. In supporting this argument, existing scales of the measurement models of Intention of TPB in relevant studies can be replicated and modified accordingly. The effort in the modification of the original dependent variable in the HBM fulfils the existing gap and compatibly in the context of this study. Details for the dependent construct 'Intention' are discussed in Chapter 4 (The Conceptual Framework).

2.12 Chapter Summary

In summary, Chapter 2 in this literature review has provided insights and ideas on how the association between functional food and consumer behaviour. It also justifies the selection of theory to be used in this study, which based on psychology behaviour. The discussion of literature review continues with Chapter 3 for more interesting recent facts and figures. It will support and justify the reason of the conceptual selection with focus products to be assessed in this study.

Chapter 3. Market Analysis: The Literature Reviews- Part II

3.1 Introduction

This chapter aims to review and discuss the relevant data associated to the functional food products in the market. In particular, the review focuses on the context of the UK market and consumer. It provides insights on the real current market performance of functional food products and justifies the importance of the current study. The discussion starts with Section 3.2 to review the UK market analysis. This theme is extended to review of the issues in marketing communications in Section 3.3. Finally, Section 3.4 presents a summary of the chapter.

3.2 The UK market analysis

The discussion begins with the UK consumer market trend in healthy foods, UK market size and potential growth, and the functional food products' performance in the UK market.

3.2.1 The UK consumer market trend in healthy foods

A healthier lifestyle is becoming popular among the UK population. This phenomenon of behaviour was initiated by the UK government's campaign to promote the adoption of healthier lifestyles by consuming healthy foods. Table 3.1 presents a segmentation of consumers in the UK. According to Mintel (2013) the dietary changes towards healthier food consumption is more obvious among the older population. This is due to escalating information and knowledge about food ingredients and their nutritional values among the UK citizens. One of the proven examples of the impact of health motivation for taking up preventative health measures, is the rise in the consumption of health supplements such as vitamins as part of a daily diet (Mintel, 2010). Interestingly, according to Mintel (2013), a higher portion of citizens that favour functional foods is represented by almost one third (32%) of the age segment of 65 and above. It followed by 11% (aged 35-44), and only 8% (aged 15-34). This indicates that despite the fact that scepticism towards the product's health benefits of products exists, the senior citizen is the largest consumer of functional food products. Nevertheless, it is expected that the trend would also extend to another segment of the population as the positive growth is forecasted (except group of teens 13-19 years) until the year 2020.

Table 3-1 Consumer Segmentation in the United Kingdom- Actual and Forecast

Age segment	Numbers in thousands[1]			Percentage Growth 2010-2020
	2010	2015	2020	
Babies/Infants (0-2 years)	2,367	2,399	2,498	5.5
Kids (3-8 years)	4,209	4,666	4,821	14.5
Tweens (9-12 years)	2,794	2,792	3,139	12.3
Teens (13-19 years)	5,389	4,966	4,925	-8.6
Young Adults (20-29 years)	8,606	9,028	8,699	1.1
Adults (30-39 years)	8,109	8,281	9,288	14.5
Middle-aged Adults (40-64 years)	20,366	20,396	20,412	0.2
Seniors (65+ years)	10,126	11,190	11,949	18.0

Source: (International Market Bureau, 2012, p. 3)

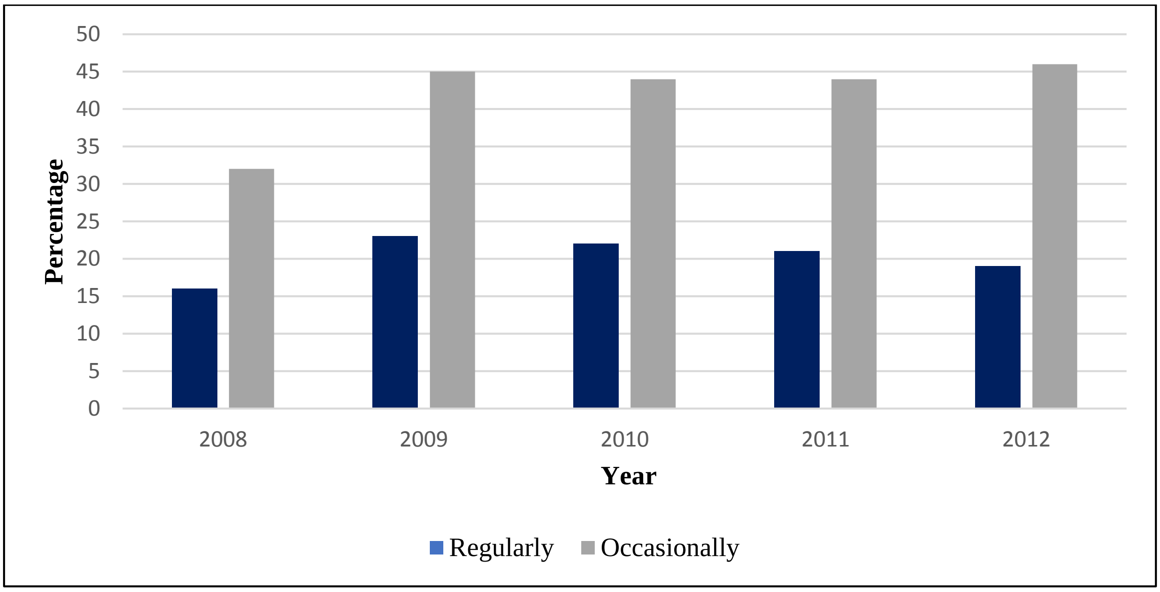
According to Table 3.1 in 2010, the actual data showed a majority segment is 40-64 years (33%) while senior citizens are 16%. Young adults represent 14%; Adults represent 13% and kids, 7%. Based on the actual data of the year 2010, senior citizen is behind the other segment. However, it is interesting to note that, in relation to accumulated data of actual and forecast, Table 3.1 provides information that between the period of 2010 and 2020, the senior citizen (65+ years) is the consumer with the highest growth rate. It followed by population of adult aged 30-39 and kids aged 3-8 years with a same growth rate of 14.5% respectively. This indicates that it could be a positive influence among these segments (particularly for the young adult segment) to adopt the consumption of functional foods. This potential opportunity is based on the fact that this age segment is a younger generation with a desire to embrace new and trendy products such as functional foods.

Despite the promising figure of growth of the younger generation, previous analysis indicated that the consumption of functional foods among adult in the UK still low. According to Mintel (2013), the functional food consumer in the UK market has faced notable challenges as only 46 % of adults occasionally consume them. Figure 3.1 presents the detail of a percentage of the purchase of food and drink with added health benefits. The

[1] Data for 2010 are actual. Data for 2015 and 2020 are forecasts

figure shows the record for the past several years is almost stagnant, indicating that the awareness towards healthy eating among people is yet to achieve a satisfactory level.

Figure 3-1 Percentage of Purchase of Food and Drink with Added Health Benefits (e.g. probiotic, Omega-3, or cholesterol lowering)



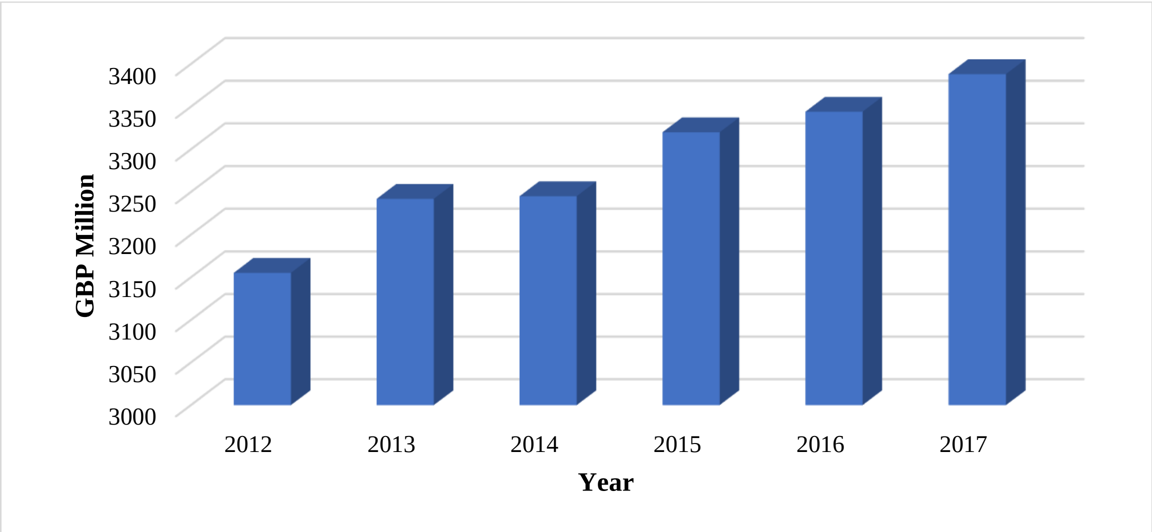
Source: Mintel (2013)

In relation to this fact, despite various approaches and initiatives made by the government to drive healthy eating lifestyle among consumers in recent years, i.e. Public Health Responsibility Deal, a food policy launched in 2011 to promote healthier diet (British Nutrition Foundation, 2011), such an effort is yet to be successful. This is proven when the number of unhealthy diet related diseases such as obesity are rising over the years. It is also revealed the UK younger generation' feedback (aged between 16-34 years old) about functional foods. The key finding shows that despite these groups believe about the health benefits of the products, they are yet to frequently consume the product as the brands are unexciting. In addition, the variety of popular products such as yoghurt, cereals with functional benefits are still limited (Mintel, 2013).

3.2.2 UK market size and potential growth

Figure 3.2 presents data on the market for functional foods in the UK for the period 2012-2017. In general, the market size of functional food product in the UK recorded an escalating growth. The recent data of five years from 2012 until 2017 supported this fact (i.e. £3155.3 million in 2012, £3242 million in 2013, £3245.1 million in 2014, £3320 million in 2015, £3344.1 million in 2016, and £3388.2 million in 2017.

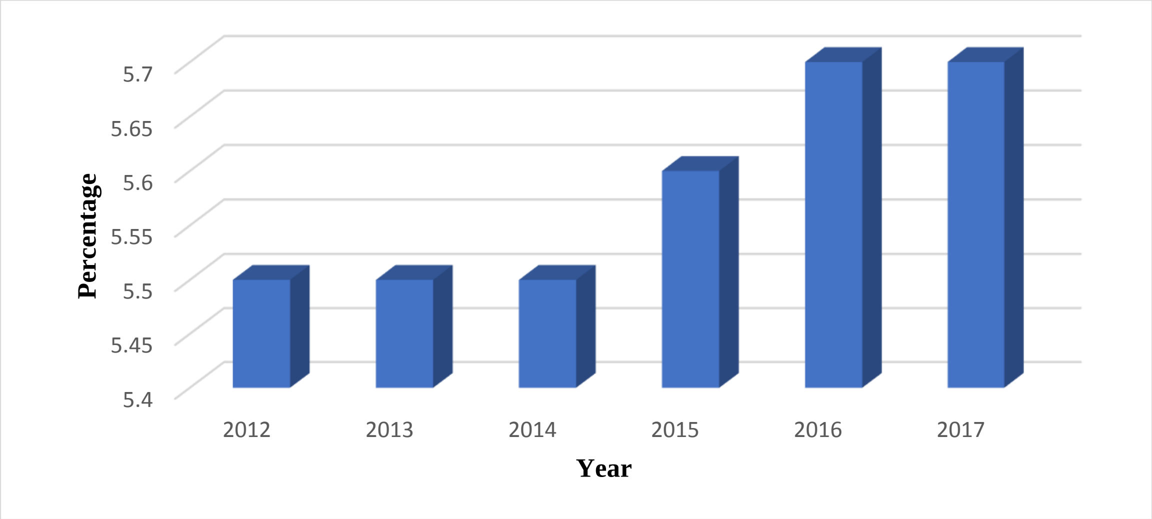
Figure 3-2 The UK Functional Foods Market Size by Value



Source: Euromonitor International (2018)

Figure 3.3 presents percentage actual market share data for the period 2012-2017. In terms of the market position in the health and wellness products, the functional food product stands at an average of 5.5% annually for the total market for the year of 2012 to 2014. The improvement of growth in the recent years shows it has reached 5.7% in the year 2017.

Figure 3-3 The UK Functional Foods Percentage Market Share in Health and Wellness Products



Source: Euromonitor International (2018)

3.2.3 The functional food products' performance in the UK market

Euromonitor International (2018) found that functional foods' products have very promising market potential due to the adoption of a healthier lifestyle trend among consumers increase recently. More consumers aware of the potential health benefits offer by functional food products as the information widely spread very fast.

Historical analysis provides an outlook on the demand for functional foods. Table 3.2 actual sales by value and growth rates of functional food for the period 2011-2016. The information provided by Euromonitor International (2018) reveals the recent performance (recorded for the year 2016) of the business revenue, industry of functional foods showed a mixed growth for various segments of functional food products. For example, the functional (FF) packaged food increase in average about 2.3% annually from year 2011 to year 2016 with accumulated growth of 11.9% in five years period. Euromonitor International (2018) suggested the factors contributing to market growth include continued product innovation by large manufacturers and an ageing UK population. Nevertheless, a number of functional food products have recorded a negative growth. For example, the accumulated growth from year 2011 to year 2016 for FF Margarine and Spreads was -17.4%. Such accumulated negative growth is the largest among all functional food products. Hence, further analysis to understand consumer behaviour towards this category of functional food that offer specific health benefits for the consumer is needed.

Table 3-2 Actual Sales by Value and Growth Rates of Functional Food by Category for the Period 2011-2016.

	Sales (GBP million)						Growth rate (%)		
	2011	2012	2013	2014	2015	2016	2015/16	2011-16 CAGR[2]	2011/16 Total
FF Baby Food	319.4	354.0	386.5	389.2	455.1	515.9	13.4	10.1	61.5
- FF Milk Formula	319.4	354.0	386.5	389.2	455.1	515.9	13.4	10.1	61.5
- FF Prepared Baby Food	-	-	-	-	-	-	-	-	-
FF Breakfast Cereals	1,031.2	1,043.0	1,060.2	1,047.2	1,036.0	1,014.9	-2.0	-0.3	-1.6
FF Bread	112.3	111.0	109.9	114.8	117.0	118.9	1.7	1.2	5.9
FF Confectionery	165.3	176.2	182.5	191.4	201.2	207.5	3.1	4.6	25.5
- FF Chocolate Confectionery	4.4	4.4	3.9	3.7	3.6	3.4	-4.2	-4.8	-22.0
- FF Chewing Gum	76.7	81.1	86.2	93.3	95.2	97.0	1.9	4.8	26.5
-- FF Sugar-free Chewing Gum	76.7	81.1	86.2	93.3	95.2	97.0	1.9	4.8	26.5
-- FF Sugarised Chewing Gum	-	-	-	-	-	-	-	-	-
- FF Sugar Confectionery	84.2	90.7	92.5	94.3	102.4	107.0	4.5	4.9	27.1
-- FF Sugar-free Sugar Confectionery	14.1	15.4	17.5	21.3	24.5	26.7	8.7	13.5	88.8
-- FF Sugarised Sugar Confectionery	70.1	75.3	75.0	73.0	77.9	80.4	3.2	2.8	14.6
FF Dairy	1,202.8	1,231.0	1,233.1	1,218.9	1,219.3	1,223.9	0.4	0.3	1.8
- FF Cheese	96.6	94.1	92.3	89.4	87.2	84.9	-2.6	-2.5	-12.1
- FF Dairy-based Yoghurt	835.3	860.2	859.6	852.2	856.2	862.6	0.7	0.6	3.3
-- FF Drinking Yoghurt	261.6	275.3	253.2	242.1	243.7	246.5	1.1	-1.2	-5.8
-- FF Spoonable Yoghurt	573.6	584.9	606.4	610.1	612.5	616.1	0.6	1.4	7.4
-- Total Probiotic Yoghurt	749.8	773.4	769.5	761.3	765.7	771.7	0.8	0.6	2.9
- FF Flavoured Milk Drinks	30.8	34.5	38.4	42.4	47.2	51.6	9.3	10.8	67.4

[2] CAGR= Compound Annual Growth Rate

- FF Fromage Frais and Quark	136.0	138.3	142.1	139.3	137.9	137.3	-0.4	0.2	1.0
- FF Margarine and Spreads	75.7	74.8	70.4	66.9	64.2	62.6	-2.6	-3.7	-17.4
- FF Milk	25.5	26.3	27.6	26.0	23.9	22.4	-6.4	-2.6	-12.1
-- FF Reduced Fat Milk	20.3	21.2	22.7	21.0	19.2	17.8	-7.1	-2.5	-11.9
-- FF Standard Milk	5.2	5.1	4.9	5.0	4.7	4.6	-3.6	-2.7	-12.9
- FF Powder Milk	2.9	2.8	2.8	2.7	2.6	2.5	-3.7	-2.8	-13.4
FF Pasta	-	-	-	-	-	-	-	-	-
FF Sweet Biscuits, Snack Bars and Fruit Snacks	133.1	161.0	189.9	203.2	220.1	234.4	6.5	12.0	76.2
- FF Sweet Biscuits	36.9	59.5	87.0	97.7	108.4	116.0	7.0	25.7	214.1
- FF Snack Bars	96.1	101.5	102.8	105.5	111.7	118.5	6.0	4.3	23.2
-- FF Cereal Bars	81.1	82.7	79.4	76.5	73.6	71.5	-2.8	-2.5	-11.8
-- FF Energy Bars	15.0	18.8	23.5	29.0	38.2	47.0	23.0	25.6	212.6
FF Vegetable and Seed Oil	11.5	11.7	11.8	12.0	12.6	13.5	6.8	3.2	17.0
Fortified/Functional Packaged Food	2,975.6	3,087.9	3,173.9	3,176.8	3,261.2	3,328.9	2.1	2.3	11.9

Source: Euromonitor International (2018)

Table 3.3 presents data on percentage sales growth by value for functional foods by category for the period 2016-2017 (actual data), and forecasts for the period 2016-2021. From the table, it indicates, among the functional food products which its Compound Annual Growth Rate (CAGR) in positive positions are Functional Foods (FF) Baby foods, FF Bread, FF Confectionary, FF Chewing gum, FF Sugar Confectionery, FF Sugar Free Confectionary. Such positive performance indicates that consumers are satisfied with the product. Nevertheless, more study should emphasise to the functional food product that are under satisfactory level, or precisely in a negative growth. Among the products in the negative list are FF Breakfast Cereal, FF Chocolate Confectionary, FF Cheese, FF Drinking Yoghurt, FF Margarine and Spread, FF Milk, FF Reduced Fat Milk, FF Standard Milk, FF Powder Milk. Hence, it is an indication that the products may have some issues or the consumer is lack of confidence towards its health claims. Further investigation of consumer behaviour towards these products is necessary.

Table 3-3 Forecast Percentage Sales Value Growth of Functional Food by Category

Category	% constant value growth		
	2016/2017	2016-21 CAGR[3]	2016/21 Total
FF Baby Food	8.4	4.3	23.2
- FF Milk Formula	8.4	4.3	23.2
- FF Prepared Baby Food	-	-	-
FF Breakfast Cereals	2.1	2.5	13.3
FF Bread	1.4	1.0	5.0
FF Confectionery	2.0	1.5	7.5
- FF Chocolate Confectionery	-4.1	-2.7	-12.8
- FF Chewing Gum	1.5	1.1	5.4
-- FF Sugar-free Chewing Gum	1.5	1.1	5.4
-- FF Sugarised Chewing Gum	-	-	-
- FF Sugar Confectionery	2.7	1.9	10.1
-- FF Sugar-free Sugar Confectionery	6.2	4.1	22.4
-- FF Sugarised Sugar Confectionery	1.6	1.2	6.0
FF Dairy	-0.1	-0.1	-0.7
- FF Cheese	-3.4	-2.9	-13.5
- FF Dairy-based Yoghurt	0.4	0.2	1.0
-- FF Drinking Yoghurt	0.5	0.6	3.1
-- FF Spoonable Yoghurt	0.3	0.0	0.2
-- Total Probiotic Yoghurt	0.3	0.2	0.9
- FF Flavoured Milk Drinks	6.0	4.3	23.6
- FF Fromage Frais and Quark	-1.8	-1.2	-6.0
- FF Margarine and Spreads	-2.3	-1.9	-8.9
- FF Milk	-4.6	-2.9	-13.6
-- FF Reduced Fat Milk	-5.3	-3.3	-15.6
-- FF Standard Milk	-1.9	-1.2	-5.8
- FF Powder Milk	-4.2	-3.5	-16.3
FF Pasta	-	-	-
FF Sweet Biscuits, Snack Bars and Fruit Snacks	4.3	1.6	8.5

[3] CAGR= Compound Annual Growth Rate

Category	% constant value growth 2016/2017	2016-21 CAGR[3]	2016/21 Total
- FF Sweet Biscuits	4.2	0.9	4.4
- FF Snack Bars	4.5	2.4	12.5
-- FF Cereal Bars	-2.7	-2.3	-10.8
-- FF Energy Bars	15.4	8.2	48.1
FF Vegetable and Seed Oil	5.2	2.9	15.2
Fortified/Functional Packaged Food	2.4	1.7	8.7

Source: Euromonitor International (2018)

In terms of value of sales recorded among various segments of functional food product, most of them showed a decent revenue despite a small number of products showed a decline in trend from year 2011 to 2016, i.e. FF Margarine and Spreads. The decline in revenue is a translation of decline in growth, which has been discussed earlier. Therefore, for such product like Margarine, the recorded data justifies that further investigation is needed to understand consumer behaviour towards this product. Other than that, many of functional food products recorded positive growth. In particular, Fortified/ Functional Packaged Food actual revenue was GBP2, 975.6 million (2011), increased by +3.7% in the following year to GBP3, 087.9 million (2012), increased +2.78% to GBP3, 173.9 (2013), increased +0.09% to GBP3, 176.8 (2014), increased +2.6% to GBP3, 261.2 (2015) and increased + 2.0% to GBP3, 328.9 (2016). The functional food products show steady growth over the review period, which, among others contributed by rising consumer awareness of associated health benefits to the products. In addition to that, the positive market growth also contributed by the establish brands that widen its product line with higher penetration into grocery stores (Euromonitor International, 2018).

In relation to company shares between the players of fortified/functional packaged food, Kellogg Co of Great Britain Ltd holds the first position recorded in five consecutive years (2012-2016). For example, the company achieved 13.8% in 2016. It followed by Cow and Gate Nutricia Ltd, and Danone Ltd for the second and third position respectively. Table 3.4 provides details of each related products.

Table 3-4 Company Percentage Shares Value of Functional Food

Category	% retail value				
	2012	2013	2014	2015	2016
Kellogg Co of Great Britain Ltd	16.8	16.2	15.8	14.8	13.8
Cow & Gate Nutricia Ltd	8.7	9.8	10.1	11.6	12.8
Danone Ltd	12.4	11.3	10.6	9.6	8.9
Cereal Partners UK Ltd	4.6	4.7	4.7	4.5	4.3
Yeo Valley Farms (Production) Ltd	2.5	2.5	2.9	3.1	3.4
Yoplait UK Ltd	2.9	3.1	3.1	3.1	3.0
Mondelez UK Ltd	2.1	2.5	2.8	2.8	2.8
Wrigley Co Ltd, The	2.3	2.3	2.5	2.5	2.5
Wyeth & Brother Ltd, John (SMA Nutrition)	2.7	2.3	2.1	2.2	2.3
Tesco Plc	2.5	2.5	2.4	2.4	2.3
Onken Dairy (UK) Ltd	2.1	2.1	2.2	2.2	2.3
Fage UK Ltd	1.2	1.4	1.7	2.0	2.2
Benecol Ltd	-	-	2.1	2.1	2.0
Unilever Foods UK Ltd	2.3	2.0	2.0	1.8	1.7
Hovis Ltd	2.2	2.1	1.8	1.7	1.6
Lactalis Nestlé Produits Frais	1.8	1.8	1.7	1.6	1.5
Asda Group Ltd	1.5	1.5	1.5	1.5	1.4
J Sainsbury Plc	1.5	1.5	1.5	1.4	1.4
Ernest Jackson Ltd	1.4	1.3	1.3	1.3	1.4
Rachel's Dairy Ltd	1.5	1.6	1.5	1.4	1.2
Mars Food UK Ltd	1.2	1.2	1.1	1.1	1.2
Weetabix Ltd	0.9	1.1	1.1	1.1	1.2
Müller Dairy (UK) Ltd	1.2	1.2	1.1	1.0	0.9
Yakult UK Ltd	0.9	0.9	0.8	0.8	0.8
Raisio UK Ltd	0.9	0.8	0.8	0.8	0.8
Allied Bakeries Ltd	0.4	0.4	0.7	0.7	0.7
Epicurean Dairy (UK) Ltd	0.1	0.2	0.3	0.5	0.7
Grace Foods UK Ltd	0.4	0.5	0.5	0.6	0.6
Peppersmith Ltd	0.1	0.2	0.3	0.4	0.4

Category	% retail value 2012	2013	2014	2015	2016
Quaker Trading Ltd	-	-	-	0.2	0.4
McNeil Consumer Nutritionals UK Ltd	2.3	2.1	-	-	-
Other Private Label	7.0	7.1	7.1	6.9	6.8
Others	12.0	11.7	11.8	12.5	12.7
Total	100.0	100.0	100.0	100.0	100.0

Source: Euromonitor International (2018)

Table 3.5 provides details of the actual performance of the functional food brand market share in the UK. In terms of brand performance of functional packaged food in the UK, the data over 6 years from 2012 to 2017 shows a mixed and fluctuated performance among the brands. The recent data for the year 2017 shows Aptamil is the leading brand in the market. It's followed by Activia for the second place, whilst Cow and Gate achieved the third place.

Table 3-5 Percentage Market Share of Functional Packaged Food by Brand

Brand Name	Company Name	Percent (%) 2012	2013	2014	2015	2016	2017
Aptamil (Danone, Groupe)	Danone, Groupe	4.7	5.4	6.1	7.2	7.8	8.0
Activia (Danone, Groupe)	Danone, Groupe	8.5	8.0	7.5	6.4	5.7	5.2
Cow & Gate (Danone, Groupe)	Danone, Groupe	3.7	4.1	3.8	4.1	4.1	4.1
Yeo Valley (Yeo Valley Farms (Production)) Ltd)	Yeo Valley Farms (Production) Ltd	2.4	2.4	2.8	3.1	3.3	3.5
Actimel (Danone, Groupe)	Danone, Groupe	3.5	3.0	2.9	3.0	3.3	3.4
Kellogg's Special K (Kellogg Co)	Kellogg Co	4.7	4.2	3.9	3.4	3.2	2.9
Kellogg's (Kellogg Co)	Kellogg Co	3.2	3.0	2.9	2.8	2.8	2.8
Petits Filous (General Mills Inc)	General Mills Inc	2.9	2.9	2.9	2.8	2.8	2.8
Belvita (Mondelez International Inc)	Mondelez International Inc	1.6	2.0	2.3	2.4	2.7	2.7
Kellogg's Crunchy Nut Cornflakes (Kellogg Co)	Kellogg Co	2.9	3.0	3.0	2.8	2.7	2.5
Total (Fage International SA)	Fage International SA	1.1	1.4	1.7	1.9	2.2	2.4
Onken (Emmi Group)	Emmi Group	2.1	2.1	2.1	2.2	2.3	2.3
Private label (Private Label)	Private Label	12.6	12.7	12.7	12.4	11.9	11.6

Source: Euromonitor International (2018)

In summary, the data provide evidences that there is large potential in the UK functional foods market. Understanding the consumer behaviour towards the product is essential as to estimate the existing consumer’s intention, thus would help stakeholders to undertake necessary actions accordingly. In this relation, issues related to the marketing communication also need to be comprehended.

3.3 Issues in Marketing Communications

There are numerous identified motivators in marketing functional foods. Findings from Mintel (2015) revealed there are two major drivers of consumer demand.

First, there is developing customer consciousness of the connection between greater wellbeing and food consumption. In this relation, escalating confident among consumer together with increase in purchasing power would encourage producers to offer much more variety of functional food products in a premium segment, e.g. yoghurt with live cultures. In relation to that, Mintel (2015) suggested the 30.9% rise in UK consumer spending over year 2014-2019 indicates the higher ability of consumers to purchase more premium products such as functional foods, thus the functional food products should have been garnered decent support. Since consumers’ awareness of having a good diet for a good health increases, these products also become popular with the ageing population in the UK as they consume it for the purpose of getting alternative preventative medicine in different form. A high demand with above-average consumption of the product segment of yoghurt which derived from households with children indicated that the product is having potential value for its future growth. Consumer research found a positive feedback on the consumption of yoghurt/yoghurt drinks, with three in four users agreeing that yoghurt/ yoghurt drinks are a good way to get nutrients, but only around two in five see the products as natural (Mintel, 2015).

Second, the support from the British government towards fortified food products has encouraged many manufacturers to produce such products. For example, give a date or period the numbers of infants conceived with neural tube defects in the UK, affected approximately 700-900 pregnancies per year. In 2007, the Food Standard Agency (FSA) imposed “mandatory fortification” of folic acid to be added in the flour. This action indicates that the government is prepared to adopt a strong stance on health issues by giving priority to food fortifications. This call for food fortification by the government has stimulated many novel products launched in the market which focused on providing health benefits.

Hence, in realising positive prospects of the functional food products in the UK, it is imperative to understand the challenges faced by functional food product in the market, as it has to face a high competition with conventional foods although they have unique health properties (International Market Bureau, 2012). This statement indicates that functional food products face challenges in the market. In this challenging environment, Kotler et al., (2000) suggested that companies should be creative in promoting and to deliver greater value to potential customers. Thus, it is important to highlight and discuss current issues that matter in relation to marketing of functional foods. Key identified issues are discussed in the sub-sections that follow.

3.3.1 Questionable health claims

Since there is no legal or governmental definition of what a 'functional food' is, UK consumers are left to question and evaluate a functional food's health claims on their own. EFSA regulation of health claims is very clear, however, no official recognition of the term 'functional food' is given. According to Van Buul and Brouns (2015), certified health claims can be used as a marketing tool. In fact, despite numerous scientific studies that have supported the health benefits of several types of functional foods, EFSA has yet to certify its health claim. The EFSA restriction on the use of health claims is a potential barrier to the promotion of the health benefits associated with the products. Due to this problem, the producer should employ other approaches to capture consumer intention. It has been proven that an effective individual communication approach being employed by the company of Yakult yoghurt may help the success in marketing the products of functional foods, rather than solely emphasis given to products' health claim (Heasman and Mellentin, 2001).

3.3.2 Communication barriers in the market for functional food

Boluda and Capilla (2017) suggested that consumer misunderstand about the health benefits of functional foods still exist, and thus need corrective actions. This indicates the existence of communication barrier as the message of the product properties is yet to fully comprehend by the consumers. In the same way, as other novel items, Brannback et al., (2002) suggested functional foods may experience mistrust and rejection. In this situation, the health benefits of functional foods are difficult to be conveyed through mere label information as consumers not easily comprehend scientific terms related without sufficient information. Therefore, the relevant stakeholders in the functional food industry should creatively find ways to fill the communication gap as to enable the market development effectively (Organic Monitor, 2009).

Furthermore, Heasman and Mellentin (2001) found that the rejection and mistrust of functional foods' products may due to an inability of marketers to deliver an effective communication to target markets to simplify the complexity of the products' ingredients and its health benefits. A better understanding of these benefits would lead to consumer acknowledgement of the product's premium nature. It appears that functional foods need to contend with the highly developed markets of traditionally handled foods. As a good example, Japan's Yakult case shows that a strong relationship with consumers is a vital element. Despite various imitators, Yakult remains the market leader in numerous countries as they employed direct individual communication since 1955. Yakult's way to deal with the promotion is uncommon. Ordinarily, most producers do not give a priority on individual communication approaches, but rather using general advertisements through other means.

3.3.3 *Lack of categorisation*

There is no established specific categorisation of functional foods compared to other food categories in the market. This problem makes people unfamiliar with the products. In certain cases due to lack of categorisation, consumers may think that functional foods, mainly design for individual with diseases (Hellyer et al., 2012). However, the functional food products are beneficial to all, regardless their health status.

Chambers and Lobb (2007) argued that lack of categorisation is a major factor restraining growth in the functional food market. This issue shows functional foods need to establish their own identity like the other category of foods, i.e. organic foods. The establishment of own identity categorisation can help consumers easily distinguish and better understand the specific characteristics of functional foods. Only certain consumers with sufficient knowledge are able to identify functional foods. Most of the existing functional food products in the current market are recognised by their brand name (Organic Monitor, 2009). The lack of categorisation of functional food products further worsens the situation with other associated issues such as confusion among consumers and lower consumer awareness.

3.3.4 *Confusion among consumers*

Functional foods commonly promote its health benefits which resulted from the selected additive ingredients in processed food products. Nevertheless, at the same time, Stewart et al., (2007) argued that in the UK, there are too many educational messages on choosing a right diet. To support this argument, Mosley (2013) described, the "Five a Day" campaign that promotes consuming five pieces of fresh fruit and vegetable rather than processed foods, which launched by the UK government in 2003 created confusion among consumers. In addition, the campaign also discouraged consumers to consume dairy product due to high fat content (Organic Monitor, 2009).

In addition to this, confusion also arises from the technical terms used in the labelling of functional food products. The term such as prebiotic, probiotic, omega, cholesterol lowering, live cultures, that difficult to be comprehended by a layman. In this relation, consumers are more confident if the information being simplified (Bogue and Ryan, 2000).

Precise labelling would ensure the success of a product when it provides information that consumers understand.

3.3.5 Marketing difficulties

Organic Monitor (2009) found that inability to choose a right marketing message makes many companies struggle to market functional foods' products. Each company should know their strength and realise that one marketing strategy does not fit all other companies. Many companies rely on their established brand name rather than greater focus on health functionality to market their new product line. Unfortunately, this marketing strategy does not necessarily effective for all manufacturers. For example, Boost Juice Bars, a new functional foods' product line by Nestlé withdrawn within only five months in the market. Nevertheless, the similar marketing strategy approach which focusing on a strong brand identity by Danone for their products of yoghurt with live cultures, Actimel is successful (Organic Monitor, 2009).

Besides that, in relation to product development, the cost incurred for research and development in the creation of a new functional food product is very high, thus it creates constrains for certain manufacturers, especially those with limited capital to compete in the market (Vergari et al, 2010).

3.3.6 Premium price

Chambers et al., (2006) described many consumers perceive functional food products as premium products which come with relatively higher prices than conventional food products. For example, the price of functional dairy products recorded increments between 30-50% than the ordinary products. Such high price increments would be compromised by the consumers if the health claims are proven and certified, nevertheless, it is not the case (Vergari et al., 2010). This is one of the reasons of limited market success. In relation to this, Heasman and Mellentin, (2001) provided a justification of higher price for premium products like functional foods due to a high investment cost in research and development. These efforts are concerned with the improvement of the quality of the products of which many consumers are unaware. Normally, lower price would easily attract consumers' attention, but manufacturers of functional foods' products unable to practice the consumers' demand. Therefore, the health benefits of consuming functional foods' products i.e. reducing health risk, should be promoted extensively to justify a higher product price, hence would escalate demand.

3.4 Chapter Summary

This chapter extends the discussion of literature review from Chapter 2. The importance of the study of consumer behaviour towards functional food is further justified by the current data of the functional food, particularly in the UK. The data suggest that the functional foods market is growing and has a good potential. Nevertheless, the growth rate does not really stable in the long run. In addition, the study of factors that affect consumers' intention to the functional foods in the UK is considered limited and insufficient. Therefore, the conceptual framework to investigate this issue is further presented in Chapter 4.

Chapter 4. The Conceptual Framework

4.1 Introduction

The chapter aims to develop a conceptual model of the determinants of consumers' intentions to purchase and consume functional food. The model is developed from two primary inputs i.e. from the research aims and objectives and the literature review discussed in Chapters 2 and 3 previously. As explained in Section 2.3, Chapter 2, the study relates to two types of functional food products, i.e. Yoghurt with Live Cultures and Cholesterol Lowering Margarine. Further justification of the selection of the types of functional food utilised in the study, is also discussed in this chapter. Subsequently, since the central framework or theoretical foundation of the model utilised in this study derives from the Health Belief Model (HBM), a review of the augmentation of the HBM in previous studies is further discussed. Following this, the formulation of the Extended Health Belief Model (EHBM) model, discussion of the model constructs and finally, the formulation of hypotheses is presented.

The chapter contains seven sections. Section 4.2 provides a justification of the types of functional foods utilised in the study, followed by Section 4.3, which discusses the justification for augmenting the original HBM constructs. Section 4.4 presents an extension of the HBM model. The next Section 4.5 describes the model utilised in this study: Extended Health Belief Model (EHBM). Subsequently, Section 4.6 discusses the research hypotheses, and finally, Section 4.7 presents a summary of the chapter.

4.2 Justification of the Types of Functional Foods Utilise in the Study

The types of functional food considered in this study are based upon the arguments of Taylor (2010) and FAO (2007) which have been discussed in the Chapter 2 previously. In particular, most of functional food producers focus on two health benefits of the products: which aim to improve or maintain gastrointestinal health (for general health) and cardiovascular health (for specific health). Thus, there are two different types of functional foods considered in this study. The first is a functional food that provides a general health benefit. For that reason, Yoghurt with Live Cultures which contains probiotics (healthy/ good live cultures) is selected as a sample represents this category. The second provides specific health benefits, and Cholesterol-Lowering Margarine which contains non-nutrients such as plant sterols is selected to represent this category.

4.2.1 Yoghurt with Live Cultures – for general health benefits

It is important to note that bacteria can be classified into beneficial/ good or bad types of bacteria. Beneficial bacteria also known as healthy bacteria. Only healthy bacteria are useful for the human health. Probiotics is one of the well-known types of good bacteria. It is often to describe probiotic with the term live cultures. In relation to functional foods that offer general health benefits, Taylor (2010) explained that healthy bacteria can improve gastrointestinal function by enhancing the effectiveness of gut microflora in the gastrointestinal system. Specifically, this relates to products with live cultures. The potential general health benefits of healthy/ good live cultures include reducing the incidence or the seriousness of gastrointestinal contaminations, easing lactose intolerance and a general improvement in gut capacity, incorporating lessening in constipation and loose bowels (FAO, 2007). Despite scientific evidence of these claims, EFSA has yet to officially approve any health claims in relation to probiotics.

Yoghurt with live cultures is a very popular functional dairy product and commonly known by many consumers. The products are made with ingredients of live microorganisms, i.e. Lactobacillus and Bifidobacterium (often referred as to Bifidus). These live organisms offer health benefits to the gastrointestinal functions of the human body system. In particular, the addition of these lactobacteria in dairy products can improve the digestive system and enable some consumers to manage digestive disorders, i.e. Irritable Bowel Syndrome (IBS) and diarrhoea. Better gut health is vital for immunity and digestion. Hence consumption can improve the immune system provide for better general health (Sheil et al., 2007).

Examples of brands of yoghurt with live cultures which available in the UK include Actimel yoghurt drink, Activia yoghurt and Yakult yoghurt drink. These functional food products also contain vitamins D and B6 that contribute to the normal function of the immune system. Others available brands are Benecol yoghurt and yoghurt drinks and Müller vitality yoghurt and yoghurt drinks.

4.2.2 Cholesterol Lowering Margarine –for specific health benefits

Cholesterol lowering margarine ingredients offer specific types of health benefits to consumers. There is currently a wide array of cholesterol-lowering types of functional foods on the market. Among the most popular additives is esterized fat solvent structures of phytosterols or sterols/ stanols (plant extracts). The addition of sterols/ stanols in cholesterol lowering margarine products claim to lower cholesterol levels in the blood, reducing the risk of cardiovascular diseases (Abumweis et al., 2008; Berger et al., 2004). Among the available brands in this functional food product category in the UK market are Flora pro. activ margarine and Benecol margarine spreads.

With respect to cardiovascular disease that target a specific health function, a healthy heart is associated with lower consumption of saturated fats. Particularly, optimal low-density lipoprotein (LDL) cholesterol levels can be achieved by consuming functional foods that contain elements of ingredients that reduce absorption of cholesterol (Taylor, 2010).

Ras et al., (2014) note that more than 85 scientific studies have shown the ability of plant sterols to significantly lower cholesterol. Technically, plant sterols protect the gut in the stomach from the absorption of cholesterol. It has been proven that plant sterols are able to reduce cholesterol levels (LDL-cholesterol) in the blood. This can be achieved by consuming plant sterols in two to three weeks as part of a healthy diet and lifestyle, together with consuming plenty of fruit and vegetables (Taylor, 2010).

4.3 Justification for Augmenting the Original HBM Constructs

As discussed in the literature review chapter previously, in order to assess consumer behaviour towards the intention to consume functional foods, the original HBM independent variables are suitable to explore individual’s psychological dimensions. It is also supported by the fact that the consumption of functional food, roles as a preventative measure to avoid certain diseases. HBM fits to study in the context of preventive health behaviour as it attempts to discover the individual’s perceptions over threat and the benefits of consuming functional food products. This is in accordance with the fact that the preventative health behaviour of food is an interesting topic to be studied (Moorman and Matulich, 1993). However, prior to the application, the original HBM should be augmented first by taking into consideration its deficiencies.

The need to justify augmenting the original HBM model in this study is based on two perspectives. The first perspective is based on the identified weaknesses or deficiencies of previous research in utilising the HBM, and the second perspective is based on the success of other previous research in augmenting the original HBM and further created an extended HBM in a different context of this research.

4.3.1 Augmentation of the HBM in previous research

This study aims to augment the HBM model to provide a more suitable framework in the context of functional foods. In this respect, it is useful to consider how other studies have augmented the HBM model. Several previous studies that have used augmented versions of HBM are summarised in Table 4.1.

Table 4-1 Augmentation of HBM in Selected Studies

Authors	Topic of study	HBM original construct	Additional new constructs
Lubran (2010)	Farmers behaviour on farm processing license	The independent variables were 5 original HBM constructs of Perceived Susceptibility, Severity, Benefits, Barriers and Cues to Action.	3 additional constructs taken from the Theory of Planned Behaviour (Attitude, Subjective norms and Perceived Behavioural Control. The dependent variable was Intention.
Buglar et al., (2010)	An extended HBM in dental	Five independent variables were formed which consists 4 HBM original constructs of Susceptibility, Severity, Benefits, Barriers and one new construct.	Self- Efficacy
Mikhail and Nustas (2001)	Transcultural adaptation of Champion's HBM on breast cancer.	Four original HBM constructs of Susceptibility, Severity, Benefits and Barriers.	The study utilised the HBM measures by Champion's (1993), which version consists of 4 original HBM construct and two other constructs of General Health Motivation and Confidence. The new construct in the study is Behavioural Intention as the dependent variable. The framework is initiated by combining the HBM with The Theory of Reasoned Action (TRA) by Ajzen & Fishbein, (1980)
Vassallo et al., (2009)	HBM on functional bread consumption	The study utilises four original HBM constructs of Susceptibility, Severity, Benefits and Barriers. Perceived Benefits conceptualised as Perceived Healthiness. The Perceived Barriers conceptualised as Pleasantness.	Health motivation.
Huang et al., 2016	HBM on health examination	The independent variables were 5 original HBM constructs of Perceived Susceptibility, Severity, Benefits, Barriers and Cues to Action	3 additional independent constructs (Self-efficacy, Health knowledge and Social support. The dependent variable was Behavioural Intention.

The augmentation of the HBM has been made in various ways. As indicated in Table 4.1 above, for example, one of the studies that has similarities with the current study is that of Vassallo et al., (2009). However, the study did not study the impact of the construct of Cues to Action. Since the construct of Cues to Action is considered to activate and stimulate consumer readiness to act (Rosenstock, 1966), it is important to include this construct. By considering these identified deficiencies and limitations and relevant discussion made in the Section 2.10.1 in Chapter 2 (literature review), therefore this research, augments the HBM by including additional constructs to form the Extended Health Belief Model (EHBM).

4.4 Extension of the HBM Model

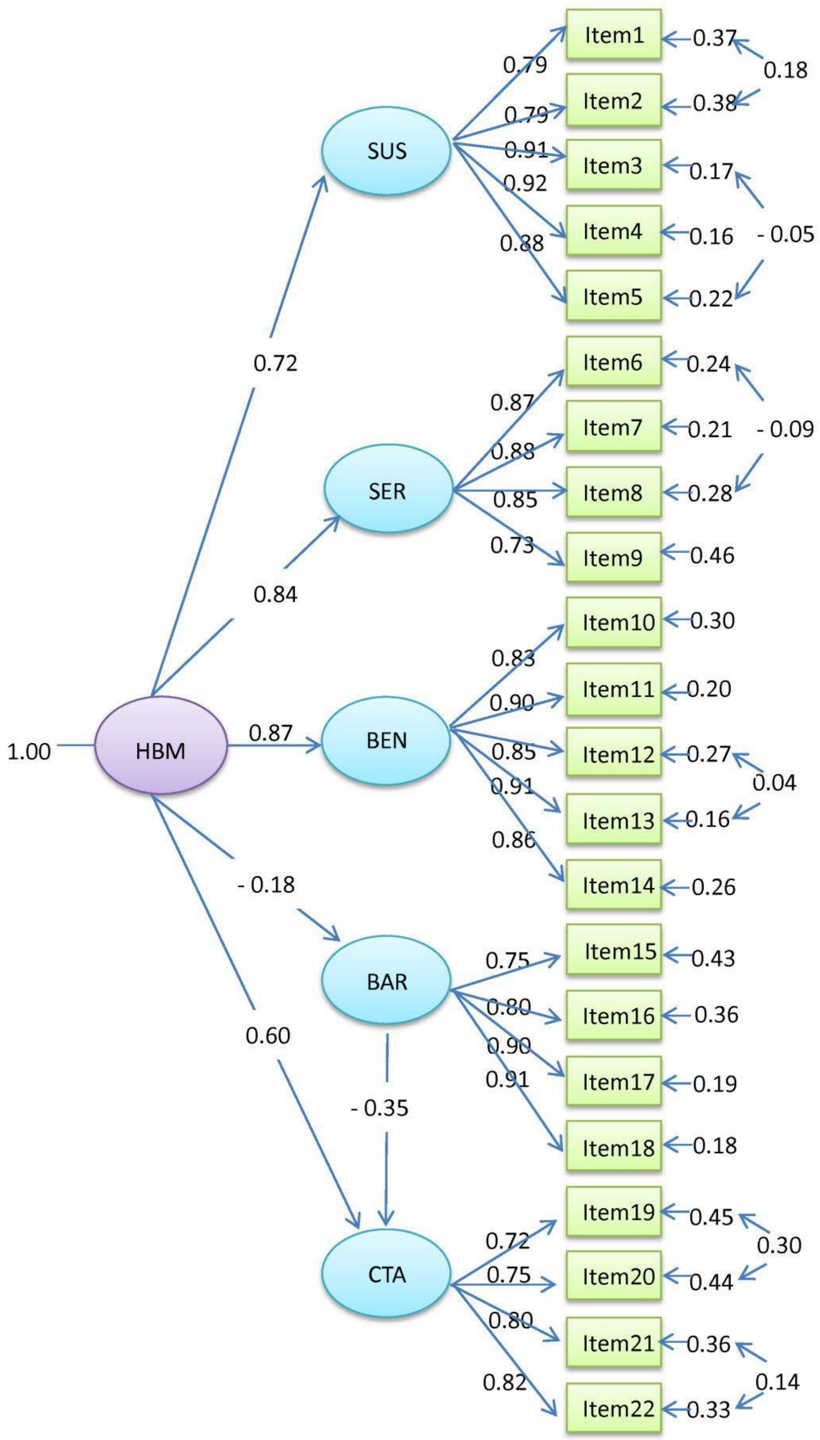
Extension of the HBM model is justified in response to the identified deficiencies and limitation of the original HBM constructs which have been discussed earlier. As mentioned previously, studies in the context of food such as Vassallo et al., (2009) formulate their HBM framework on selective constructs only. Nevertheless, it is important to assess each of the original HBM constructs prior to any decision to omit a construct. Therefore, the current study includes all five original constructs of HBM together with two new constructs to form the Extended Health Belief Model (EHBM). The two additional constructs are Behavioural Intention and Self-identity.

4.4.1 Behavioural Intention

Behavioural Intention is the dependent variable in the EHBM that replaces the dependent variable from the original HBM which was "taking recommended preventive health action" (Rosenstock, 1974, p. 331). As discussed before, the original dependent variable of the HBM is lacking as the specific measurement model for "taking recommended preventive health action" (Rosenstock, 1974, p. 331) *per se* is yet to be established. Most of past studies didn't assess using structural model that incorporates the dependent variable in the HBM framework, rather they only assess the HBM based on measurement of each of the independent constructs (Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers and Cues to Action) focus on the respective context of research.

For example, Cao et al., (2014) assess the HBM in the context of the school health education programme for injury prevention among high school students in the community. The study explores the measurement model of each HBM independent variable only without assessing cause-related effect to any dependent variable (structural model). Figure 4.1 presents HBM framework of past study related to this issue.

Figure 4-1 Example of Past Studies Utilising HBM Framework.



Source: Cao et al., (2014)

Another example, the same case applies to the study by Jalilian et al., (2014) which uses HBM in the assessment of Effectiveness of self-management promotion educational program among diabetic patients. The study only suggests the result based on the measurement model of each construct of HBM that measure individual behaviour without specifying dependent variable.

Nevertheless, there are past studies assessing the HBM dependent variable, however, there are issues identified along with the frameworks.

In relation to this, previous studies utilised this dependent variable only explore based on the context of their research respectively. Hence, the Behavioural Intention is identified as suitable to be utilised as the dependent variable for the EHBM. This dependent variable is much more reliable as it is supported by measurement models in various previous studies, which discussed earlier in Section 2.9.

Besides that, since in the context of this study which aims to measure individuals' intention prior to manifest them into a final behaviour, i.e. taking recommended preventive health behaviour, therefore, it is much more precise to measure using the construct of Behavioural Intention rather than using original construct of 'Action' which the word itself is quite vague in specifying the individual's Intention. Despite in certain extent, the construct of 'Action' seems quite similar in explaining individuals' intention, however, most of the previous studies explain the 'Action' using items that manifest the final behaviour. In particular, there are many redundancies and overlapping in the utilisation of the dependent construct of Action in previous studies. The identified redundancy is when the construct of 'Action' could be used to explain the likelihood of taking the action and it also could be used to explain the real action/ behaviour itself. In getting a clear understanding over these issues, the dependent variable of 'Action' used by past studies utilising HBM framework are useful to reflect this conflict. Table 4.2 presents example of the measurement scales of dependent variable of 'Action' used in a past study utilising HBM.

Table 4-2 Example of Measurement Scales of Dependent Variable of 'Action' in a Past Study

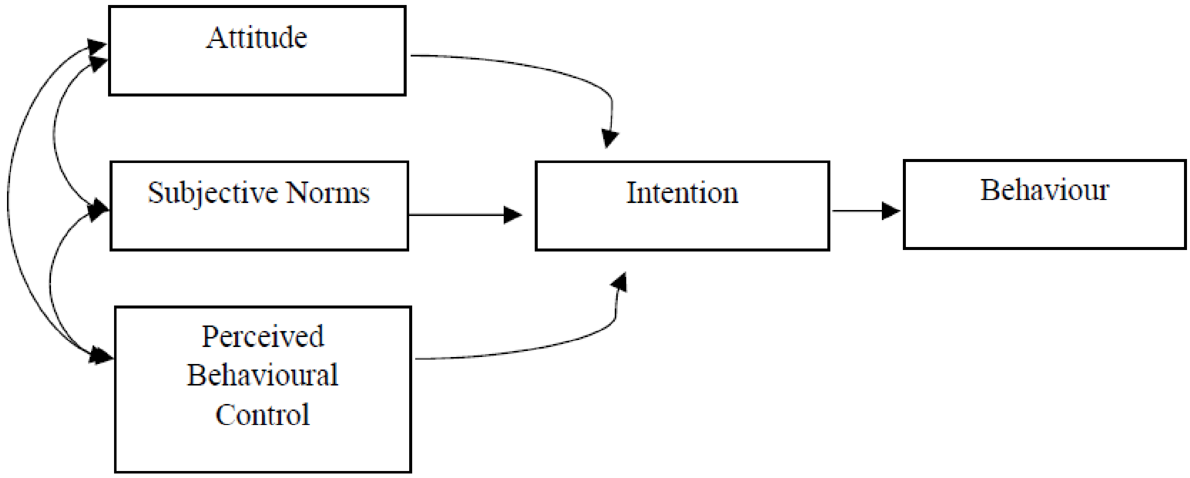
Author	Topic of study	Dependent/outcome variable of 'Action'	Example of Items used and scales
Hanson and Benedict (2002)	Assessment of Older Adults' Food-Handling Behaviours using HBM	Safe food handling behaviours (i.e. sanitation and cross-contamination).	"I keep raw meats and their juices away from other foods" "I wash my hands with soap and warm water before handling food" "I eat raw fish or raw shellfish" Scale value from 1-4. A value from 1 (never) to 4 (often), with assigned values increasing as frequency increased. Option given (a) always, (b) often, (c) seldom, and (d) never

Hence, by taking into consideration of the identified weaknesses of the original construct of 'Action' in relation to this study, it is essential to have a very precise construct that definitely explain individuals' Behavioural Intention in the context of purchase and consume two different types of functional foods.

In order to overcome the identified weaknesses of the construct of 'Action', the Behavioural Intention is deemed as more precise to explain the individual's intention. In justifying this selection, numbers of HBM studies have utilised Behavioural Intention to measure individual's intention. The utilisation of the dependent variable of Behavioural Intention in numbers of HBM studies can be seen in the Table 4.1. For example, Huang et al., (2016) describe Behavioural Intention in the context of health examination by using three scale items 'I intend to perform illness self-examination once a month', 'I will attempt to perform illness self-examination in the next month' and 'I have decided to perform illness self-examination in the next month'.

In justifying this, intentions have been defined in the Theory of Reason Action (TRA) and Theory of Planned Behaviour (TPB) as the individual's total effort to achieve the objective (Ajzen, 1991). Ajzen (1996) described Behavioural Intention as behavioural planning to achieve behavioural ultimate goal (Bandura, 1997). Intentions convey the message of a willingness to execute certain behaviour (Ajzen, 1991). Figure 4.2 illustrates the role of the construct of intention which clearly indicate the separation between intention and actual behaviour.

Figure 4-2 The Theory of Planned Behaviour



Source: Ajzen, (1991)

For the present study, the construct of Behavioural Intention is utilised as the dependent variable. The justification is based upon the importance of Behavioural Intention as a good indicator of consumer readiness to respond prior to taking any action. Previous research has found that Behavioural Intention is a good antecedent of individual behaviour (action); therefore, this research uses this construct as the dependent variable.

4.4.2 Self-Identity

The other new construct in addition to existing HBM constructs is Self-Identity. McCall and Simmons (1978), defined Self-Identity as "the salient part of an actor's self which relates to a particular behaviour that reflects the extent to which an actor sees him or herself as fulfilling the criteria for any societal role" (Conner and Armitage, 1998, p. 1444). Precisely, Self-Identity explains the consumer's perception of "who am I in my own eyes?" (Thoits and Virshup, 1997). Identity-Theory explained by Stryker and Burke (2000) provides some important reference to the construct. Precisely, individual's Self-Identity is developed by two elements that complement one another, i.e. linkages of social structures, and internal process of self-verification.

Inclusion of the construct in the model recognises that Behavioural Intentions are influenced by an individual's personal salient identities (Charng et al., 1988). In addition to justify that, Davidhizar (1983) suggests that while the original constructs of HBM are good predictors determine perception of health and illness, they are lacking in addressing "personality and socioculturally".

Self-Identity theory recognises the individual's stance on certain identity that would influence others (Hagger and Chatzisarantis, 2006). The theory suggests that an individual will match their own values, characteristics with a salient group in society (Turner and Tajfel, 1986). In other words, people have a tendency to adopt the norms and values of the group members to validate their membership status (Hagger and Chatzisarantis, 2006).

Based on this argument, many social psychologists such as Sparks and Shepherd, (1992) and Sparks et al., (1995) identify Self-Identity as an important influence on consumer behaviour. In relation to healthy behaviour, an individual with high a perception of health awareness, tends to positively adopt healthy behaviour recognised in the society (Sparks and Guthrie, 1998).

Eagly and Chaiken, (1993) stated that Self-identity suitably to measure individual behaviour. It is supported by Sparks and Shepherd (1992) that assessed Self-Identity in the context of green identity. The result indicates a positive relationship between Self-Identity and consumers' intention of the consumption of organic vegetables. In another context, a similar positive relationship of Self-Identity to impact dietary change, evidenced in the context of diet with low fat (Sparks et al., 1995). In a related development, Szalavitz, (2012) suggests the significant positive impact of Self-Identity towards intentions in various contexts, i.e. eating behaviour, exercise, drug use and sexuality. Similarly, the reverse outcome would also be possible. The study indicates an individual whose internal identity engages consistently with unhealthy behaviour, tends to continue such behaviour in the society (Szalavitz, 2012; Orji et al., 2012). Therefore, the inclusion of Self-Identity in the model would be a useful additional variable, particularly in various dietary behaviours studies.

Table 4.3 summarises the adoption of Self-identity in models, as having a direct or indirect effect on Behavioural Intention. Previous studies by Charng et al., (1988) and Sparks and Shepherd (1992) utilise Self-Identity as having an indirect effect antecedent, while studies of Sparks and Guthrie (1998), Sparks et al., (1995), Fekadu and Kraft (2001), Terry et al., (1999) and Granberg and Holmberg (1990) employ a direct effect of Self-Identity. In relation to the context of this study, it employs direct effect as to understand the effectiveness of the Self-Identity construct to affect individual's intention.

Table 4-3 The Effect of Self-Identity on Various Topics in Previous Studies

Previous Studies	Outcomes	Relationship
Sparks and Shepherd (1992)	Consume organically grown vegetables	Self-identity (SI) ➡ Attitude ➡ Behavioural Intention
Charng et al., (1988)	Donate blood	Self-Identity (SI) ➡ Attitude ➡ Behavioural Intention
Sparks et al., (1995)	Dietary changes	Self-Identity (SI) ➡ Behavioural Intention
Fekadu and Kraft (2001)	Contraception	Self-Identity (SI) ➡ Behavioural Intention
Sparks and Guthrie (1998)	Diet low in fat	Self-Identity (SI) ➡ Behavioural Intention
Terry et al., (1999)	Household recycling	Self-Identity (SI) ➡ Behavioural Intention
Granberg and Holmberg (1990)	Voting	Self-Identity (SI) ➡ Behaviour (Action)

From Table 4.3, it is evident that several studies (Sparks and Guthrie, 1998; Sparks et al., 1995; Sparks and Shepherd, 1992) have applied their research to food-related issues. However, none of these previous studies have integrated Self-identity into the HBM conceptual framework. For the current study, Self-Identity is used to augment the original HBM model and is the first attempt to employ Self-Identity in the context of functional foods.

4.4.3 Measuring Self-Identity

In measuring the construct of Self-Identity, the scales of a previous study by Spark and Guthrie (1998) are suitable to be adapted for this research since it has been validated. One of the items in the construct of Self-Identity used by these scholars was, "I think of myself as someone who is concerned with healthy eating" (Orji et al., 2012).

In a related study by Sparks and Shepherd (1992) Self- Identity has been measured by two items in the context of green consumerism research. The first consisted of the statement, "I think of myself as a green consumer", while the second consisted of the statement, "I think of myself as someone who is very concerned with green issues". Measurement employed Likert scales. The coefficient of reliability of these measures using Cronbach's alpha was 0.80. Other studies that have used the construct of Self-identity in various fields and the coefficient of Cronbach's alpha is presented in Table 4.4. From the results, it indicated the value of Cronbach's alpha coefficient of 0.84 by Wilson and Muon (2008), 0.86 by van der

Werf et al., (2013), 0.82 by Flores et al., (2010) and 0.80 in the study of smoking by van den Putte et al., (2009).

Table 4-4 Cronbach Alpha for the Construct of 'Self-Identity' in Previous Studies

Previous studies	Cronbach's Alpha	Outcome
Wilson and Muon (2008)	0.84	The exercise identity scale for psychometric properties in a university sample.
Werf et al., (2013)	0.86	The value of environmental self-identity.
Flores et al., (2010)	0.82	Measure psychosocial characteristics of teacher candidates by the academic self-identity.
van den Putte et al., (2009)	0.80	Smoking self-identity and quitting self-identity to motivate quit smoking.

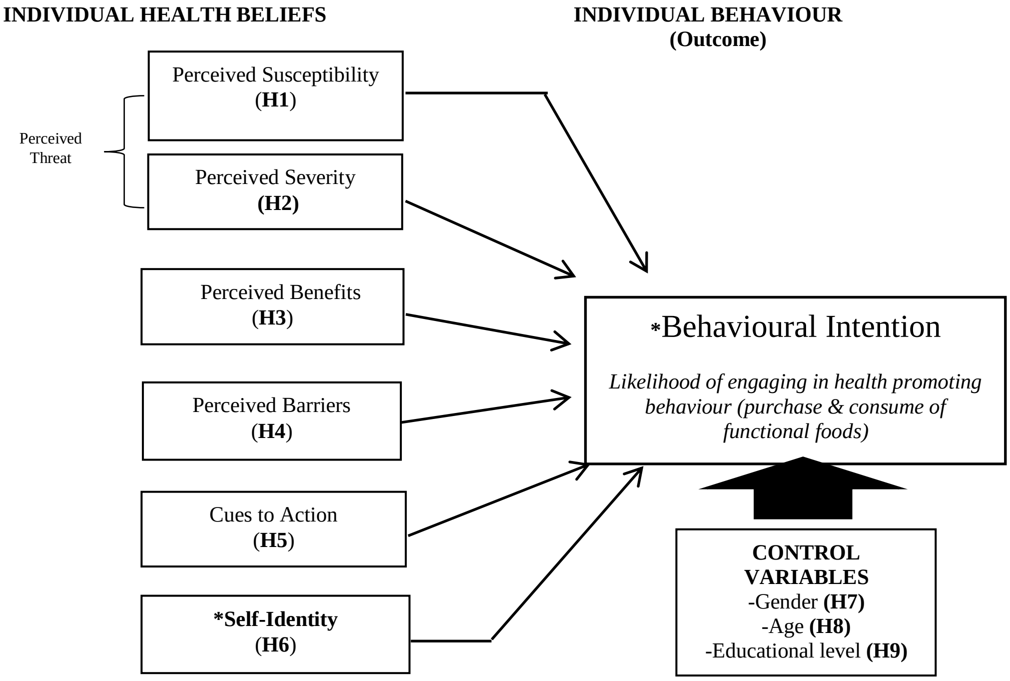
In summary, the inclusion of Self-Identity in the present study is based upon the positive outcome in previous studies in various contexts that measure this construct. It would provide a new value to the framework. In particular, the construct may investigate the impact of Self-Identity in the context of functional foods that would bring a healthier-identity to the consumers.

4.5 Proposed Conceptual Model Framework: Extended Health Belief Model (EHBM)

The aim of the current study is to model consumers' intentions to purchase and consume functional foods. The EHBM is used as the conceptual framework. Two different categories of functional foods are assessed. The first category concerns health promotion (Yoghurt with Live Cultures products). The second category concerns the disease reduction, and utilises Cholesterol Lowering Margarine products.

In introducing an original element to the current study, an augmentation of the original HBM construct is made to enhance the reliability of HBM construct in studying consumers' behaviour particularly in the context of functional food. In particular, dependent variable of Behavioural Intent is adopted from the Theory of Planned Behaviour (Ajzen, 1991) which consistent with many HBM studies, and the construct of Self-identity is adopted from the Identity Theory of Stryker and Burke (2000). The conceptual framework for this study is illustrated in Figure 4.3.

Figure 4-3 The Proposed Conceptual Framework: An Extended Health Belief Model (EHBM)



Note: *Augmentation to Health Belief Model (new construct)*

4.5.1 The EHBM constructs

The EHBM constructs are divided into two categories which represent the dependent construct and the antecedent independent constructs.

The dependent construct of the extended Health Belief Model (EHBM) is Behavioural Intention. Behavioural Intention replaces the original dependent variable of Action in the HBM, which has been justified in the earlier discussion in this chapter. The independent variables of EHBM are Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action and Self-identity. The discussion on the original HBM (i.e. Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, and Cues to Action) are conducted in the previous literature review in Chapter 2, whilst the addition of a new construct of Self-Identity is discussed in this chapter (Section 4.4.2 and 4.4.3).

4.5.2 Control variables

The model includes several control variables, namely gender, age and education. The rationale for including each is discussed below.

4.5.3 Gender

Gender may be an important determinant of Behavioural Intention regarding functional foods. Ares and Gambaro (2007) argued that gender has different impacts to types of characteristic concept of functional foods. In general, high concern about healthy eating and health conscious is more associated with females. Females also had more positive beliefs and attitudes towards a healthier diet (Shepherd and Dennison, 1996). Such positive effect among female is supported by Childs (1997) in the assessment of consumer acceptance of functional food in the U.S. In a related development, a study by Verbeke (2005) to understand the determinants towards functional foods, found a significant difference between gender. Meanwhile, a high willingness to buy a functional food also evidenced among Danish women (Poulsen, 1999). Hence, by taking into consideration of all relevant studies, it is hypothesised that female consumers have more positive Behavioural Intentions compared to male consumers, in regard to the purchase and consumption of functional foods.

4.5.4 Age

Age has been found to be a significant determinant in various studies. Drewnowski and Shultz (2001) found that people eat less and make different food choices as they get older. In this respect, it can be hypothesised that older people tend to have more positive Behavioural Intention towards consumption of functional foods. It is based on the assumption that functional food consumer represents individual that is very particular to disease prevention (high level of disease prevention behaviour). Such assumption regarding elderly consumer of functional food is supported by Childs (1997) in the U.S and Poulsen (1999) in Denmark. Besides that, Serwinek (1992) argued that age must be considered in the research design for experiential results to be meaningful. Hence, by taking into consideration of all relevant studies, it is hypothesised that older age consumers have more positive Behavioural Intentions towards the purchase and consumption of functional foods.

4.5.5 Level of Education

The previous study found higher levels of education have a significant impact to engage in healthy behaviour (van Oort et al., 2004). People with higher level of education tend to have greater knowledge about health and proper treatment of certain diseases such as HIV/AIDS (Layte et al., 2006), diabetes and rheumatoid arthritis (Goldman and Smith, 2002). Katz (1997) found that participation in disease prevention programmes (i.e. cancer screening) is higher for better educated individuals. Furthermore, studies indicate that dietary behaviour can be affected by the level of education (Kearney et al., 2000). In relation to the functional foods, Childs (1997) and Verbeke (2005) found positive acceptance among higher educated individual. Contrary to this, Poulsen (1999) found a positive impact in the willingness to buy functional foods among lower educated people. However, taking into consideration of the importance to have a decent education to understand the health properties and benefits of functional food products, this study hypothesised that higher educated individuals have more positive Behavioural Intentions towards the purchase and consumption of functional foods.

4.6 The Research Hypotheses

This study is based on the principal assumption that consumers' intentions towards functional food are determined by constructs included in the EHBM. The model forms the basis for the test of nine hypotheses. Table 4.5 identifies the constructs and control variables that are the focus for the formulation of hypotheses and provides a summary of the construct themes.

Table 4-5 List of Constructs/ Variables and a Brief Explanation of Proposed Extended Health Belief Model (EHBM)

	THEORY
INDEPENDENT CONSTRUCTS	**Health Belief Model** (descriptions)
Hypothesis 1 Perceived Susceptibility	The person's judgement of his/her vulnerabilities at risk of contracting the related health problem/disease.
Hypothesis 2 Perceived Severity	The perception the seriousness of getting the disease.
Hypothesis 3 Perceived Benefits	The probability of the positive outcome of engaging in the protective behaviour (i.e. The benefits of consuming functional foods).
Hypothesis 4 Perceived Barriers	The probability of the negative outcome/losses/ the cost incurred that interfere with engaging in health behaviour change by consuming functional foods.
Hypothesis 5 Cues to Action	Strategies to activate individual's "readiness". Provide how-to information, promote awareness and reminders. Include internal and external cues. Internal cues involve, such as individual own experience related disease, external cues involve, such as doctor's advice, the illness of close family members, awareness training and guidance programs from experts.
ADDITIONAL SELECTED CONSTRUCTS	**Identity Theory**
Hypothesis 6 Self- Identity * *adapted from the Theory of Planned Behaviour (TPB) augmentation construct*	Formed through the internalisation process. An individual compares others' expectation with own value, beliefs, and previous experience. This will transform them into own self-expectation.
DEPENDENT VARIABLE	**Theory of Planned Behaviour (TPB)**
Behavioural Intention	"Intention" to consume functional food product that adapted from the Theory of Planned Behaviour (TPB) original construct which replaces "Action" in the original HBM.
CONTROL VARIABLES	**Demographic factor**
Hypothesis 7 Gender	Represent by male and female.
Hypothesis 8 Age	Ranging from 18 to above 65 years**.**
Hypothesis 9 Education	Ranging from 'no formal education' to 'masters and PhD'.

Research hypotheses

Nine hypotheses have been formulated in association with the Extended Health Belief Model (EHBM).

Hypothesis 1

H1: Perceived Susceptibility has a positive effect on Behavioural Intention to purchase and consume functional foods.

Perceived Susceptibility measures the respondents' beliefs of their vulnerability to disease. Hence it is proposed that the higher the perception of vulnerability the more positive will be an intention to purchase and consume functional food. In a related study, Xiaoli et al., (2016) found that Perceived Susceptibility to foodborne illnesses significantly influences the consumer to obtain food safety information. Therefore, it can be suggested that a higher degree of Perceived Susceptibility to certain disease consequences, would result in a higher level of consumer Behavioural Intention to purchase and consume functional foods. The rationale of this conduct is due to the consumption of functional foods would prevent them from disease and illness.

In the context of the weight loss and dietary concern, Hur and Jang (2015) suggest Perceived Susceptibility positively influence individual intention. In a related development, Huang et al., (2016) in the context of health examination also suggests positive impact of Perceived Susceptibility towards Behavioural Intention. The result of another context shows the negative elements in the Perceived Susceptibility of the Health Belief Model (HBM) significantly affect the consumer's willingness to use functional breads (Vassallo et al., 2009).

Hypothesis 2

H2: Perceived Severity has a positive effect on Behavioural Intention to purchase and consume functional foods.

The HBM model proposes that people are more likely to change health behaviours when they perceive a condition to be serious and are less likely to engage in healthy behaviours if they believe the condition is not serious (Harrison et al., 1992; Rosenstock, 1974). Huang et al., (2016) suggest a positive impact of Perceived Severity of HBM towards individual intention in the context of health examination. Allen and Goddard (2012) suggest a significant impact of Perceived Severity in the context of consumer preferences for milk and yoghurt. In addition, Ma et al., (2013) indicate a significant impact of Perceived Severity to influence women to undertake cervical cancer screening.

It is proposed that the greater the degree of Perceived Severity, the more the positive intention to purchase and consumer functional food. For this study, in particular, it is based on the assumption that a person would be more likely to have a higher level of Behavioural Intention to engage in healthy behaviour (to purchase and consume functional foods as a healthy diet) if they believed there are tendencies and possibilities of having the severity such as negative physical, psychological and social effects as the consequences of diseases due to improper diet.

Hypothesis 3

H3: Perceived Benefits has a positive effect on Behavioural Intention to purchase and consume functional foods.

The consumption of functional foods is known as a protective behaviour to avoid getting a certain disease, Perceived Benefits indicates the belief that consuming functional foods would be effective in providing health benefits. Perceived Benefits conveys positive messages to understand consumer belief about the benefits of taking specific actions, including accurate information about how effective functional foods are at reducing or mitigating the problems of the condition considered in Perceived Susceptibility and Perceived Severity. The message may also subtly include instructions on taking the recommended actions and indicate the time scales involved before benefits appear. In a related study, it is evident that Perceived Benefits positively affected attitude toward Behavioural Intention towards street food (Choi et al., 2013). Another study of Dobrenova et al., (2015) suggest a positive impact of Perceived Benefits on the promotion of functional ingredients and functional foods of Japanese products with probiotics. Cazacu et al., (2014) also suggest the Perceived Benefits related to nutrition is one of the factors to positively impact the purchase intention of water buffalo milk products in Greece. In another context of study, Rezai et al., (2014) suggest the positive impact of Perceived Benefits as influencing factors of purchase synthetic functional foods in Malaysia. The utilisation of Perceived Benefits in the EHBM of the current study is based on the assumption that a person would be more likely to have the intention to purchase and consume functional foods if they believed that the degree of possible positive benefits exceeds the perceived threat (Perceived Susceptibility and Perceived Severity).

Hypothesis 4

H4: Perceived Barriers have a negative effect on Behavioural Intention to purchase and consume functional foods.

A previous study by Poulsen (1999) described that Perceived Barriers negatively influence consumers. The identified factors were such as, the cost of foods, consumers' preference, lack of knowledge about functional foods, and uncertainty about whether they (consumers) are getting the right number of active ingredients in a serving of functional foods. In the current study, the relationship suggests that higher levels of Perceived Barriers would reduce consumers' intentions to consume functional food. Furthermore, in examining the impact on consumers' intentions towards functional foods, if the Perceived Barriers outweighs the Perceived Benefit, the lower would be the intention to consume functional foods. To support this hypothesis, various past studies have produced a similar significant impact of Perceived Barriers. For example, Huang et al., (2016) evidenced higher Perceived Barriers would significantly affect individual Behavioural Intention on health examination, which explained by negative intentions. Lubran (2010) also confirms the negative impact of Perceived Barriers in the context of farmer's behaviour on farm processing license. In another study, Buglar et al., (2010) also confirm a significant negative impact of Perceived Barrier to the individual intention of dental service. Deshpande et al., (2009) also suggest a significant negative impact of Perceived Barriers in the context of healthy eating among college students.

Hypothesis 5

H5: Cues to Action has a positive effect on Behavioural Intention to purchase and consume functional foods.

A positive relationship between Cues to Action (stimulus) and consumers' action to purchase functional foods is expected. For the purpose of this research, in studying consumers' behaviour towards functional food cues (e.g. a doctor's advice, family influence, advertisements, friends and colleagues' guidance) may encourage changes to healthy behaviour, especially for people who not used to consume functional foods. To support this, past studies have indicated the significant impact of Cues to Action, i.e. Lubran (2010) in the context of farmers' behaviour on farm processing license, Huang et al., (2016) in the assessment of HBM on health examination. Deshpande et al., (2009) in the assessment of healthy eating also confirm the positive influence of Cues to Action.

Besides that, many other studies that suggest positive relationships of Cues to Action on consumer behaviour, i.e., Broers et al., (2018) in the context of vegetable choice, Penafiel

(2016) in the context of consumption of traditional foods, and Sekhon and Szmigin (2009) suggest that reference groups such as family members and ethnic community significantly influence purchase decision making.

Hypothesis 6

H6: Self-Identity has a positive effect on Behavioural Intention to purchase and consume functional foods.

According to Levy (1959), consumers would behave consistently based on their sense of self. The sense of self which explain the possession about certain values and the belief that creates individual self-identity (Sirgy 1982). In relation to functional food that offer higher health properties than ordinary foods, the individual Self-Identity is a reflection about the individual's sense of self or their stand about their health consciousness. Precisely, in the context of functional food consumption, Self-Identity is a manifestation and affirmation of individual concerns about the health properties associates with the product. This is in line with the role of Self-Identity to explain the consumer behaviour sense of self, which based on their needs, which explore the individual distinctiveness, affiliation, self-affirmation and self-verification (Curator, 2013). In this regard, an individual with a good health consciousness would assume to have a positive Self-Identity. It is expected that there is a positive relationship between Self- Identity and Behavioural Intention. As functional foods are associated with food that provides a health benefit beyond basic nutrition, consumers of these types of food would gain its higher health benefit as compared to conventional foods, thus would have a healthier identity.

The hypothesis is that Self-Identity would have a positive effect to trigger an individual's Behavioural Intention to purchase and consume functional foods. The positive effects (if proven) in this study, would corroborate past studies in other contexts, such as by Armitage and Conner, (1999) and Sparks and Shepherd, (1992). In related development Khare and Pandey, (2017) suggest that a 'green self-identity' positively fosters trust in organic food retailers. Sparks and Shepherd, (1992) suggest Self-Identity positively affects purchase behaviour for organic vegetables. In a related context, Loebnitz et al. (2015), indicates that individuals with strong pro-environmental self-identities have stronger intentions to purchase fruits and vegetables.

Control variables

Three hypotheses are formulated for the effect of the control variables of Gender, Age and Level of Education. The evidences supporting these hypotheses are presented in Sections 4.5.3, 4.5.4 and 4.5.5 respectively.

Hypothesis 7

H7-Gender

Females have a higher Behavioural Intention to purchase and consume functional foods, compared to males.

Hypothesis 8

H8- Age

Older people have a higher Behavioural Intention to purchase and consume functional foods.

Hypothesis 9

H9-Level of education

Higher educated people have a higher Behavioural Intention to purchase and consume functional foods.

4.7 Chapter Summary

This research focuses on two different categories/types of functional food products, one with disease risk reducing factor (for specific health benefits) and another one promoting better health in general (for general health benefits). In particular, Cholesterol Lowering Margarine and Yoghurt with Live Cultures products are used in the empirical research. The determinants of consumers' Behavioural Intentions for these product groups, are assumed to be captured by constructs included in the Extended Health Belief Model (EHBM). This model developed from the HBM model. The thesis continues with an explanation of the research methodology in Chapter 5.

Chapter 5. The Research Methodology

5.1 Introduction

This chapter discusses the systematic development of the research design. It also provides a justification of the selection of the research methods utilised in the study. Since the literature review laid the foundations and informed the development of a theoretical framework, the research methodology can now be presented. This chapter is organised into nine major sections. The initial discussion begins with the research paradigm and philosophy in Section 5.2. Following this, Section 5.3 discusses research design and purpose: a quantitative research strategy involving a web-based survey. It continues with a discussion about research implementation (data collection method and administration) in Section 5.4. Sections 5.5 and 5.6 address sampling and data preparation and screening, respectively. Furthermore, Section 5.7 explains the data analysis strategy. The discussion continues by addressing the reliability, validity and unidimensionality of the measures used in Section 5.8. It followed by Section 5.9 which describes the exploratory factor analysis (EFA). The next Section 5.10 presents an overview of structural equation modelling (SEM). Finally, Section 5.11 presents a summary of the chapter.

5.2 Research Paradigm and Philosophy

The study seeks to expand knowledge and understand consumer behaviour using the EHBM in the context of two different types of functional foods. With respect to the importance of research design, Aaker et al., (2004) stressed that the usefulness and value of a research project depends on the quality of its research design, data collected and analysis.

5.2.1 Research paradigm

According to Mangan et al., (2004), the research paradigm is central to research design. Kuhn (1970) described it as “the world view”. Furthermore, the research paradigm reflects “the researcher’s value judgements, norms, standards, frames of reference, perspectives, ideologies, myths, theories, and approved procedures that govern their thinking and action” (Gummesson, 1999, p. 18). In addition to that, Denzin and Lincoln (2011) note that research paradigms can be explained from a philosophical perspective, drawing on the concepts of ontology, epistemology and methodology. In understanding these three elements, Denzin and

Lincoln (2011) described firstly, ontology as ways of constructing reality, or precisely, how does it look like and how does it work. Secondly, epistemology is described as the reality of different types of knowledge and the basis for the establishment of knowledge. Thirdly, methodology refers to the tools that are used to know that reality.

5.2.2 Research philosophy

Two main factors affect the choice of a research method. Firstly, the ontology which explains the researcher's view of reality (Chung and Alagaratnam, 2001). Secondly, the research objectives, together with the research questions. Fundamentally, there are multiple research philosophies. Table 5.1 describes the main research philosophies and their differences in terms of ontology, epistemology and methodology.

Table 5-1 Summary of Characteristic of Research Perspectives

Orientation	Positivism	Post-positivism (Realism)	Interpretive/ Constructivism	Critical Theory	Pragmatism
Synonym	Verify	Predict	Understand/ Interpret	Emancipate	Dialectic
Ontology (What is real?)	Objectivist ✓ Realism ✓ Findings=truth	Modified Objectivist ✓ Transcendental realism ✓ Findings probably true	"Local, relative, co-constructed realities, subjective objectivity, relativism" (Surtees, 2014, p. 85).	"Historical/virtual realism shaped by outside forces, material subjectivity" (Surtees, 2014, p. 85).	"Constructed, based on the world we live in and explanations that produce the best-desired outcomes" (Surtees, 2014, p. 85).
Epistemology (What is true?)	"The only knowledge is scientific knowledge which is the truth, reality is apprehensible" (Surtees, 2014, p. 85).	✓ Finding the approximate truth. ✓ A reality is never fully captured.	Co-created multiple realities and truths.	"Findings are based on values, local examples of the truth" (Surtees, 2014, p. 85).	Objective and subjective points of view.
Methodology (How to examine what is real?)	Quantitative ✓ Primarily experimental ✓ Quasi experimental ✓ Surveys.	Quantitative ✓ Experimental with threats to validity Qualitative ✓ Observations ✓ Survey ✓ Case study	Often qualitative and/or quantitative ✓ Phenomenology ✓ Grounded Theory	Usually qualitative, but also quantitative ✓ Interpretive case study ✓ Action research.	✓ Qualitative ✓ Quantitative
Method	✓ Measurements ✓ Observation ✓ Structured questionnaires ✓ Interviews	✓ Measurements ✓ Observation ✓ Structured questionnaires ✓ Interviews	✓ Open ended questions ✓ Collection of qualitative data ✓ Recording of observations ✓ Impressions	✓ Measurements ✓ Focus group interviews ✓ Community organisation ✓ Action	Conduct single face to face interviews or a focus group interview. The findings are then utilised for a construction of a questionnaire which to be

					applied to a larger sample of the group.

Sources: Surtees, (2014); Bryman and Bell, (2015); Grubic and Fan, (2010); Guba and Lincoln, (2005).

5.2.3 The research philosophy of the present study

The present study focuses on consumer behaviour in the context of food and health, and in particular functional foods. In general, Hudson and Ozanne, (1988) indicate that positivist or interpretivist approaches are more common in the social sciences.

Since this study seeks to explain and predict consumer behaviour, it is more appropriate to construct a research design within the positivist approach. This is based on the justification that the ontology of positivists emphasises the observable reality (Naslund, 2002). Besides that, the separation between the researcher and what is to be researched is the key principle in the epistemology of positivism (Gummesson, 1999).

According to Neuman (2000), in order to understand a causal relationship in a behavioural study, the combination of deductive logic and empirical observations are the most effective when based on a positivist outlook.

5.3 Research Design and Purpose: Quantitative Research Strategy through Web-Based Questionnaire Survey

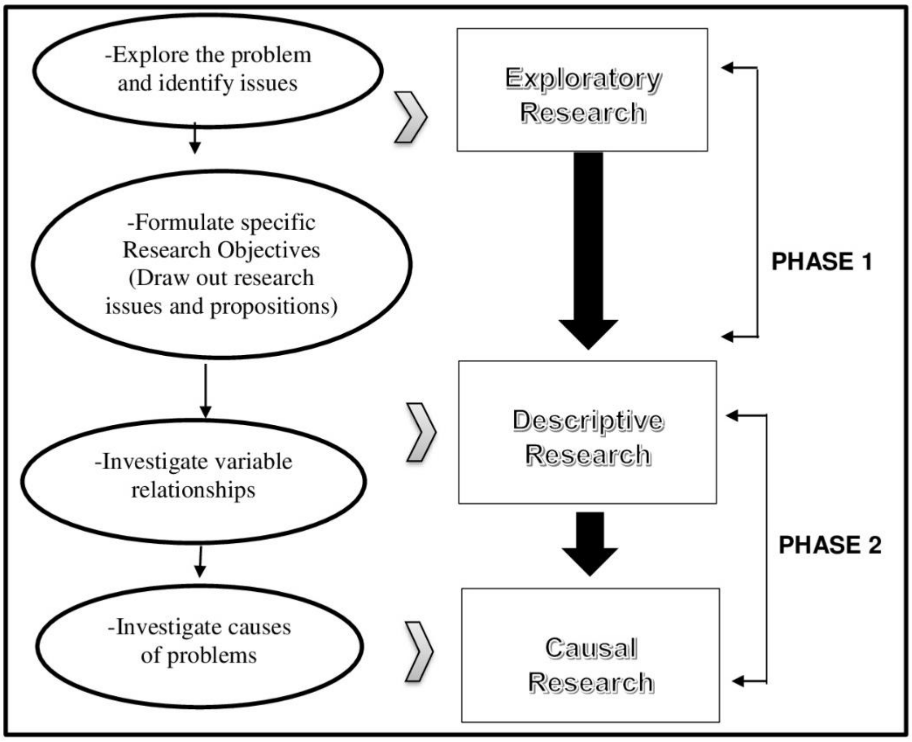
Since the paradigm and philosophy of this study have been established, a research design is identified. A research design is "a set of advanced decisions that makes up the master plan specifying the methods and procedures for collecting and analysing the needed information" (Burns and Bush 2004, p. 120). A suitable research design is important in each research. Consideration of choosing a type of data, technique for data collection, the methodology for sampling, the research schedule and the research budget are all aspects of the research design. A good research design will help to guide the proper steps to achieve the research aims and objectives, based on the different classification of issues either based on theory or policy for the resolution (Hair et al., 2003; Hamid, 2006).

There are three categories of research design. Aaker et al., (2004) describes these categories as exploratory research, descriptive research and causal research. Burns and Bush (2004) suggested that the combination of these categories is necessary but not compulsory.

The exploratory study is a starting point, as a background to gather as much information as possible regarding the identified issues. It follows with a descriptive study, which involves analysis based on the information or data collected. Once completed, further analysis can be conducted in order to identify the determinants, and cause and effect of variables in the study (Hamid, 2006).

In relation to this study, the objective is to understand the consumers' intentions to purchase and consume functional foods. In brief, the research design of the study dealt in two phases which is illustrated in Figure 5.1.

Figure 5-1 Relationship between Research Designs



Source: Churchill and Iacobucci (2002)

Phase one

An exploratory study involves flexibility of suitable and appropriate methods to be employed in exploring insights and to develop relevant hypotheses (Churchill and Iacobucci, 2002). According to Hair et al., (2003), an exploratory study is also useful to provide an insight and information about possible development of scales in the next phase of descriptive research. For this study, exploratory research (phase 1) based on secondary data and a literature review was undertaken to draw out research issues and propositions. The review of the literature was conducted to obtain insight into the relevant problems, which led to the establishment of the theoretical framework of EHBM in this study.

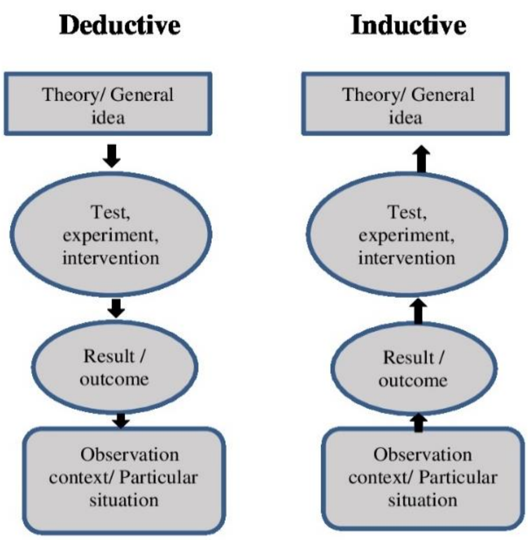
Phase two

In this stage, causal research is the focus as there has already been prior research using the HBM as a theoretical framework. Nevertheless, prior to that, descriptive analysis is conducted. In this study, the description of the characteristics of current consumers' perspectives on functional foods is obtained. Causal research focuses on the analysis of cause and effect correlation for each variable and provides evidences (Hair et al., 2003). This study investigates the antecedents of intentions to purchase and consume functional foods. In this study, causal research generates evidence to make inferences to justify the hypotheses between factors in the EHBM.

5.3.1 Research strategy and approach

According to Creswell (2013), the selection of a research strategy and approach determines the level of validity of the study. The decision to adopt a suitable and an appropriate research approach is reflected by either theory or first the collection of data to establish a theory. In relation to this, Figure 5.2 illustrates the deductive and inductive approaches.

Figure 5-2 The Research Approaches



Source: Trochim, Donnelly, and Arora, (2016) Trochim, Donnelly, and Arora, (2016) explained the deductive reasoning approach begins with an identified theory or general idea relating which is applied to a more specific context(s). In other words, the research findings are deduced from the theory or a general idea that underpins the research framework. From the theory, hypotheses are formed which would be accepted or rejected from the analysis of data collected (Bryman, 2004). Alternately, the inductive approach starts with a specific circumstance or situation, issue or an idea and leading to a development of a theory (Babbie, 2013).

This study is within the positivist paradigm and it involves an exploratory, descriptive and causal research design. Hence, this study appropriately adopted the deductive approach.

5.3.2 Quantitative method

As discussed earlier, the aim of this study is to assess the validity of the EHBM and its constituent elements to explain intentions to purchase and consume functional foods. For this reason, together with reference to the present study's aims and objectives, a quantitative strategy is employed, utilising a web-based questionnaire. A questionnaire-based approach is chosen to allow the researcher to directly collect information from respondents. It also facilitated wide and inclusive coverage, enabling generalisation. Furthermore, the quantitative data collection method, utilising an online survey, enables the collection of a large volume of data in a short time period. The quantitative method employed in this study, involves the testing of research hypotheses and validation of a model using statistical methods.

5.3.3 Web-based survey questionnaire

The main method employed for data collection in this study, is a web-based questionnaire. Qualtrics.com software was used to create and publish a web-based questionnaire. Among the justifications of utilising Qualtrics.com software includes its user-friendly element that allows the creation of a web-based survey by the researcher. Following the creation of the questionnaire, an administrator at Qualtrics.com distributed the questionnaire to a representative panel data of UK adults (Detail of the sample used in this study is further discussed in Section 5.5).

There are several advantages to collecting survey data via the web as opposed to other means such as postal and telephone. (Solomon, 2001). A web survey is less expensive and user friendly (Dillman 2000). In addition, Bryman, (2004) suggested a larger sample can easily be reached via web platform. In this study, the utilisation of a Qualtrics panel helped reach respondents across the UK. Among the benefits of using the Qualtrics panel was obtaining respondent feedback quicker, since there are huge number which over 4 million respondents from all walks of life of registered participants who form part of Qualtrics' panels.

5.3.4 Choice of a cross-sectional design

A cross-sectional design focuses on one single point in time for data collection. As the study focuses on explaining intentions at one point in time, which is common to most HBM and TPB applications, a cross-section rather than a longitudinal design was deemed appropriate.

5.4 Research Implementation (Data Collection Method and Administration)

This research draws on primary data. Primary data collection occurred based upon the conceptual framework developed. The questionnaires were constructed, and a consumer survey conducted. In answering the research objectives in this research, the present study employed a quantitative design using the deductive approach.

5.4.1 Questionnaire development

The first phase focused on questionnaire design. This involves establishing the right scales for each of the constructs in the research theoretical framework. In relation to guarantee a high standard of the questionnaire, opinions and insights of experts which are gathered in this study involved a consultation with the researcher's PhD supervisors. Prior to the development of a good questionnaire to measure the constructs in this study, careful consideration was given to reliability and validity. Diamantopoulos, (2005) suggested, in developing a questionnaire based on a conceptual framework, it can be made by either adapting existing published items of the identified constructs or creating new scales. In addition to that, refinement of the measurement instrument is also essential to correctly measure each of the research constructs developed.

In relation to this study, items were adapted from published and verified scales for which reliability and validity are proven. The process of refinement and verification for each of the constructs to fit with the context of this study was made with input from fellow academics, prior to the pre-test.

Subsequently, the developed questionnaires were screened, pre-tested and launched to reach target respondents in the UK, as the representative sample of consumers. The screening process to ensure understanding each of the items, involved some potential respondents, i.e. ten postgraduate students at Newcastle University. Next, a pre-test was conducted with 30 respondents (both academics as well as non-academics). The pre-test provided feedback to the researcher regarding any potential issues with items in the questionnaire.

5.4.2 Constructs measurement and scale modification

The study utilises seven constructs. For each, multiple questions capture the underlying, latent construct (Steenkamp and Baumgartner, 2000). All items in every construct are measured using a seven-point Likert scale (1 = Strongly disagree, 7 = Strongly agree). Each construct and associated questions are explained below. In addition to that, further information regarding the questionnaires is presented in the appendices. Specifically: Appendix 1: Survey questionnaire (Yoghurt with Live Cultures); Appendix 2: Survey questionnaire (Cholesterol Lowering Margarine); Appendix 3: EHBM constructs and items (Yoghurt with Live Cultures); Appendix 4: EHBM constructs and items (Cholesterol Lowering Margarine). Appendix 5 summarises the control variables in the EHBM.

5.4.3 Items for EHBM constructs and measures

This section describes the items for each of the EHBM constructs. In summary, there are 39 items for each context (Cholesterol Lowering Margarine and Yoghurt with Live Cultures) investigated in this study. The questions are similar in both contexts. The total number of items for both contexts is thus 78. All items were assessed for reliability and validity. Table 5.2 details the number of items utilised for capturing each construct, along with relevant sources.

Table 5-2 Number of Items for each EHBM Construct

		Number of items for the subject: Yoghurt with Live Cultures.	**Number of items for the subject:** Cholesterol Lowering Margarine.	**Sources**
Independent variables				
1	Perceived Susceptibility	8	8	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.98)*
2	Perceived Severity	7	7	**Deshpande et al., (2009)** *(Cronbach alpha 0.86)*
3	Perceived Benefits	6	6	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.99)*
4	Perceived Barriers	8	8	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.99)*
5	*Cues to Action	3	3	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.97)*
		1	1	**Deshpande et al., (2009)** *(Cronbach alpha 0.66)*
6	*Self-Identity	3	3	**Sparks and Guthrie (1998)** *(Cronbach's alpha 0.82)*
Dependent variable				
1	*Behavioural Intention	3	3	**Sparks and Guthrie (1998)** *(Cronbach's alpha 0.82)*
TOTAL ITEMS		**39**	**39**	

Note: ***** additional construct that creates EHBM (compared to HBM)

5.4.4 Operationalisation of Consumers' Perceived Susceptibility

This construct is adapted from the Health Belief Model (Champion and Scott, 1997) and in particular, derives from Erkin and Ozsoy (2012) which measures an individual's Perceived Susceptibility to influenza. The wording of items from Erkin and Ozsoy (2012) was adapted and refined to fit with the context of functional foods. Eight items are used to measure this construct, as presented in Table 5.3.

Table 5-3 Items of Perceived Susceptibility Scale

	Items of Perceived Susceptibility Scales		Reference
	Yoghurt with Live Cultures	Cholesterol Lowering Margarine	
1	If I do not adopt a healthy lifestyle I could suffer from digestive system problems.	If I do not adopt a healthy lifestyle I could suffer from coronary heart disease.	Erkin and Ozsoy (2012)
2	Someone of my age is at risk of getting digestive system problems.	Someone of my age is at the risk of getting coronary heart disease.	
3	It is likely that I could suffer a digestive system problem.	It is likely that I could suffer coronary heart disease.	
4	Anyone may suffer from digestive system problems if they do not adopt a healthy diet.	Anyone may suffer from coronary heart disease if they do not adopt a healthy diet.	
5	I might develop a digestive system problem in the future.	I might develop coronary heart disease in the future.	
6	I am concerned about getting digestive system problems.	I am concerned about getting coronary heart disease.	
7	I could suffer a serious problem with my digestive system in the next year.	I could suffer from coronary heart disease in the next year.	
8	The thought of getting digestive system problems, worries me.	The thought of getting coronary heart disease worries me.	

5.4.5 Operationalisation of Consumers' Perceived Severity

This construct is adapted from the Health Belief Model (Champion and Scott, 1997). Specifically, this construct is adapted from Deshpande et al., (2009) which measured individual Perceived Severity in relation to healthy eating habits. The wording of items from Deshpande et al., (2009) was adapted and refined to fit with the context of functional foods. Table 5.4 presents the seven items that measure this construct.

Table 5-4 Items of Perceived Severity Scale

	Items of Perceived Severity Scales		Reference
	Yoghurt with Live Cultures	Cholesterol Lowering Margarine	
1	A digestive system problem would distract from my daily work activities.	Coronary heart disease would distract from my daily work activities.	Deshpande et al., (2009)
2	A digestive system problem would have long-lasting effects.	Coronary heart disease would have long-lasting effects.	
3	A digestive system problem would make me less active if it was very serious.	Coronary heart disease would make me less active if it was very serious.	
4	A digestive system problem would be financially damaging and result in loss of earnings.	Coronary heart disease would be financially damaging and result in loss of earnings.	
5	A digestive system problem would harm my career.	Coronary heart disease would harm my career.	
6	A digestive system problem would affect my social relationships.	Coronary heart disease would affect my social relationships.	
7	A digestive system problem would affect my family life.	Coronary heart disease would affect my family life.	

5.4.6 Operationalisation of Consumers' Perceived Benefits

This construct is adapted from the Health Belief Model (Champion and Scott, 1997) and specifically the previous study by Erkin and Ozsoy (2012), which measures an individual's Perceived Benefits associated with influenza medication. Again, the wording of items from Erkin and Ozsoy (2012) was adapted and refined to fit the context of this study. Six items were used to measure this construct as described in Table 5.5.

Table 5-5 Items of Perceived Benefits Scale

Items of Perceived Benefits Scales			Reference
	Yoghurt with Live Cultures	Cholesterol Lowering Margarine	
1	Consuming yoghurt with live cultures would protect me from getting digestive system problems.	Consuming cholesterol lowering margarine would protect me from getting coronary heart disease.	Erkin and Ozsoy (2012)
2	Consuming yoghurt with live cultures would protect others in my household from getting digestive system problems.	Consuming cholesterol lowering margarine would protect others in my household from getting coronary heart disease.	
3	The health benefits of consuming yoghurt with live cultures would help me avoid being absent from work.	The health benefits of consuming cholesterol lowering margarine would help me avoid being absent from work.	
4	Consuming yoghurt with live cultures would be beneficial for my digestive system health.	Consuming cholesterol lowering margarine would be beneficial for the health of my heart in particular.	
5	Consuming yoghurt with live cultures would give me more confidence that I can avoid digestive system problems.	Consuming cholesterol lowering margarine would give me more confidence that I can avoid coronary heart disease.	
6	Consuming yoghurt with live cultures would reduce the likelihood of getting other diseases related to an unhealthy digestive system.	Consuming cholesterol lowering margarine would reduce the likelihood of getting other diseases related to an unhealthy cardiovascular system.	

5.4.7 Operationalisation of Consumers' Perceived Barriers

This construct is adapted from the Health Belief Model (Champion and Scott, 1997). In particular, the measurements of this construct are based on Erkin and Ozsoy (2012). Again, the wording of items was adapted to fit with the context of functional foods. Table 5.6 presents the six items utilised to measure this construct.

Table 5-6 Items of Perceived Barriers Scale

Items of Perceived Barriers Scales			Reference
	Yoghurt with Live Cultures	Cholesterol Lowering Margarine	
1	Consuming yoghurt with live cultures is not convenient for me.	Consuming cholesterol lowering margarine is not convenient for me.	Erkin and Ozsoy (2012)
2	In order to obtain the benefits of consuming yoghurt with live cultures, I would have to give up some of my favourite snacks/ foods.	In order to obtain the benefits of consuming cholesterol lowering margarine, I would have to give up some of my favourite snacks/ foods.	
3	I don't like the taste of yoghurt with live cultures.	I don't like the taste of cholesterol lowering margarine.	
4	I think it would take too much effort to change my diet to include frequent consumption of yoghurt with live cultures.	I think it would take too much effort to change my diet to include frequent consumption of cholesterol lowering margarine.	
5	Consuming yoghurt with live cultures would interfere with my daily routine.	Consuming cholesterol lowering margarine would interfere with my daily routine.	
6	Consuming yoghurt with live cultures might be risky for those who are intolerant to dairy products.	Consuming cholesterol lowering margarine might be risky for those having certain food allergies.	
7	It is too difficult to frequently consume yoghurt with live cultures as the price is higher than alternative food products.	It is too difficult to frequently consume cholesterol lowering margarine as the price is higher than alternative ordinary margarine.	
8	I am concerned about the uncertainty of the benefits of consuming yoghurt with live cultures.	I am concerned about the uncertainty of the benefits of consuming cholesterol lowering margarine.	

5.4.8 Operationalisation of Consumers' Cues to Action

This construct is adapted from the Health Belief Model (Champion and Scott, 1997) with a combination of items used by Erkin and Ozsoy (2012) and Deshpande et al., (2009) which measure individuals' Cues to Action relating to influenza and healthy eating habits respectively. The wordings of items are again modified and refined to fit the context of functional foods, with 3 items derived from Erkin and Ozsoy (2012) and one item from Deshpande et al., (2009). Table 5.7 presents the list of items used to measure the construct Cues to Action in this study.

Table 5-7 Items of Cues to Action Scale

Items of Cues to Action Scales			References
	Yoghurt with Live Cultures	Cholesterol Lowering Margarine	
1	I would more likely consume yoghurts with live cultures if recommended by a doctor.	I would more likely consume cholesterol lowering margarine if recommended by a doctor.	Erkin and Ozsoy (2012)
2	I would more likely consume yoghurts with live cultures if recommended by my family.	I would more likely consume cholesterol lowering margarine if recommended by my family.	
3	I would more likely consume yoghurts with live cultures if its health benefits were advertised in the mass media (press, magazines, newspaper, radio, television, and internet).	I would more likely consume cholesterol lowering margarine if its health benefits were advertised in the mass media (press, magazines, newspaper, radio, television, and internet).	
4	I would more likely consume yoghurts with live cultures if recommended by my friends and colleagues.	I would more likely consume cholesterol lowering margarine if recommended by my friends and colleagues.	Deshpande et al., (2009)

5.4.9 Operationalisation of Self-Identity

This construct is adapted from a modified version of the Theory of Planned Behaviour developed by Sparks and Guthrie (1998) that measures an individual's Self-Identity. The wordings of items are modified and refined to fit the context of functional foods. The measure of the construct of Self-Identity utilises three items, as presented in Table 5.8.

Table 5-8 Items of Self-Identity Scale

Items of Self-Identity Scales			Reference
	Yoghurt with Live Cultures	Cholesterol Lowering Margarine	
1	"I think of myself as the sort of person who is concerned about the long-term health effects of my food choices" (Sparks and Guthrie, 1998, p. 1399).	"I think of myself as the sort of person who is concerned about the long-term health effects of my food choices" (Sparks and Guthrie, 1998, p. 1399).	Sparks and Guthrie (1998)
2	"I think of myself as someone who generally thinks carefully about the health consequences of my food choices" (Sparks and Guthrie, 1998, p. 1399).	"I think of myself as someone who generally thinks carefully about the health consequences of my food choices" (Sparks and Guthrie, 1998, p. 1399).	
3	"I think of myself as a health-conscious person" (Sparks and Guthrie, 1998, p. 1399).	"I think of myself as a health-conscious person" (Sparks and Guthrie, 1998, p. 1399).	

5.4.10 Operationalisation of Consumers' Behavioural Intention (endogenous construct)

This construct is adapted from the Theory of Planned Behaviour (Ajzen, 1985). In particular, this construct is derived from the previous study by Sparks and Guthrie (1998) that measures an individual's Behavioural Intention in the Theory of Planned Behaviour. Again, the wordings of items are adapted and refined to fit the context of functional foods in this study. The measure of the construct of Behavioural Intention utilises three items as presented in Table 5.9.

Table 5-9 Items of Behavioural Intention Scale

	Items of Behavioural Intention Scales		Reference
	Yoghurt with Live Cultures	Cholesterol Lowering Margarine	
1	I will make an effort in future to eat yoghurt with live cultures.	I will make an effort in future to eat cholesterol lowering margarine.	Sparks and Guthrie (1998)
2	I would encourage my friends and family to eat yoghurt with live cultures in the future.	I would encourage my friends and family to eat cholesterol lowering margarine in the future.	
3	In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	In the future, I intend to eat a diet that includes cholesterol lowering margarine even it is more expensive.	

5.4.11 Form of response

According to Alreck and Settle, (2004) to measure latent (unobservable) constructs, the utilisation of rating scales is very popular and common in social science research. In relation to the instrument in this study, all constructs are measured on seven-point Likert-type scales. Preston and Colman, (2000) argued that despite a five-point scale being considered adequate, a seven-point scale allows for a finer level of detail. In addition to that, no undue cognitive burden is placed to the respondent. Furthermore, optimal information together with higher scale reliability is associated with a seven-point Likert scale (Churchill and Peter, 1984). In relation to the analysis, Likert scale data are treated as metric data. Whilst, demographic data is treated as nominal (Nunnally and Bernstein, 1994).

5.4.12 Question wording

The process of composing the questions drew on several previous studies. In particular, the questionnaire items were composed with reference to previously published and validated questionnaires on influenza (Erkin and Ozsoy, 2012), healthy eating habits (Deshpande et al., 2009) and Self-Identity (Sparks and Guthrie, 1998) and then adapted to the context of this study.

In order to ensure the interpretation of the questions was consistent, the questionnaire used simple words, and attempted to avoid ambiguity and double-barrelled questions that would bring confusion, (Churchill and Iacobucci, 2005).

5.4.13 Question sequence

According to Tourangeau et al. (2000), the sequencing of questions can significantly affect the answers of respondents. Applying the guidelines from Dillman (2000) and Churchill and Iacobucci (2005), helped sequence the questions appropriately. Details of construction of the questionnaire can be found in Appendix 1 and Appendix 2. Table 5.10 summarises the structure of the questionnaire.

The questionnaire comprises of 9 sections. The first section captures demographic elements such as gender, age, education and income. Section Two asks respondents about purchasing frequency, the occasion of consumption, prices and where they buy functional food products. Section Three to Section Nine measures respondents' attitudes to one of the two different types of functional foods. Specifically, Sections 3 to 9 cover, in turn, the scales for Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self-Identify and Behavioural Intention. Respondents were only required to answer questions relating to either Yoghurt with Live Cultures or Cholesterol Lowering Margarine. Following the pre-test, the final questionnaire was uploaded by Qualtrics.com for distribution to selected panels.

Table 5-10 Questionnaire Structure

Section	Construct/ Variable	Items	Scale	Source
I	About yourself	4	Categorical format (multiple choice)	Author
II	Purchase of functional foods	4	Categorical format (multiple choice)	Author
III	Perceived Susceptibility	8	Seven-point Likert scale	Erkin and Ozsoy (2012)
IV	Perceived Severity	7	Seven-point Likert scale	Deshpande et al., (2009)
V	Perceived Benefits	6	Seven-point Likert scale	Erkin and Ozsoy (2012)
VI	Perceived Barriers	8	Seven-point Likert scale	Erkin and Ozsoy (2012)
VII	Cues to Action	4	Seven-point Likert scale	Erkin and Ozsoy (2012) Deshpande et al., (2009)
VIII	Self-Identity	3	Seven-point Likert scale	Sparks and Guthrie (1998)
IX	Behavioural Intention	3	Seven-point Likert scale	Sparks and Guthrie (1998)
		TOTAL: 39 items		

5.4.14 Pre-test the questionnaire

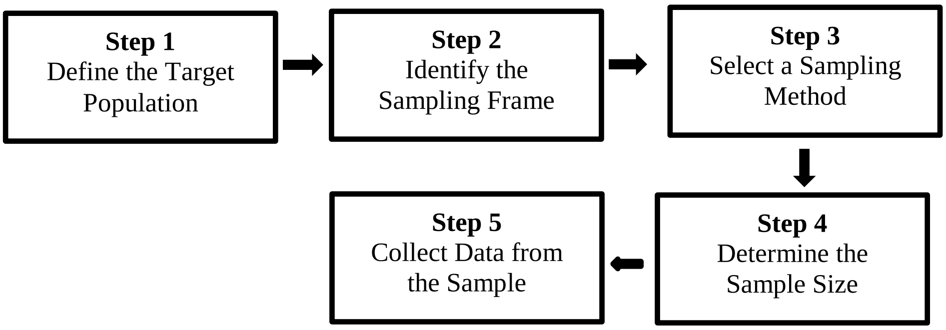
Prior to conducting the pre-test, the questionnaire was refined drawing on inputs from individuals that have expertise in scale development to refine the construct measures (Zikmund, 2000; Diamantopoulos, 2005). This involved two academic staff members of the Newcastle University Business School with experience in scale development as research experts. They commented on the structure of the questionnaire, the wording, as well as scale items to be used to measure the EHBM constructs. Such an exercise helps ensure that the scales measure what they are intended to capture.

In order to find any possible flaws, requires the trial administration of an instrument. Since a questionnaire is an instrument to gather data from respondents, it is essential to ensure the requirement and content of the questionnaire is understood. Such measures known as a pre-test (Polit and Hungler 1995). For this study in particular, prior to the actual data collection, a pre-test of the questionnaire was conducted to get feedback from the respondents. The process involved those who are not included in the main data collection, comprising thirty participants. The sample comprised PhD postgraduate students registered at Newcastle University. The pre-test questionnaire revealed unexpected mistakes. It involved a minor error in the wording and was corrected accordingly. Following the pre-test of the questionnaire, an analysis using SPSS software was made to the data. This process is essential to check the completeness of responses as well as to examine the reliability. The result shows that the respondents were able to complete the questionnaire within 10 to 15 minutes on average. In addition to that, respondents' feedback on the quality of the questionnaire was solicited at the end of the pre-test. This involved questions regarding the length of the questionnaire, content, the font, wording, clarity of instruction and the layout.

5.5 Sampling

There are five steps of sampling (Churchill and Iacobucci's, 2009). Figure 5.3 illustrates the processes.

Figure 5-3 The Five Steps Research Sampling



Source: Churchill and Iacobucci, 2009, p. 282

5.5.1 Target population

The study focuses on United Kingdom residents aged 18 and over. The latest official recorded population in 2016 of the United Kingdom was 65,600,000 (Office for National Statistics, 2017).

5.5.2 Sampling frame

According to Saunders (2011), a list of all cases in the population from which the sample can be drawn is defined as the sampling frame. Based on the study, the defined population is determined as UK adults. In reaching the sampling frame of the study, the Qualtrics panel respondents were used, which a sample of adult United Kingdom residents has been obtained. The adult United Kingdom respondents were randomly invited by the Qualtrics.com whom have registered as a panel in the system. During the process of data collection in 2015, population estimates based on the 2014 census calculate United Kingdom’s usually resident population at 64, 679, 700 people. Of these 46,828,200 people are aged 18 years or older, according to UK local government elections (Office for National Statistics, 2015).

5.5.3 Sampling method

Generally, there are two major sampling methods: probability and non-probability approaches. Probability sampling refers to the case where each element (person or case etc.) in a population has a known, a non-zero chance of being included in the sample (Churchill and Iacobucci, 2002). Meanwhile, a non-probability sample refers to a sample which relies on personal judgment somewhere in the element selection process and, therefore, prohibits an estimation of the probability that any population element will be included in the sample (Churchill and Iacobucci, 2002).

In relation to the first approach, Levy and Lemeshow (2008) described there are four main different categories of probability samples. Generally, the classification includes, firstly, the Simple Random Sampling, which is the most well-known procedure. Secondly, the Stratified Sampling, which provides a significant improvement to simple random sampling. Thirdly is known as the Systematic Sampling which recognised as the easiest to apply, followed by the fourth one which is suitable for a large survey, i.e. national surveys, which sampling method is namely a Cluster Sampling.

Meanwhile, the non-probability samples are chosen based on the subjective judgement and suitable for exploratory studies, for example to test new extended items for a construct in the framework (Kinnear, 1991). The non-probability sampling comprises several numbers of categories. First, the Convenience Sampling focuses on selected identified population. Second, the Consecutive Sampling which single person or groups is used for numbers of research subjects. Third, the Quota Sampling involves certain numbers of individuals being identified to be used to represent the population. The fourth one is recognised as Judgment or Purposive Sampling, which only identified credible respondent is selected to participate. Fifth, known as Snowball Sampling, which roles like a referral programme when the respondent forward the questionnaire to their friends or relatives.

In relation to this study, Quota Sampling is considered appropriate. It is useful when a specific individuals or groups are identified to be the respondents. This method can produce a sample which is similar to the population and it provides a good control over the sampling procedure as certain attributes of importance to the study are proportionately represented in the sample (Kinnear, 1991). For instance, elements such as the required number of respondents, and demographics, are predetermined. Quota sampling is often applied in consumer food research. For instance, in a study by Tarkiainen and Sundqvist (2005) that focuses on the consumer intentions to the purchase of organic food in Finland, Hieke et al., (2018) for European consumers' interest in nutrition information, and Scalvedi and Saba (2018) studying organic food consumption.

The quota sampling method in this study utilises a private research software company of Qualtrics.com to reach the registered panel respondents via online. The selection of respondents is made by the system on qualified registered panels based on predetermined criteria set by the researcher. In relation to Qualtrics software, Scott, (2012) described the platform is very reliable, especially in the context of various choices of online platform available for data collection in the consumer research. The quota sampling method was utilised as the number of respondents was limited to a maximum of 350 individuals for each functional food product type questionnaire, which should not exceed 700 respondents altogether. Besides that, potential respondent must fulfil predetermined criteria, i.e. must be a UK resident aged 18 years and above.

5.5.4 Sample size

To produce greater stability, an appropriate sample size should be considered. Gerbing and Anderson (1985) conducted a Monte Carlo study using samples ranging in size from 50 to 300, found that a sample size of between 100-200 respondents is adequate and acceptable. Nevertheless, a sample size of below 100 is not recommended. Bearden et al., (1982) indicated that, a good sample size required for modelling should be at least 200. In another view, Hair et al., (2010) suggested a good sample size for Structural Equation Modelling (SEM), with minimum of 100 but not over 400 should be utilised. The justification is based upon the fact that a larger sample size (>400) is problematic as slight changes can affect the result and the model becomes more unstable, thus the goodness of fit measures suggests a poor fit (Hair et al., 2010).

For this study, the total sample utilised was 345 for each functional food studied. The collected number of responses in this study is thus appropriate to conduct analysis relating to reliability, validity and statistical power (Preston and Colman, 2000).

5.5.5 The process of data collection of the sample and research ethics

Data collection occurred in June 2015. All respondents were UK consumers aged above 18 years. A paid survey platform (Qualtrics.com) was used to collect the data by distributing the online questionnaires. Despite the cost of data collection being rather expensive, this reliable platform method provided a sample of over 700 hundred responses, divided into two groups of 350 respondents each, according to the two different types of functional foods in this study. Data collection took approximately three weeks to complete.

At the beginning of the process, every potential respondent has been explained the purpose of the survey. They, also, were informed that participation was voluntary. To increase response rates, each respondent was paid based on the rates set by Qualtrics.com. The condition set to receive the payment was the full completion of the questionnaire. To increase the reliability of the data *Qualtrics* software employs quality checks. The three main 'quality checks' used are validation, attention filters, and survey duration checks. Details on these are further discussed in Section 5.6.1.

Respondents did not provide their name or any personal details as part of completing the survey. The full anonymity of the results is maintained. The research fully complied with Newcastle University's policy on research ethics, including the ESRC Framework for Research Ethics (ESRC, 2010) and the Market Research Society's Code of Conduct Guidelines (2014).

5.6 The Data Preparation and Screening Process

Despite the process of data preparation and screening being quite time consuming, it is essential prior to the data analysis (Hair et al., 2006). The process is important for two reasons. Firstly, certain assumptions of the data are required in the estimation procedures for SEM, particularly about the distributional characteristics. Secondly, model fitting programs could fail to produce a solution if any data related problems occur (Kline, 1998).

The objective data screening process or examination is to discover any overlooked hidden effects due to problems such as normality issues, outliers or missing data. These issues are quite common with survey data collection. Hence, prior to the data analysis, these issues must be given priority and addressed accordingly.

5.6.1 Data preparation

In this study, data collection occurred using the Qualtrics.com platform. In total, 706 survey questionnaires were received as presented in Table 5.11. In sorting the usable survey questionnaires, seventeen survey questionnaires of Yoghurt with Live Cultures and nineteen survey questionnaires of Cholesterol Lowering Margarine were discarded. This is due to the problem of incomplete answers, as presented in Table 5.12.

As mentioned earlier, three quality checks were utilised by *Qualtrics*. First, 'Force Response' settings were utilised for all multiple-choice type questions. This helped prevent respondents from ‘skipping through’ the questionnaire and leaving large portions of the dataset to blank. The second quality check applied was ‘attention filters’. They are used to help reduce the number of ‘straight-liners’ and ‘speeders’ for an online survey. Basically, these attention filters questions can be used to verify whether respondents are 1) reading the questions carefully and 2) following instructions. Two attention filters were added in both questionnaires in this survey to ensure that respondents fully read and understood each of the questions. Those respondents who did not fully read and follow the instructions of attention filters were screened out from the survey and not being counted as valid respondents. The third quality check used to focus on ‘survey duration’. As advised by *Qualtrics*’, in order to control the minimum time, it takes respondents to submit the questionnaire, the industry standard is applied. Using the average duration recorded during the soft launch as a reference, the industry standard is to set a minimum period of one-third of the time. Any attempt to answer below this benchmark time, was not accepted for the count towards the project total. In relation to this study, prior to the setting appropriate survey duration, a soft launch of the survey took place involving 30 respondents for each questionnaire. Based on the average time of a soft launch phase, the appropriate minimum time setting applies. The new minimum time setting applies to the full launch survey. For this reason, any respondent who answered in less than 3 minutes were screened out from the survey. This was designed to ensure the respondents allowed reasonable and proper time to answer all questions.

As detailed in Table 5.12, despite the total predetermine number of respondents of each functional food product has been set as 350 prior to the process of data collection, the total number of usable survey questionnaires (for both products) collected by the Qualtrics was 742 (372 for Yoghurt and 370 for Margarine). According to the Qualtrics system administrator, such extra data collection is a normal practice as to ensure the usable data is sufficient. However, these 742 responses were subjected to data screening prior to proceeding to the next step of data analysis.

Table 5-11 The Number of Questionnaires Received

Research subject	Data Collection Method	Number of questionnaires received
Functional food I (Yoghurt with Live Cultures)	Web-based questionnaire (*Qualtrics* panel)	372
Functional food II (Cholesterol Lowering Margarine)	Web-based questionnaire (*Qualtrics* panel)	370
TOTAL		706

Table 5-12 Number of Usable Survey Questionnaires

Description	**Subject**	
	Functional food I (Yoghurt with Live Cultures)	Functional food II (Cholesterol Lowering Margarine)
Survey received	**372**	**370**
(-) Incomplete questionnaires	17	19
Net number (raw data)	355	351
(-) Standard deviation value below 0.5	10	6
Net number usable data	**345**	**345**

5.6.2 Data screening

In the screening process, the collected data were coded, and analysed using IBM SPSS Windows 22.0 (SPSS, 2013). In order to identify possible problems such as data entry or coding errors and whether the data was normally distributed, the statistical analysis utilised FREQUENCIES. The calculations involved an analysis of means, standard deviations, skewness and kurtosis.

Both datasets (Yoghurt with Live Cultures and Cholesterol Lowering Margarine) were subjected to data screening. The process consisted of 3 steps. The first step was to find missing data in rows. However, after the screening, there were no missing data found in rows for all data. The second step was to find unengaged responses. At this stage, all completed questionnaires with a standard deviation of 0.5 and below were discarded. The latter suggests the respondent answered questions by giving the same value for all. Such responses should be eliminated as the respondent simply answered questions mechanically. For this reason, 10 respondents were removed from the Yoghurt with Live Cultures dataset and 6 respondents were removed from the Cholesterol Lowering Margarine dataset. Table 5.12 presents this information.

5.6.3 Outliers

According to Byrne (2000), outliers refer to cases which produce a substantial different score/marks than the overall set of data. Furthermore, High (2013) indicated, among possible reasons, outliers include rare events and data entry errors. The identification of outliers may involve multivariate tests, visual aids, and univariate tests (High, 2013). In particular, box plots, stem and leaf plots, and graphical evaluation of the QQ plots (Quantile-Quantile Plot) provide ways of identifying possible outliers.

The assessment of potential outliers utilised an inspection of boxplots. Precisely, the 1.5 x IQR (Interquartile Ranges) rule was used to define an outlier. It can be described by firstly, anything below Q1-1.5 IQR or secondly, above Q3+1. 5 IQR.

In the search of a possibility of evidence of outliers in the present study, boxplots were produced to inspect all the variables. No significant issues were identified, probably stemming from the fact that all constructs are assessed using a 7-point Likert scales.

5.6.4 Normality

Structural Equation Modelling (SEM) requires normality in the data. In brief, normality produces a normal distribution shape of data of respondents (Hair et al., 2010). According to DeCarlo (1997), univariate normality is established when a mean = 0, standard deviation = 1 and a symmetric bell-shaped curve. Meanwhile, the relevant tests for normality are Skewness and Kurtosis. The guideline of a normal distribution is based on the requirement of Skewness and Kurtosis values within a range of ±2 (Gravetter and Wallnau, 2014). The data collected in this study satisfies the guideline criteria. The detail of the result of this assessment is presented in Chapter 6.

5.7 Data Analysis Techniques and Administration

Briefly, there are six techniques used in analysing the data in this study. The methodology employed in this study involves two phases. Phase one started with descriptive analysis, followed by reliability analysis, and Exploratory Factor Analysis (EFA). Phase two involved the Confirmatory factor Analysis (CFA) for the measurement models, one-way ANOVA analysis and finally SEM.

Descriptive analysis was conducted to produce a general overall picture of the respondents' demographic profiles. The descriptive analysis of constructs consisted of an analysis of means, standard deviations, skewness and kurtosis (Hair et al., 2010).

Subsequently, a reliability analysis was undertaken to evaluate how well a set of manifest indicators measure the scale by using Cronbach's alpha. It is utilised to measure internal consistency and to address the issue of the reliability of the scale measurement (Hair et al., 2010). The relevant tests for the EFA are KMO and Bartlett's' Test of Sphericity (chi-square, significant, *df* and total variance).

In addition, CFA is an assessment to evaluate the sub-scale. It determines the sub-scales correctly positioned in the right group. This assessment is useful to find any issue related to scale measurement. The assessment of CFA helps the researcher to ensure that the measurement model is valid which then can be further used in making attempts to evaluate the structural equation models. The models are evaluated using measures of model fit, including NFI, TLI, CFI and RMSEA (Hair et al., 2010).

Furthermore, the ANOVA one way tests with *post hoc* analysis were performed to explore the impact of control variables (gender, age, education and income) on the dependent variable (Behavioural Intention). The results from the ANOVA tests provide a justification for which control variables should be included in the final SEM model.

The final stage of the analysis focused on SEM. SEM allows for an assessment of the interrelations between the latent variables which are based on the hypotheses developed in the theoretical framework. There are two types of model fit measures used in this study. The first one is an absolute fit index (measures). The relevant test for this is RMSEA. Secondly, there are incremental fit indices. They are utilised to assess whether the estimated model achieves a better fit compared to an alternative baseline model, whereby the number of items could be different from each model. The relevant tests for incremental fit are NFI, TLI and CFI, Average Variance Extracted (AVE) and composite reliability (CR).

The descriptive analysis, reliability analysis, exploratory factor analysis and ANOVA analysis were conducted using IBM SPSS Statistics 22.0 software (IBM Corp, 2013), while the analysis of CFA and SEM employed AMOS Version 22 (Arbuckle, 2013).

5.8 Reliability, Validity and Unidimensionality of the Measures

5.8.1 Reliability and validity

It is important to assess model accuracy to confirm the overall results. For that reason, subsequent to the descriptive analysis, reliability analysis, and exploratory factor analysis (EFA) were conducted before assessing reliability and validity. Reliability and validity assessment cover the measurement model and the theoretical constructs (Churchill, 1979). Following the assessment of the measurement models, the structural model assessment is made. The entire process is summarised in Table 5.13 which involves four essential steps.

Table 5-13 Construct Validity and Unidimensionality Assessment Guidelines (Hair et al., 2010; Fornell and Lacker, 1981; Bollen, 1989)

		Reliability / Validity	**Description**	**Assessment**	**Recommendation**
A good measurement Instrument	**Step 1:** Specification the domain of interest	*Content validity*		Literature review Expert reviewer	
	Step 2: Reliability Analysis	*Item Reliability*		Individual item squared multiple correlations (R^2)	≥ 0.5
		Scale Reliability	The level of consistency of a measure of a construct / concept	Cronbach Alpha	≥ 0.7 or above 0.6 in exploratory research
				Composite Reliability $CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum Var(\varepsilon_i)}$	≥ 0.7 suggests good reliability. A value between 0.6 and 0.7 may be acceptable provided that other indicators of a model's construct validity are good.
				AVE	AVE of ≥0.5 is a good rule of thumb.
	Step 3: Construct Validity	*Convergent Validity*	Items in a construct should commonly share / converge a high proportion of variance	Factor Loadings	-Standardised loading estimates should be ≥ 0.5 and, ideally ≥ 0.7. -Factor loadings should be statistically significant.
				AVE	AVE of ≥0.5 is a good rule of thumb.
				Composite Reliability	≥ 0.7 suggests good reliability. A value between 0.6 and 0.7 may be acceptable provided that other indicators of a model's construct validity are good.
		Discriminant Validity	A true distinction between constructs	Correlations between factors	Low to moderated correlations between factors (<0.85)
				AVE	AVE of ≥0.5 is a good rule of thumb.
				Comparison between AVE and inter-construct squared correlation	AVE greater than (>) inter-construct squared correlation.
	Step 4: Unidimension -ality	*Unidimension -ality*	Validity of underlying set of items in the existence of a construct	Goodness of fit indices	GFI, NFI, TLI, CFI, IFI, and RMSEA (Refer to Table 5.29 for the recommended fit).

5.8.2 Steps in the assessment of construct validity and unidimensionality

Four steps are necessary in the assessment to confirm the validity and the unidimensionality of the constructs of the research model utilising appropriate instruments (Churchill, 1979; Peter 1981). The following sections discuss the execution of each step.

5.8.3 The first step: Specify domain of interest - Content validity/ face validity

According to Churchill, (1979) content validity is an assessment to validate the correctness of the measurement instrument in measuring the underlying concept. Content validity is also called face validity or armchair validity as the nature of its assessment involves the eyes in confirming the relevant domain of interest (Churchill and Iacobucci, 2002). In addition to that, Bryman and Cramer (2011) stressed that content validity is required prior to establishing construct validity, reliability and unidimensionality. Table 5.14 summarises the methods and outcomes of the assessment of face validity of selected studies for the HBM.

Table 5-14 Face Validity in Selected Studies Utilising the HBM Model

Studies	Methods / instrument	Face validity assessment
Eslami et al., (2011) HBM on family planning pills and condoms	Some documents and questionnaires related to reproductive health and family planning scales utilising HBM were assessed.	The first step in face validity and content assessment of primary questionnaire conducted by expert opinion. The second step followed by getting feedback from 20 respondents. In the third step, the assessment involves a test- retest, LQAS and Cronbach alpha utilising STATA software. Eventually, a descriptive statistic presents the results.
Vakili et al., (2012) Development and Psychometric of HBM Instrument about HIV/AIDS.	The validity of the tool was assessed utilising a focused target group. In particular, similar demographic, economic, and social characteristics with a target population were given a list of edited items.	Comprehensibility, social and cultural appropriateness from the viewpoint of the target group were also examined for all items. Therefore, questions related to Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, and Perceived Self-Efficacy structures were evaluated by this researcher for face validity.

In relation to the present study, content validity was confirmed through different processes in four phases. Initially, the first phase involved an extensive review of the literature, providing insights for the relevant items. The second phase involved the creation of items, followed by the third phase, which experts such as academics with an expertise in statistical analysis provided relevant advice. The fourth phase provided confirmation of the appropriateness of the measuring instruments through pilot test, from which respondents' feedback was sought to improve the items.

For this study in particular, the questionnaires for each subject (Yoghurt with Live Cultures and Cholesterol Lowering Margarine) were pre-tested by 15 PhD students, two faculty members from Newcastle University, and followed by the soft launch of the survey using the Qualtrics platform which were answered by 30 anonymous online panel participants in the UK). Following the confirmation of content validity, an assessment of reliability was conducted.

5.8.4 The Second step: Reliability analysis

Reliability represents the stability of a measure for a construct. Precisely, reliability is defined as "the consistency or stability of a measure of behaviour" (Cozby and Bates, 2015, p. 100). Specifically, the definition of reliability is, "an assessment of the degree of consistency between multiple measurements of a variable" (Hair et al., 2006, p. 137). In general, Hair et al., (2010) explained that the assessment of reliability can be made using two approaches. The first one deals with the test-retest approach, whilst the second considers internal consistency. Cronbach Alpha is the most widely used for the reliability analysis to measure the internal consistency of items in each construct.

In confirming reliability, Hair et al. (2010) recommend a minimum threshold for Cronbach Alpha of 0.7 is required for an establish research area, while for an exploratory research, a minimum value of 0.6 is considered acceptable. For the purpose of this study, the internal consistency approach is employed for the assessment of reliability. Further discussion and analysis of Cronbach's alpha is presented in the following Section 5.8.5.

5.8.5 Review of the HBM model reliability based on Cronbach's alpha

This section briefly discusses the HBM model constructs and measures. According to Rosenstock (1974), the HBM model predicts the dependent construct of 'the likelihood of taking preventative health action' using five determinant constructs of Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers and Cues to Action. All the HBM variables are based upon a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree).

It is important to assess the reliability, the validity and measures of the model fit of the HBM model prior to applying it to the current study. This is also to confirm that the selection of the HBM constructs is applicable and reliable for integration into the proposed EHBM model. The principles of reliability and validity are fundamental cornerstones of research. Together, they provide scientific proof that the constructs possess acceptable measurement properties.

The assessment of reliability of the HBM constructs is crucial as the HBM forms the foundation of the proposed EHBM model. The following paragraphs provide discussions of HBM model reliability based on Cronbach's alpha. The utilisation of Cronbach alpha (α) is generally to measure the internal consistency or reliability of the items in a construct (Cronbach, 1951). Reliability is defined as, "the proportion of variance attributable to the true score of the latent variable" (De Vellis, 2003, p. 27). In this study, the assessment of Cronbach's (α) for reliability covers all HBM constructs.

According to Gliem and Gliem (2003), a useful lower bound on reliability can be assessed using Cronbach's alpha. Furthermore, if the correlation between items increase, the Cronbach's alpha coefficient increases as well. In relation to this, internal consistency can be measured using the coefficient value. Cronbach's alpha is based upon the ratio of explained variance to total construct variance. Hence, in theory, its value ranges from zero to one, where the ideal value is one. However, in practice, negative values may be experienced. Table 5.15 summarises the categorization of values of Cronbach's alpha.

As a good guideline, "a commonly accepted rule of thumb is that an alpha of 0.7 which indicates the minimum threshold of value" (Hair et al., 2010, p. 125). In assessing construct reliability (CR), it is known that "value 0.7 or higher implies good reliability" (Hair et al., 2010, p. 710). In addition, the actual value of Cronbach's alpha is also influenced by other elements. For instance, the value of Cronbach's alpha (α) would increase when the number of items increases. Nevertheless, it does not affect the internal consistency (Hair et al., 2010).

Table 5-15 Categorization of Cronbach's Alpha Values (Hair et al., 2010, p.125)

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent (High-Stakes testing)
$0.7 \leq \alpha < 0.9$	Good (Low-Stakes testing)
$0.6 \leq \alpha < 0.7$	Acceptable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

The results of reliability analysis of several previous studies which used the HBM constructs are summarised in Table 5.16. The assessment of internal consistency utilises Cronbach’s alpha (α), the item-to-total score correlation and the impact on an alpha of item deletion. Several selected studies achieve good results in which the Cronbach’s alpha (α) coefficients were 0.7 and above for all four of the original constructs of HBM (Perceived Susceptibility, Perceived Severity, Perceived Benefits and Perceived Barriers). However, in some studies, certain constructs did not achieve the required minimum threshold. This result is evident in the study by Lum (2011) where the coefficients for Perceived Severity and Perceived Benefit were 0,43 and 0.51 respectively. The study by Jack (2009) also indicates unacceptable alpha values for the constructs of Perceived severity (0.093), Perceived Barriers (0.582) and Cues to Action (0.581). Cronbach’s alpha coefficients below 0.7 might be due to a poor scale development in which constructs are not measured by an appropriate number of items. This issue of scale development is given high priority in the current study. Overall, however, the desirable property of the construct reliability is confirmed in many previous studies that have used the HBM model framework. To justify the use of HBM as the main framework of the current study, its validity is assessed with reference to the previous research works.

Table 5-16 Summary of Cronbach's Alpha Coefficients for Constructs in Selected Studies

Author(s)	**Kim et al., (1991)**	**Allen and Goddard (2012)**	**Lum (2011)**	**Champion (1984)**	**Deshpande et al., (2009)**	**Jack (2009)**	**Sullivan et al., (2008)**	**Soleymanian et al., (2014)**	**Tovar et al., (2010)**	**Rose (2012)**	**Noroozi et al., (2011)**
Topic of study	Calcium intake and osteoporosis risk.	Consumers preferences for milk and yoghurt.	The knowledge and belief in food handling practices.	Breast self-exam behaviours.	Healthy eating behaviours among college students.	Worker beliefs about using personal protective equipment.	Intention to exercise and relationship to stroke.	Exercise behaviours and osteoporosis.	Health beliefs concerning CVD risk, diet, and exercise within diabetic patients.	Rural community behaviour on cholesterol and blood pressure screening.	HBM and breast self-examination.
Perceived Susceptibility	0.80	0.69	0.79	0.78	NA	0.66	0.91	0.80	0.91	0.92	0.90
Number of questions / items*	3	4	19	4	1	6	3	4	5	7	5
Perceived Severity	0.65	0.85	0.43	0.78	0.86	0.46	0.84	0.78	0.71	0.84	0.85
Number of questions / items*	3	4	2	2	3	7	3	4	5	8	7
Perceived Benefits	0.68	0.89	NA	0.61	0.84	0.58	0.82	0.90	0.91	0.83	0.85
Number of questions/ items*	3	7	-	3	1	4	4	5	6	4	6
Perceived Barriers	0.73	0.72	NA	0.76	0.79	0.68	0.74	0.72	0.62	0.84	0.82
Number of questions/ items*	4	1	-	4	3	8	4	5	9	16	6
Self-efficacy	NA	NA	0.75	NA	0.88	0.74	0.67	0.86	NA	NA	0.89

Number of questions/ items*	-	1	10	-	2	6	2	5	-	-	11
Cues to action	NA	NA	0.68	NA	0.66	0.58	NA	NA	NA	NA	NA
Number of questions/ items*	-	-	15	-	3	8	-	-	-	-	-
Health motivation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.75
Number of questions/ items*	-	-	-	-	-	-	-	-	-	-	7
Subjective Norm	NA	NA	NA	NA	NA	NA	0.83	NA	NA	NA	NA
Number of questions/ items*	-	-	-	-	-	-	2	-	-	-	-

5.8.6 Assessment of the impact on Cronbach's alpha of deleting items from the HBM scale

According to Churchill (1979), in order to test for the possibility of existence of some inconsistent items, an item-total correlation test is utilised. This process is conducted by deleting "garbage items" to ensure the construct is well presented with appropriate items only.

Technically, an item may not measure the particular construct if the value of item total correlation produces small value i.e. less than 0.3. This is known as a "non-homogenous item". It may be deleted as it has an indication of a lack of correlation of the identified item with the overall scale (Field, 2005).

Table 5.17 provides an example, Erkin and Ozsoy (2012) determined the identification of non-homogenous items. This was made by analysing whether deletion of the identified non-homogeneous item would produce "an increase of >0.10 in the total scale's reliability, or a correlation of <0.25 between the item and the subscale score" (Erkin and Ozsoy, 2012, p. 33). The assessment of Cronbach's alpha is the method employed to assess the homogeneity of the items (Erkin and Ozsoy, 2012). The finding indicates that among all original 44 items being assessed, there are fifteen items recorded as obtaining low correlation coefficient values of <0.25. As a consequence of low Cronbach's alpha coefficients, these fifteen items were all removed. After the deletion process was completed, the Cronbach's alpha values were recalculated based on only 29 items. The revised scales achieved Cronbach's alpha coefficients of between 0.97 and 0.99.

Table 5-17 Item-Total Correlation and Cronbach alpha for Constructs (N=44) after Item Deleted (Erkin and Ozsoy, 2012, p. 39)

Subscale	Number of Items assessed (after deletion of item correlation of <0.25)	Item-total subscale correlation	Internal consistency (Cronbach α) *
Susceptibility	8	0.47-0.55	0.98
Seriousness	4	0.36-0.37	0.99
Benefits	6	0.40-0.47	0.99
Barriers	8	0.57-0.63	0.99
Cues to Action	3	0.26-0.29	0.97
Total	**29**		**0.91**

*All correlations are statistically significant at p< 0.001.

Subsequent to the reliability analysis, further investigation is essential, particularly to the measurement models. In relation to the SEM analysis, extensive assessment of the reliability, includes assessment of the Squared Multiple Correlation Coefficient (SMCC). Precisely, the reliability of each item is assessed using the Squared Multiple Correlation Coefficient (SMCC). According to Hair et al., (2010), the minimum threshold requirement of R^2 for SMCC is 0.3. Besides that, further confirmation is also required for the measurement model to be validated. For this reason, the next step involves the necessary assessment on construct validity, which is Confirmatory Factor Analysis (CFA).

5.8.7 The Third step: Construct validity (Confirmatory Factor Analysis/ CFA)

Construct validity refers "to the extent to which a measure reflects accurately the variability among objects as they are arrayed on the underlying (latent) continuum to which the construct refers" (Sechrest, 2005, p. 1584). Confirmatory Factor Analysis (CFA) is appropriate for assessing construct validity. In assessing measurement model validity in this study, the aim is to assess construct validity utilising several systematic measures empirically. The success of the measurement model's validity test is subjected to the fulfilment of two criteria. The first one deals with the satisfactory achievement of goodness of fit, whilst the second criteria emphasise the establishment of specific evidence of construct validity in the measurement model.

Basically, in assessing the measurement model for construct validity, two types of validation are necessary i.e. convergent and discriminant validity. Precisely, the CFA assessment in the measurement model of a construct can be evaluated utilising properties of convergent validity, discriminant validity, and nomological validity (Hair et al., 2012). Details and further information on these properties are comprehensively discussed in Section 5.8.9, Section 5.8.13 and Section 5.8.14 respectively

Convergent validity concerns the similarity between items in a construct to explain the same construct. Meanwhile, discriminant validity emphasises on whether constructs that are not supposed to be related are, in actual fact, unrelated. Table 5.18 describes the summary of thresholds for reliability, convergent validity and discriminant validity.

Table 5-18 The Thresholds Criteria for Reliability, Convergent and Discriminant Validity (Gaskin, 2012)

Reliability	Convergent Validity	Discriminant Validity
CR >0.70	CR>AVE AVE>0.5	Correlation <0.85 AVE>0.5 AVE>inter constructs' squared correlation

5.8.8 Convergent validity

According to Hair et al., (2012), convergent validity can be described as the relationship between items in a construct. The existence of convergence is explained by items that the proportion of variance in common is highly shared in a construct (Hair et al., 2010). In addition, Neuman (2000) stated that multiple measures would operate in a similar way for the same construct, as to identify convergent validity. There will be an issue if the items do not possess good correlation among each item in a construct (MacCallum and Austin, 2000).

Sharing a high proportion of variance in common for items associated with a construct is a property of convergent validity. The methods for evaluating this property are three-fold: standardised items loading, composite reliability (CR), and average variance extracted (AVE). The following sections (Section 5.8.9, Section 5.8.10 and Section 5.8.11) provide a detailed review of these three assessments to establish convergent validity of a measurement model.

5.8.9 Standardised item loadings

Anderson and Gerbing, (1988) suggested that all item coefficients should be statistically significant. In addition to that, standardised loadings should be at least 0.5 or ideally 0.7. According to Anderson and Gerbing (1988), the variance of a measure is equal to the variance shared with the construct (variance extracted or item communality of item reliability) and the variance not explained (Error variance). Thus, if the loading is at least 0.7 the square of this is approximately 0.5 so this situation shows that the construct is explained by at least half the variance of the measure. Hence, if coefficients are at least 0.5 or 0.7 they demonstrate high convergent validity because the loadings converge at a common point, the construct.

The review of the performance of the construct validity of the HBM in previous studies, provides some understanding of this assessment. Table 5.19 summarises the standardised item loadings for the HBM constructs for selected studies applied to a range of research contexts. The study by Huang and Lee (2013) included only two constructs of Perceived Benefits and Perceived Barriers but achieved acceptable results in that the coefficients for all items achieved the minimum threshold value of 0.5 and in most cases, exceeded the ideal value of 0.7. Erkin and Ozsoy (2012) achieved excellent results for the four constructs, with the coefficients for all items exceeding the 0.7 threshold. The study by Kartal and Ozsoy (2007) revealed a mixed result on the four HBM constructs. The items for Perceived Susceptibility and Perceived Benefits achieved the minimum threshold of 0.5. However, in the case of Perceived Severity, one out of three items did not achieve the minimum threshold of 0.5. Furthermore, two items in Perceived Barriers did not achieve the minimum threshold of 0.5. In summary, the general results indicated the acceptability of the standardised coefficients for most items in the HBM model.

Table 5-19 Summary Standardised Item Loadings in Selected Studies Utilising HBM

Studies	Standardised factor loading of HBM original constructs			
	SUS	SEV	BEN	BAR
Huang and Lee (2013) Telecare for chronic disease patients utilising HBM	N/A	N/A	BEN 1=0.95 BEN 2=0.97 BEN 3=0.84 BEN 4=0.83	BAR 1= 0.91 BAR 2= 0.98 BAR 3= 0.68
Erkin and Ozsoy (2012) Influenza on health care workers utilising HBM	SUS 1=0.96 SUS 2= 0.96 SUS 3= 0.96 SUS 4= 0.94 SUS 5= 0.96 SUS 6= 0.97 SUS 7= 0.97	SEV 1= 0.92 SEV 2= 0.97 SEV 3= 0.97 SEV 4= 0.97	BEN 1= 0.98 BEN 2= 0.96 BEN 3= 0.96 BEN 4= 0.98 BEN 5= 0.98 BEN 6= 0.96	BAR 1= 0.98 BAR 2= 0.98 BAR 3= 0.98 BAR 4= 0.98 BAR 5= 0.99 BAR 6= 0.98 BAR 7= 0.98 BAR 8= 0.94
Kartal and Ozsoy (2007) Diabetic patient compliance, utilising HBM	SUS 1= 0.51 SUS 2= 0.55 SUS 3= 0.75 SUS 4= 0.72	SEV 1= 0.47 SEV 2= 0.51 SEV 3= 0.52	BEN 1= 0.55 BEN 2= 0.70 BEN 3= 0.79 BEN 4= 0.75 BEN 5= 0.82 BEN 6= 0.73 BEN 7= 0.52	BAR 1= 0.54 BAR 2= 0.48 BAR 3= 0.51 BAR 4= 0.66 BAR 5= 0.52 BAR 6= 0.49 BAR 7= 0.60

Note: SUS=Perceived Susceptibility, SEV=Perceived Severity, BEN=Perceived Benefits, BAR=Perceived Barriers

5.8.10 Composite reliability (CR)

Internal consistency is measured by composite reliability (CR) which presents in Equation 5.1. Internal consistency is satisfied when the measures consistently represent the same construct. It is defined by the sum of the standardised coefficient squared and the sum of the error variances (Hair et al., 2010).

Equation 5-1 The Composite Reliability (CR)

$$CR = \frac{(\Sigma L_i)}{(\Sigma L_i)^2 + (\Sigma e_i)}$$

Where:

L_i = Standardised coefficient (loading) for item *i*

e_i = Error variance (indicator's measurement error) for item *i*

The recommendation is that the CR should have a minimum threshold value of 0.7. However, Hair et al., (2010) suggested that if other measures of construct validity are good, a value of 0.6 is acceptable.

Table 5.20 provides an assessment of CR in selected studies. In the study by Hsieh and Tsai (2013) to predict the usage intention for a telehealth system, the constructs generally achieve acceptable results in the range 0.67 to 0.99. The exception is the construct for Perceived Severity where the value of 0.67 approximates to the minimum threshold of 0.7. The studies of Davaadorj and Kim (2014) and Humaidi and Balakrishnan (2015) each have a limited range of constructs and all achieve the minimum threshold of 0.7. In summary, based on selected studies, it is evident that the HBM constructs can achieve satisfactory properties of composite reliability.

Table 5-20 Composite Reliability Assessment of Health Belief Model (HBM) in Selected Studies

	HBM STUDIES		
	Hseih and Tsai (2013) HBM on the telehealth system	**Davaadorj and Kim (2014)** HBM on behavioural adoption of smart health care system	**Humaidi and Balakrishnan (2015)** HBM on leadership styles and information security compliance behaviour
HBM Constructs	**CR**	**CR**	**CR**
SUS	0.92	0.92	0.90
SEV	0.67	0.91	0.88
BEN	0.99	0.90	0.92
BAR	0.82	0.84	0.90
CTA	0.89	NA	NA
SE	0.99	NA	NA
UI	0.99	NA	NA

*****NOTE: CR = Composite Reliability, SUS=Perceived Susceptibility, SEV=Perceived Severity, BEN=Perceived Benefits, BAR=Perceived Barriers, CTA=Cues to Action, SE=Self-Efficacy, UI=Usage Intention

The following Section presents the discussion and review of another essential element in the CFA, which is the discriminant validity.

5.8.11 Discriminant validity

Discriminant validity concerns the distinction between constructs. Therefore, if the measures of a construct possess high discriminant validity this means that the measures are unique and capture some information that is not captured by the measures associated with other constructs (Hair et al., 2012). In other words, discriminant validity occurs when the items of one construct hang together or converge, and at the same time are and distinguished from other constructs (Neuman, 2000).

According to Farrell and Rudd (2009), the measurement scales utilises may not perform properly if discriminant validity is not obtained. In this situation, there could be an overestimation of the strength of the relationship, or incorrect confirmation made about the existence of relationship despite there is no actual relationship exist. This is known as a Type II error. There are two common methods of assessing discriminant validity in CFA.

Method 1 tests for the statistical difference between the fit of alternative models.
For example, a test between two constructs requires estimation of two alternative models:
Model 1: An original model with two independent constructs.
Model 2: An alternative model with two constructs combined into a single construct by setting the covariance between construct to equal 1. That is in effect both constructs are combined.

The method applies a Chi-square difference test between two models. If the Model 1 is superior to Model 2 there is evidence of discriminant validity (Anderson and Gerbing, 1988; Bagozzi and Philips, 1982). Nevertheless, there may be a lack of strong evidence of discriminant validity using this method as sometimes a high correlation between constructs can produce significant differences in the fit between models.

Method 2 compares the average variance extracted (AVE) of a construct with the squared correlations between the construct and all other constructs in the model (Fornell et al., 1981). Table 5.21 presents an example of three constructs.

Table 5-21 Assessment of Discriminant Validity using AVE and Squared Correlation (Fornell et al., 1981)

Construct	C1	C2	C3
C1	**AVE (C1)**	$(\text{Corr C2C1})^2$	$(\text{Corr C3C1})^2$
C2	$(\text{Corr C1C2})^2$	**AVE (C2)**	$(\text{Corr C3C2})^2$
C3	$(\text{Corr C1C3})^2$	$(\text{Corr C2C3})^2$	**AVE (C3)**

Fornell et al., (1981) suggested the criterion employed to confirm discriminant validity. In particular, a greater value should be obtained by the AVE for a construct than the squared correlations between the construct and other constructs. The logic of the test is that more of the variance should be explained by the construct. It indicates the variance it shares with other constructs. The construct considered demonstrates a successful discriminant validity, in the case where the diagonal element (AVE) is greater than the recommended value of 0.5, as well as greater than correlation values.

In reviewing the application of the guideline of discriminant validity, which has been discussed, Table 5.22 and Table 5.23 summarise the assessment of discriminant validity for selected studies.

From Table 5.22 the study by Ng and Xu (2007) of users' computer security behaviour establishes a satisfactory result. The values of squared correlations between the construct and other constructs are less than the AVE. Hence the constructs in the HBM model demonstrate the property of discriminant validity.

Table 5-22 Descriptive Statistic, AVE and Inter-Construct. Correlation for Constructs (Ng and Xu, 2007, p. 431)

CONSTRUCT	MEAN	SD	BEH	SUS	SEV	BEN	BAR	GEN	CUE	SEF
BEH	6.034	0.818	**0.559**							
SUS	4.856	1.281	0.406	**0.759**						
SEV	5.418	1.052	0.334	0.356	**0.639**					
BEN	5.560	0.976	0.534	0.306	0.388	**0.625**				
BAR	3.638	1.382	-0.068	0.136	0.156	0.043	**0.723**			
GEN	5.224	1.157	0.173	0.095	0.223	0.088	-0.048	**0.776**		
CUE	4.957	1.439	-0.041	-0.106	0.226	0.045	0.052	0.356	**0.800**	
SEF	5.216	1.140	0.400	0.075	0.048	0.110	-0.151	0.155	-0.011	**0.784**

*NOTE: BEH=Behaviour, SUS=Perceived Susceptibility, SEV=Perceived Severity, BEN=Perceived Benefits, BAR= Perceived Barriers, GEN= General Security Orientation, CUE= Cues to Action, SEF= Self-Efficacy

Table 5.23 summarises the AVE and the results of the test or discriminant validity of three selected studies. In each study the AVE of the constructs is greater than the minimum threshold of 0.5 and the property of discriminant validity is confirmed. In summary, the general conclusion is that the constructs of the HBM model demonstrate the desirable property of discriminant validity.

Table 5-23 Discriminant Validity Results of Selected Studies

HBM Constructs	HBM STUDIES					
	Hseih and Tsai (2013)		**Davaadorj and Kim (2014)**		**Humaidi and Balakrishnan (2015)**	
	Telehealth adoption		Behavioural adoption of smart health care system		Leadership styles and information security compliance behaviour	
	AVE	**Discriminant validity exists**	**AVE**	**Discriminant validity exists**	**AVE**	**Discriminant validity exists**
SUS	0.79	Yes	0.74	Yes	0.70	Yes
SEV	0.50	Yes	0.73	Yes	0.64	Yes
BEN	0.96	Yes	0.82	Yes	0.63	Yes
BAR	0.50	Yes	0.52	Yes	0.81	Yes
CTA	0.68	Yes	n/a	n/a	n/a	n/a

*****NOTE: AVE = average variance extracted, SUS=Perceived Susceptibility, SEV=Perceived Severity, BEN=Perceived Benefits, BAR=Perceived Barriers, CTA=Cues to Action

From the discussion, it is evident that various HBM related study complies with the application of discriminant validity guidelines. Subsequent to this, another element in the assessment of CFA (Nomological Validity), is discussed in the next Section 5.8.12.

5.8.12 Nomological validity

Nomological validity considers the ability of a construct "to predict other constructs embedded in a theoretical network of relationships" (Oh et al., 2013, p. 185). Nomological validity focuses on the effective ability of a construct to be linked to other constructs which should be in line with the theory (Grawitch et al., 2013). The basis of evaluation is correlation, regression or structural equation modelling. Table 5.24 summarises the evaluation of nomological validity in various studies that applied the HBM model.

Table 5-24 The Nomological Validity of Selected HBM Related Studies

Studies	Nomological validity assessment	Result
Chisholm et al., (2005) Immunosuppressant therapy barrier	The assessment of the Perceived Barriers subscales which known as immunosuppressant therapy barrier scale (ITBS) to the adherence to immunosuppressant therapy (IST) among transplant patients.	The assessment of nomological validity utilises the ITBS subscales. Specifically, no significant differences in patient reports of IST adherence barriers, based on the patient factors such as income, race, the type of organ transplanted, time since receiving the transplanted organ, or kidney donor type (living vs cadaveric). "However, male patients reported significantly more barriers, both 'uncontrollable' and 'controllable', than did female patients (P<0.05). Also, older patients reported more 'uncontrollable barriers' than did younger patients (P<0.05), and patients taking tacrolimus reported significantly more 'controllable barriers' than patients taking cyclosporin (P<0.05)" (Chisholm et al., 2005, p. 186).
Oh et al., (2013) Smoking behaviour of Chinese students in Korea	The assessment was made to identify the possibility of problems with the items. In order to identify whether the questionnaire is understandable, the nomological validity assessment involved 30 Chinese students, followed by a pre-test.	Nomological validity was evidenced by significant interrelationships between constructs such as "Perceived Severity, Benefit, Barrier, Self-Efficacy, and social support" (Oh et al., 2013, p. 185).
Simon (2006) Identifying barriers to adherence in a paediatric transplantation	The assessment involved the impact of Perceived Barriers to medical adherence utilising The Parent Medication Barriers Scale (PMBS) and Adolescent Medication Barriers Scale (AMBS) scales. There were eighty adolescent whom an organ transplant recipient participated in the study.	The results indicated a significant relationship between disease and medication regimen variables based on the score of barrier scale, hence provides a valid method in assessing barriers to medication adherence.

5.8.13 The fourth step: Unidimensionality

Unidimensionality can be defined as a set of indicators as measured variables that are represented by one underlying construct (Hair et al., 2010). Unidimensioanality is assessed utilising the goodness of fit indices, such as GFI, CFI, IFI, and RMSEA (Anderson and Gerbing, 1988). Prior to the unidimensionality assessment, EFA assessment is highly recommended, followed by CFA that assesses measurement model's multiple indicators. For this study in particular, the assessment of unidimensionality utilises both CFI and RMSEA. Further discussion on the method of assessment of unidimensionality in the Structural Equation Modelling (SEM) is presented in Section 5.10 onwards. Meanwhile, the results for unidimensionality of this study are presented in Chapter Seven (Structural Equation Modelling).

5.9 Exploratory factor analysis (EFA)

An Exploratory Factor Analysis (EFA) is useful prior to conducting the SEM analysis. Despite it not being included in the four essential steps of the assessment guideline of construct validity and unidimensionality, nevertheless, it is considered crucial to the present study. The importance of EFA can be addressed as to validate the novelty to the newly created items in the EHBM.

Precisely, the analysis of EFA is conducted after the completion of reliability analysis and before assessing the CFA. The data is analysed using EFA to confirm suitability and the validity of items for each variable or construct in the model for further analysis (Hair et al., 2010; Straub and Carlson, 1989). In the present study, EFA is very essential as the EHBM items are adapted from another area or context of studies, and the modified items are being applied for the first time in a new context.

The EFA assessments are KMO and Bartlett's' Test of Sphericity (chi-square, significant, *df* and total variance). According to Kaiser (1974) the guidelines for KMO assessment consist of values between 0 and 1, which a value close to 1 (preferably greater than 0.5) is required to evidencing the compactness of the pattern correlation, which can produce a distinct and reliable factor analysis. In addition to that, Pallant (2005) suggests that the value of a score p-value of <0.001 for Bartlett's' Test of Sphericity is required as an evidence that the data is suitable to proceed to factor analysis. Besides that, the assessment of total variance explained with a minimum value of 60%, and communalities minimum value of 0.5 are also needed to be achieved in a social science study (Hair et al., 2010).

The presentation of the EFA analysis of the present study is discussed in detail in Section 6.6 in Chapter Six.

5.10 Structural equation modelling (SEM)

There are two components that make up SEM (Hair et al., 2010). The first one deals with a measurement model that consists of observed variables. The second component involves a structural model that describes the linkages or relationships (either recursive or non-recursive) between constructs (latent variables).

5.10.1 Assessment of the structural equation models (SEM) validity

The final stage of data analysis in this study involves the assessment of the validity of the structural equation models (SEM). In relation to this, the corresponding hypothesised theoretical relationships are examined. The validation of the structural model should fulfil the acceptable estimates, prior to the assessment of the goodness of fit for the use of SEM is appropriate for this type of study. Basically, SEM is the evolution of multiple regression approach, which has been utilised previously in many quantitative researches. According to Singh (2007), SEM can explore many other analyses, besides the multiple regression. Among the suitability of SEM is the ability to perform analysis of covariance, path analysis and factor analysis. Tomarken and Waller, (2005) suggested the compatibility of SEM to perform theory testing and to model constructs as latent variables, hence SEM is not usually utilised for exploratory analysis.

In this study, the utilisation of EHBM constructs i.e. Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self-Identity and Behavioural Intention are examples of latent variables. In this context, manifest variables refer to items that measure each construct respectively.

5.10.2 Justifications for utilising SEM in this study

The reasons for utilising SEM in the present study can be divided into four. Firstly, the present study establishes the framework by extending an existing theory, thus it is not purely exploratory. Literally, the Extended Health Belief Model (EHBM) used in this study was a creation that it is based on the Health Belief Model (HBM), Theory of Reason Action (TRA), Theory of Planned Behaviour (TPB) and Identity Theory. The TRA and TPB have both been applied in various food consumption studies. In addition, the HBM also has been applied in many health and diet related studies by scholars such as Schafer et al., (1995) in the context of fat and diet, Colavito et al., (1996) studied diet and nutrition knowledge, and Kloeblen and Batish, (1999) studied the consumption of high folate diet.

Secondly, each of the constructs of EHBM is represented by numbers of items. The measurement of constructs must be measured. In particular measuring observed variables, is essential to confirm the reliability of latent variables. Steenkamp and Baumgartner, (2000) supported this fact based on the justification that there may a variation of the degree of validity and observational meaningfulness in the observed variables.

Thirdly, the SEM has properties to identify the potential error on observed variables. Such advantage makes SEM is more practical as compared to the Multiple Regression. The identification of the error term in observed variables is crucial as a good combination of items is essential to confirm the research is valid.

Finally, the utilisation of SEM will ease the analysis of relationship among constructs in the model (Steenkamp and Baumgartner, 2000). In relation to this study, the current context is functional foods and the result could be compared to other types of foods in the future. Based on these justifications, the utilisation of SEM in the present study is a right option.

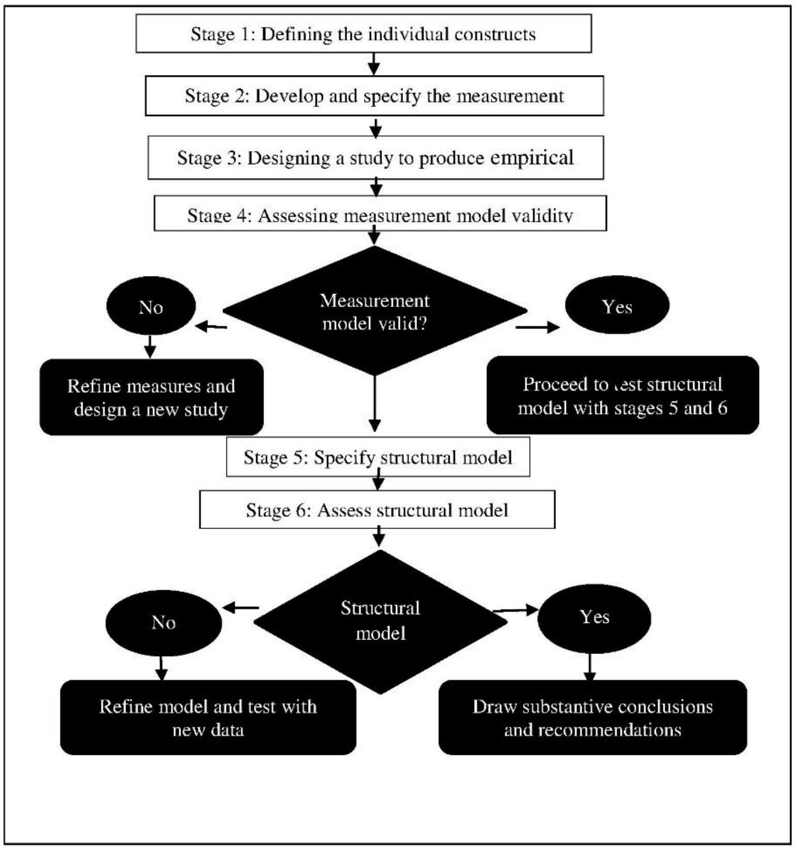
5.10.3 The procedural stages in SEM

Hair et al., (2010) suggested six-step process for conducting SEM. Figure 5.4 presents the process. In general, this process can be classified as two-step SEM where the confirmation of the validity of the measurement model prior to assessment of a structural model.

5.10.4 Estimation techniques

The use of SEM is vital to the estimation of the conceptual model and is consistent with the methods used in previous research. In particular, the Maximum Likelihood Estimation (MLE) is the most suitable technique, efficient and compatible (Hair et al., 2010). Most of the SEM program analysis, including AMOS, employs MLE (Hair et al., 2010).

Figure 5-4 Six-Stage Processes for SEM (Hair et al., 2010, p. 654)



5.10.5 Guidelines for establishing acceptable and unacceptable fit and model of fit indices measure

Generally, Goodness of Fit indices (GOF) consists three categories of assessment to test the measurement and structural model i.e. absolute fit measures, incremental fit measures, and parsimonious fit measures. Details of the guideline criteria of this assessment are presented in Table 5.25.

The first category refers to the absolute fit indexes, which measure utilises to determine the overall model fit. In general, it is to test the sample data with model fit. In particular, this assessment determines the strength of the model fits the sample data (Hair et al., 2010). The absolute fit assessments measure likelihood ratio Chi-Square Statistic χ^2 statistics, Normed Chi-Square (x^2/ df) or (cmin/df), the p-value for the model, and the root mean square error of approximation (RMSEA).

The second category is the incremental fit indexes (Hair et al., 2010). It is roles to assess the model fits by comparison with a baseline model (independent model). For this, the relevant tests are Normed Fit Index (NFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI).

The third category deals with parsimonious fit. The relevant assessments include the parsimonious normed fit index (PNFI), the parsimonious comparative index (PCFI), and the Akaike information criterion (AIC). Such tests help to identify the best model among a set of competing models. Nevertheless, the assessment of parsimonious fit indexes is less rigorous than the other two assessments which have been discussed earlier (Hair et al., 2010). Hence it can be skipped in many cases. In summary, none of this third category used in this study as it is irrelevant to the baseline model approach.

Since the approach used in this study does not involve competing models, but rather the analysis is made from a baseline model, the assessment focuses on the first two approaches only.

Generally, it is adequate and acceptable to assess model fit by using two or three indices. Conventional practice suggests that there is no requirement that all goodness of fit indices must be reported. Nevertheless, Hair et al., (2010) suggested, in addition to assess and report the x^2 value and the associated degrees of freedom, a standard acceptable report is to include at least one incremental index (e.g. CFI or TLI), together with one absolute index (e.g. RMSEA).

Table 5-25 Model fit Indices (Hair et al., 2010; Byrne, 2001; Kline, 1998; Hu and Bentler, 1999, Bollen, 1989)

Index	Descriptions remarks	Threshold criteria
1. Absolute fit determines how well a model fits the sample data		
Chi-Square Statistic (x^2)	"A measure for evaluating the overall model fit and assessing the magnitude of the discrepancy between the sample and fitted covariance matrices" (Hair et al., 2006, p. 580).	A statistical test of significance provided (low x^2 values).
Normed Chi-Square (x2/ *df*) (cmin/*df*)	"This is the ratio of the chi-square divided by the degrees of freedom. It is being used to reduce the effect of sample size" (Hair et al., 2006, p. 580).	Lower limit: 1.0, Upper limit: 2.0 or 3.0 or 5.0 (<3 good; <5 sometimes permissible)
The p-value for the model	"Is a function of the observed sample results (a statistic) that is used for testing a statistical hypothesis. Before the test is performed, a threshold value is chosen, called the significance level of the test, traditionally 5% or 1% and denoted as α. This threshold value is the proportion of false alarms that we are willing to tolerate in the decision process" (Hair et al., 2006, p. 580).	>0.5
Root Mean Square Error of Approximation (RMSEA)	"Indicates how well the model, with unknown but optimally chosen parameter estimates, would fit the population covariance matrix" (Hair et al., 2006, p. 580).	< 0.05 -good fit, 0.05-0.08 – a reasonable fit, 0.08- 0.1- mediocre fit and >0.1 – poor fit.
2. Incremental fit assesses how well the estimated model fits relative to some alternative baseline model		
Comparative Fit Index (CFI)	"A comparative index between proposed and null models adjusted for degrees of freedom" (Hair et al., 2006, p. 580).	Close to 1 indicates better model fit. (>0.95 great; >0.90 traditional; >0.80 sometimes permissible)
Tucker-Lewis Index (TLI)	"It combines a measure of parsimony into a comparative index between the proposed and null models" (Hair et al., 2006, p. 580).	Close to 1 indicates better model fit.
Normed Fit Index (NFI)	It is a relative comparison of the proposed model to the null model.	Close to 1 indicates better model fit.

The common minimum threshold value of 0.90 usually applies to indices such as CFI, and TLI. Nevertheless, the threshold value may differ according to the number of variables as well as the sample size (Hair et al., 2006). Table 5.26 provides a comprehensive comparative summary of this guideline.

Table 5-26 Criteria of Different Fit Indices Across Different Model Characteristic (Hair et al., 2006, p. 753)

	N < 250			**N > 250**		
No of vars (m)	m ≤ 12	12 < m < 30	m ≥ 30	m ≤ 12	12 < m < 30	m ≥ 30
χ^2	Insignificant p-values expected	Significant p-values can result even with good fit	Significant p-values can be expected	Insignificant p-values can result with good fit	Significant p-values can be expected	Significant p-values can be expected
χ^2/df	< 3	< 3	< 3	< 3	< 3	< 3
CFI or TLI	≥ 0.97	≥ 0.95	> 0.92	≥ 0.95	≥ 0.92	≥ 0.90
RMSEA	< 0.08 CFI ≥ 0.97	< 0.08 CFI ≥ 0.95	< 0.08 CFI ≥ 0.92	< 0.07 CFI ≥ 0.97	< 0.07 CFI ≥ 0.92	< 0.07 CFI ≥ 0.90

In particular, the present study deals with a sample of 345 for each set of the questionnaire (total 690). In addition, the value of 'm' is greater than 30. Therefore, the far-right column in the table is suitable for the current study. Nevertheless, Bentler and Bonett

(1980) argued by indicating acceptable cut-offs is the values of above 0.9 for CFI or TLI. Hence, the rule is disputable and may disregarded (Bollen 1989).

Furthermore, Bollen (1989) recommended that prior models of the same phenomenon, comparing the fit of one's model to the fit of another can be made. For example, quoted from Hooper et al., (2008), in a case where the best prior model had a fit of 0.70, a new revised model with a value of the CFI of 0.85 represents progress (Bollen, 1989). Hence, based on this argument, since the present study is the first attempt to compare the outcome of two different types of functional foods, the results may be used as the cut-off value for any future related studies.

The analysis of the correlation between a group of observed variables and a group of continuous latent variable and evaluated for fit is performed by utilising the confirmatory factor analysis (CFA) (Hair et al., 2012). Preliminary considerations require consideration of model fit. Measures of model fit are indicated by the normal fit index (NFI) which should achieve a minimum score of 0.9 (Hair et al., 1998). Besides that, (Hair et al., 2012) suggested that, in the case of large samples, the recommendation is given to utilising the root mean square error of approximation (RMSEA) as an alternative to the chi-square test, for the assessment of goodness of fit. RMSEA lies below the upper threshold value of 0.08 regarded as 'reasonable' by Browne and Cudeck (1993), while another perspective by Hu and Bentler (1999) indicated that, in order to ensure good fit exist between the hypothesized model and the observed data, a tighter cut-off value close to 0.06 or below for RMSEA are essential.

In addition to NFI and RMSEA, the assessment of SEM model fit would also be made using other indices. Precisely, there are type 2 indices suggested by Hoyle (1995). There are several numbers of type 2 indices. Among the type 2 indices are known as a comparative fit index (CFI), incremental fit index (IFI), and Tucker-Lewis index (TLI), The Normed Fit Index (NFI).

Hair et al., (1998) suggested the guideline for the values of NFI, TLI, IFI and CFI approximate to the lower threshold of 0.90. In another perspective, Hu and Bentler (1999) suggested a higher minimum value of 0.95 for TLI, while 0.90 for CFI. Nevertheless, according to Bollen (1989), the fit indices' criteria are just guidelines and may be compromised. For example, in a case of previous models in the field of study produced lower

CFI values, i.e. 0.75 only, the progression of a new CFI value of 0.8 which generated after a model purification considers acceptable, despite the value is below the threshold guideline.

The guidelines for indices of measures of model fit are summarised in Table 5.27. Therefore, to assess the fitness of the HBM model, it must comply with this guideline. The current study adopts four indices, including NFI, TLI, CFI, and RMSEA. Prior to constructing the EHBM consideration is given to a review of studies that have used HBM.

Table 5-27 Guidelines for Thresholds of Measures of Model Fit (Hair et al., 1998; Hu and Bentler, 1999, pp. 1-55)

Index	Criteria
x^2/df	<5
GFI	>0.9
NFI	>0.9
CFI	>0.9
IFI	>0.9
RMSEA	≤ 0.08
TLI	>0.9

5.10.6 Review of structural equation models (SEM) and measures of model fit on past HBM studies

Several research studies in various subjects that used HBM as a theoretical framework achieved satisfactory measures of model fit. A summary of measures of model fit of selected studies is presented in Table 5.28.

In summary, all studies achieve acceptable RMSEA values. The results for NFI, IFI, TLI and CFI indicate acceptable measures of fit. Nevertheless, in the case of the study by Kim et al., (2012) the NFI (0.86) approximated to a value of 0.9. Therefore, the general conclusion is that the selected HBM models have achieved satisfactory measures of model fit.

Table 5-28 Measures of Model Fit for the Structural Models (SEM) Utilising the Health Belief Model (HBM) in Selected Studies

Structural Model Statistic (indices)	Recommended Threshold	STUDIES					
		Hsieh and Tsai (2013) *The Adoption of Telehealth, utilising HBM*	**Kim et al., (2012)** *College students' health behaviour utilising HBM*	**Deshpande et al., (2009)** *College Students Healthy Eating Habits utilising HBM*	**Park et al., (2015)** *Factor Structure of the Arthritis utilising HBM*	**Cao et al., (2014)** *Health Education for High School utilising HBM*	**Zhao et al., (2012)** *Condom usage behaviour utilising HBM*
x^2	-	453.33	529.06	21.53	-	871.24	193.90
x^2/df	< 5	2.36	1.40	1.44	-	4.44	2.00
GFI	> 0.9	0.90	0.88	0.98	0.94	0.96	0.94
RMSEA	≤ 0.08	0.06	0.04	0.05	0.05	0.04	0.05
NFI	> 0.9	0.95	0.86	0.96	0.94	0.98	NA
IFI	> 0.9	0.97	0.96	NA	NA	0.98	NA
TLI	> 0.9	0.97	0.95	0.96	0.97	NA	NA
CFI	> 0.9	0.97	0.96	0.99	0.98	0.98	0.93

*GFI = Goodness of fit index, RMSEA = Root mean square error of approximation, NFI = Normed fit index, IFI = Incremental fit index, TLI = Tucker-Lewis coefficient index, CFI = Comparative fit index.

5.10.7 Statistical significance of the estimated coefficients and the acceptability of signs

The magnitude and direction of the relationships between the measures and the construct indicated by the estimated path coefficients. The sequence of the process requires the satisfaction of the requirements which are summarised in Table 5.29.

Table 5-29 Criteria Applied to Model Coefficients (Hair et al., 2010)

The sequence of process	Descriptions	Statistically significance (acceptability of signs)
1	Significance of factor loadings	The loadings should be significant. Non-significant loadings should be eliminated from the model.
2	Magnitude of coefficient	"All non-constrained standardised coefficients should be high, which suggest a strong relationship with the construct consistent with the property of convergent validity" (Hair et al., 2010, p. 708). It is suggested that coefficients should have an absolute value of at least 0.5 and ideally, at least 0.7. Therefore, loadings with an absolute value of 0.5 suggest that the measure should be eliminated from the model.
3	Sign of coefficient	The sign of the coefficient should be consistent with a priori expectations from the theory according to the nature of the wording of the measure.
4	Squared multiple correlation coefficient	This is a measure of how well an item measures a construct and is defined by the extent to which an item's variance is explained by the construct. It is sometimes defined as communality, item reliability, or variance extracted.
5	Identification of problems	Measures are examined for offending estimates. This includes the acceptability of the factor loading sign, and whether estimates are less than -1.0 or greater than +1.0 which means that they are out of the feasible range.

For assessing the HBM path coefficients, results from various studies are summarised in Table 5.30. Path coefficients were significant in various contexts such as Hsieh and Tsai (2013) that study the HBM on telehealth, Cho et al., (2012) study the HBM on food safety belief, and Cao et al., (2014) study the HBM on the school health education programme. These results suggest the appropriateness of the HBM model in the context of functional foods.

Table 5-30 Summary of Path Coefficients in Selected Studies Utilising HBM

Studies	SUS B	SEV β	BEN β	BAR β	CTA β	SEF β	Comments
Hsieh and Tsai (2013) HBM on the telehealth system	0.180	0.025	0.452	-0.287	0.644	0.088	"The results demonstrated that health belief factors (Perceived Susceptibility, Perceived Benefits, and Perceived Barriers) have significant impacts on usage intention mediated by Cues to Action. However, Perceived Severity has an insignificant effect on Cues to Action" (Hsieh and Tsai, 2013, p. 1).
Cho et al., (2012) HBM on food safety belief	0.23	0.20	0.17	-0.23	NA	NA	"The result showed food safety knowledge significantly predicted Perceived Severity (β =0.20), Perceived Susceptibility (β =0.23), and Perceived Barriers (β =-0.23). This implies that the Severity and Susceptibility of foodborne illness to be high when they had strong food safety knowledge. In addition, when strong food safety knowledge exists, it tended to perceive fewer barriers preventing respondents from conducting proper food safety practices. Furthermore, Perceived Benefits (β =0.17) is a significant predictor of food safety behaviour specifically, when participants reported greater benefits associated with engaging in food safety behaviours" (Cho et al., 2012, p. 12).
Cao et al., (2014) HBM on school health education programme	0.72	0.84	0.87	-0.18	0.60	NA	"The result of CFA showed that Perceived Benefits and Perceived Severity had the greatest impact on the health belief, Perceived Susceptibility and Cues to Action were the second and third most important components of HBM respectively. Perceived Barriers had no notable effect. Though Perceived Barriers had some impact on Cues to Action, the standardised path coefficient is only 0.35" (Cao et al., 2014, p. 1).

Note: **SUS**=Perceived Susceptibility, **SEV**= Perceived Severity, **BEN**= Perceived Benefits, **BAR**= Perceived Barriers, **CTA**= Cues to Action, **SEF**= Self-Efficacy

5.11 Chapter Summary

This chapter details the methodology employed in the study It details how data were collected and analysed Two sets of questionnaires developed by the researcher in relation to the EHBM theoretical framework were established in this study. A theoretical framework underpins the three phases of the research. Firstly, the exploration of literature, provides an analytical assessment of previous studies utilising the HBM constructs. The second phase provides a description of how the EHBM is developed together with relevant latent variables. The third phase explains the process of data collection. The analysis employs CFA and SEM. The study continues with the presentation of the results of descriptive, reliability and exploratory factor analysis in the next Chapter 6.

Chapter 6. Results: Descriptive, Reliability and Exploratory Factor Analysis

6.1 Introduction

The chapter conveys details of the results of the descriptive analysis, reliability analysis and exploratory factor analysis (EFA). In addition to the descriptive analysis of the sample data, the main emphasis of the chapter extends the material in Chapter 4, which was concerned with the operationalisation of the EHBM model constructs. Therefore, the items of each construct are examined for the property of reliability and following this, the dimensionality of each construct is explored. The structure of the chapter is as follows. Section 6.2 summarises the respondents' demographic profile. Section 6.3 presents the descriptive analysis of purchase behaviour. Section 6.4 presents the descriptive analysis of constructs of the EHBM framework. Section 6.5 provides the results of reliability analysis the items in each construct. Section 6.6 presents the results of exploratory factor analysis. Finally, Section 6.7 presents a conclusion to the chapter.

6.2 Descriptive Analysis of Demographic Factors

The study employs several demographic profiles of the respondents. It is represented by gender, age, education level and income. The profiles are obtained using frequency analysis of the two functional food groups (Yoghurt with Live Cultures and Cholesterol Lowering Margarine). As indicated in Table 6.1, for Yoghurt with Live Cultures, 48.7% respondents are male and 51.3% are female. For Cholesterol Lowering Margarine, 49.6% respondents are male, and 50.4% respondents are female.

Table 6-1 Gender Distribution

GENDER	**SUBJECT**			
	Yoghurt with Live Cultures		**Cholesterol Lowering Margarine**	
	Frequency	Percent %	Frequency	Percent
Male	168	48.7	171	49.6
Female	177	51.3	174	50.4
Total	**345**	**100.0%**	**345**	**100.0%**

Further analysis on Gender distribution was conducted for consumer and non-consumers. Using descriptive rather than inferential analysis, Table 6.2 presents the results for both User Group (consumer) and Non-User Group (non-consumer) of Yoghurt with Live Cultures. The percentage of User Group of Yoghurt with Live Culture is 79.13%, while for Non-User Group, the percentage is 20.87%. With respect to Gender, 47.62% are male, while 52.38% are female. This indicates that females represent a higher proportion than males. In contrast, for the Non-User Group males (52.77%) represent a higher proportion than females (47.23%).

Table 6-2 Gender Comparison among User Group and Non-User Group of Yoghurt with Live Cultures

		GROUP				
		User Group (Consumer) of Yoghurt with Live Cultures		**Non-User Group (Non-consumer) of Yoghurt with Live Cultures**		
		Frequency	**(%)**	**Frequency**	**(%)**	**Total (N)**
GENDER	**Male**	130	47.62	38	52.77	168
	Female	143	52.38	34	47.23	177
Total		**273**	100%	**72**	100%	**345**

The next analysis is on Cholesterol Lowering Margarine presented in Table 6.3. As explained in the literature review (Chapter 2), the subject of Cholesterol Lowering Margarine focused with its health claims associated with the ability of the risk reduction of having cardiovascular deficiencies. In specific it contains properties that may lower the risk of heart disease. There are differences in the results for User Group (Consumer) of Cholesterol Lowering Margarine compared with Yoghurt with Live Cultures. For the User Group (Consumer) of Cholesterol Lowering Margarine, males represent a higher proportion (61.18%) compared to females (38.82%). This might be due to a greater awareness of cardiovascular health by males as the exposure of such illness may be greater for them. This fact is supported by Townsend et al., (2012) that reports that in 2010 deaths from coronary heart disease indicates a higher rate for males compared to females. In contrast, for the Non-User Group (Non-consumer) of Cholesterol Lowering Margarine, the result shows females are represented by a higher proportion (61.71%) than males (38.29%).

Table 6-3 Gender Comparison among User Group (Consumer) and Non-User Group (Non-consumer) of Cholesterol Lowering Margarine

		GROUP				Total (N)
		User Group (Consumer) of Cholesterol Lowering Margarine		Non-User Group (Non-consumer) of Cholesterol Lowering Margarine		
		Frequency	(%)	Frequency	(%)	
GENDER	**Male**	104	61.18	67	38.29	171
	Female	66	38.82	108	61.71	174
Total		**170**	100%	**175**	100%	**345**

With regard to educational background for Yoghurt with Live Culture, the respondents with no formal qualification represented by 9.0%, and 17.4% obtained qualifications of GCSEs/O Level, 17.1% had vocational qualifications (e.g. NVQ) 19.7% had A-Level qualifications, respondents that had 19.1% obtained a Bachelor degree (e.g. B. A, BSc) and 17.7% achieved a postgraduate degree (Masters/ PhD) qualifications. Table 6.4 presents the result.

While with regard to educational background for respondents of subject Cholesterol Lowering Margarine, 7.5% had no formal qualifications, 18.0% obtained qualifications of GCSEs/O level, 18.0% had vocational qualifications (e.g. NVQ), 20.0% had A-Levels, 19.1% had obtained a Bachelor degree (e.g. B. A, BSc) and 17.4% have a postgraduate degree (Masters/ PhD). Table 6.4 presents the result.

Table 6-4 Education Level by Product Types

	SUBJECT			
	Yoghurt with Live Cultures		**Cholesterol Lowering Margarine**	
EDUCATION	Frequency	Percent %	Frequency	Percent
No formal qualification	31	9.0	26	7.5
O Level / GCSE	60	17.4	62	18.0
Vocational qualification (e.g. NVQ)	59	17.1	62	18.0
A Level	68	19.7	69	20.0
Bachelor Degree (e.g. BA, BSc)	66	19.1	66	19.1
Masters / PhD	61	17.7	60	17.4
Total	**345**	**100.0%**	**345**	**100.0%**

Further analysis was conducted at the age of participants. As indicated in Table 6.5, the age distribution among participants the Yoghurt group respondents are evenly distributed by age and ranges from 14.8-18.0% with a lower representation of the 18-24 years (15.7%)

and 25-34 years (14.8%) groups. A similar pattern applies to the Margarine group where respondents are evenly distributed by age and ranges from 14.2-19.1% with a lower representation of the 18-24 (14.2%) and 25-34 years (14.5%) groups.

Table 6-5 Age by Product Types

	SUBJECT			
	Yoghurt with Live Cultures		**Cholesterol Lowering Margarine**	
AGE	Frequency	Percent %	Frequency	Percent
18-24 years	54	15.7	49	14.2
25-34 years	51	14.8	50	14.5
35-44 years	60	17.4	62	18.0
45-54 years	62	18.0	66	19.1
55-64 years	59	17.1	60	17.4
65 plus years	59	17.1	58	16.8
Total	**345**	**100.0**	**345**	**100.0**

Analysis of the income factor shows the Yoghurt group over the half (66.4%) are earning at least £20,000 while for the Margarine group 64.6% are at least £20,000. Those who prefer not to answer represent 4.9% of Yoghurt group and 3.2% of the Margarine group Table 6.6 presents the results.

Table 6-6 Income Level by Product Types

	SUBJECT			
	Yoghurt with Live Cultures		**Cholesterol Lowering Margarine**	
INCOME	Frequency	Percent %	Frequency	Percent
Less than £15,000	59	17.1	51	14.8
£15,000-£19,999	40	11.6	60	17.4
£20,000-£24,999	56	16.2	53	15.4
£25,000-£29,999	37	10.7	53	15.4
£30,000-£39,999	50	14.5	52	15.1
£40,000-£49,999	49	14.2	45	13.0
£50,000 or more	37	10.7	20	5.8
Prefer not to answer	17	4.9	11	3.2
Total	**345**	**100.0%**	**345**	**100.0%**

6.3 Descriptive Analysis of Purchase Behaviour

The results in this section present the respondents' functional food purchase behaviour. The first subsection (6.3.1) in this part describes consumers' behaviours which focused on Yoghurt with Live Cultures whilst the second subsection (6.3.2) describes consumers' behaviour which focused on Cholesterol Lowering Margarine. Each subsection presents purchase frequency, occasion, price, and place relating to the consumption of functional foods.

6.3.1 Yoghurt with Live Cultures

As indicated in Table 6.7, for Yoghurt 18% of respondents consume once per month, 17.1% two or three times per month and 44% of respondents consume Yoghurt at least once per week. In terms of the occasion of consumption Yoghurt with Live Cultures, the consumption as a snack represents 26.9%, followed by as part of breakfast 19.2%, as part of lunch represents third largest consumption by 16.9%. Interestingly, 9.5% indicate that the consumption of Yoghurt is purely for health reason. It followed by 6.6% consumed for another occasion, 4.7% consumed it as to have on the go (e.g. while travelling) and finally 2.5% consumed Yoghurt as to replace a meal.

Additionally, the results in Table 6.7 also show that with respect to weekly expenditure yoghurt 30.1% spend between £1 and £2, 22.0% spend between £2.01 and £3.00, 14.5% more than £3.00 and 12.5% spend less than £ 1 per week.

With regard to the preferred place of purchase, the results in Table 6.7 show a similarity between the two types of functional foods. For yoghurt, the majority of the respondents choose the supermarket as their most preferred place to purchase with a score of 67% (e.g. Asda, Tesco Extra, Sainsbury’s). Their second preference goes to the convenience store (e.g. Tesco Express, Sainsbury’s local) with 9.9%, online stores 1.7%, health food shop (e.g. Holland & Barrett) by 0.6%.

Table 6-7 Purchase Behaviour

BEHAVIOURAL VARIABLES		SUBJECT: Yoghurt with Live Cultures (n=345) CATEGORY	Frequency	(%)	Cholesterol Lowering Margarine (n=345) CATEGORY	Frequency	(%)
Purchase frequency		Never	72	20.9	Never	175	50.7
		Once per month or less often	62	18.0	Once per month or less often	60	17.4
		Two or three times per month	59	17.1	Two or three times per month	36	10.4
		Once per week	61	17.7	Once per week	17	4.9
		More than once per week	56	16.2	More than once per week	34	9.9
		Everyday	35	10.1	Everyday	23	6.7
		TOTAL	**345**	**100.0**		**345**	**100.0**
Occasion of consumption	**Consumer** **Respondents may answer more than one option*	As a snack	142/455	31.0	Spreading	152/298	51.0
		As part of breakfast (e.g. with muesli, fruit)	101/455	22.0	Cooking (e.g. for frying)	50/298	17.0
		As part of a lunch deal/ or just lunch	89/455	20.0	Topping (e.g. with steamy vegetables or pasta)	24/298	8.0
		To replace a meal	13/455	3.0	Baking	40/298	13.0
		To have on the go (e.g. while travelling)	25/455	5.0			
		Other occasion	35/455	8			
		Purely for health reason	50/455	11.0	Purely for health reason	32/298	11
		Not applicable-do not consume	72/345	21.0	Not applicable-do not consume	175/345	51.0
Weekly expenditure		Nothing	72	20.9	Nothing	175	50.7
		Less than £1.00	43	12.5	Less than £1.00	60	17.4
		£1.00-£2.00	104	30.1	£1.00-£2.00	67	19.4
		£2.01-£3.00	76	22.0	£2.01-£3.00	32	9.3
		More than £3.00	50	14.5	More than £3.00	11	3.2
		TOTAL	**345**	**100.0**		**345**	**100.0**
Place of purchase		In a convenience store (e.g. Tesco Express, Sainsbury's local)	34	9.9	In a convenience store (e.g. Tesco Express, Sainsbury's local)	19	5.5
		In a health food shop (e.g. Holland & Barrett)	2	0.6	In a health food shop (e.g. Holland & Barrett)	2	0.6
		In a supermarket (e.g. Asda, Tesco Extra, Sainsbury's)	231	67.0	In a supermarket (e.g. Asda, Tesco Extra, Sainsbury's)	148	42.9
		Online stores	6	1.7	Online stores	1	0.3
		Do not buy Yoghurt with Live Culture	72	20.9	Do not buy Cholesterol Lowering Margarine	175	50.7
		TOTAL	**345**	**100.0**		**345**	**100.0**

6.3.2 Cholesterol Lowering Margarine

As indicated in Table 6.7, 17.4% of respondents consume once per month, 10.4% two or three times per month, 9.9% more often than once per week, 6.7% every day and 4.9% once per week. The finding from this study implies that more than half (50.7%) of respondents have never purchased Cholesterol Lowering Margarine indicating that they are non-consumer of this category of functional food.

The results in Table 6.7 also shows that, on an average weekly spend on Cholesterol Lowering Margarine, 50.7% of the respondents spend nothing on Cholesterol Lowering Margarine followed by 19.4% of the respondents spend between £1 and £2, 17.4% spend less than £ 1 per week on yoghurt; while 9.3% spend between £2.01 and £3.00; 3.2% spend more than £3.00.

In terms of place of purchase for Cholesterol Lowering Margarine, Table 6.7 presents majority of the consumers chose the supermarket (e.g. Asda, Tesco Extra, Sainsbury's) represented by 42.9%, followed by convenience store (e.g. Tesco Express, Sainsbury's local) by 5.5%, health food shop (e.g. Holland & Barrett) with 0.6%, online stores 0.3%. The respondents that do not buy or non-consumers represented by 50.7%.

In terms of occasion for consumption Cholesterol Lowering Margarine, Table 6.7 indicates that spreading is the most favourable occasion which represents 51%, followed by cooking 17%, baking 13%, purely for health reason 11% and for topping 5%.

6.4 Descriptive Analysis of Constructs

Descriptive analysis was conducted for the seven constructs of the EHBM model for the two product groups. The analysis begins sub-section 6.4.1 that presents a descriptive analysis of Perceived Susceptibility of Yoghurt with Live Cultures, followed by Perceived Susceptibility of Cholesterol Lowering Margarine in sub-section 6.4.2. Next, sub-section 6.4.3 and 6.4.4 presents Perceived Severity for Yoghurt with Live Cultures and Cholesterol Lowering Margarine respectively. Perceived Benefits are presented in sub-section 6.4.5 and 6.4.6 for both subjects respectively. It followed by descriptive analysis of Perceived Barriers by sub-section 6.4.7 and 6.4.8, Cues to Action in sub-section 6.4.9 and 6.4.10, Self-Identity in sub-section 6.4.11 and 6.4.12, and finally, the Behavioural Intention in sub-section 6.4.13 and

6.4.13 for both subjects of Yoghurt with Live Cultures and Cholesterol Lowering Margarine, respectively.

The descriptive analysis of constructs consists of the analysis of mean, standard deviation, skewness and kurtosis. All constructs items are measured on a seven-point Likert scale (1 = Strongly disagree, 7 = Strongly agree).

6.4.1 Perceived Susceptibility for Yoghurt with Live Cultures

The scale of Perceived Susceptibility for Yoghurt with Live Cultures utilised the measurement of eight items with a seven-point Likert scale. The definition (summary) of each item in this construct is presented in Appendix 3.

Table 6.8 provides the descriptive analysis of one of the EHBM constructs (Perceived Susceptibility). The results indicated that respondents agree if they do not adopt a healthy lifestyle, they could suffer from digestive system problems (SUS1: mean = 5.10, SD = 1.27) and slightly agree that someone of their age is at the risk of getting digestive system problems (SUS2: mean = 4.76, SD = 1.42). The respondents slightly agree that it is likely that they could suffer a digestive system problem (SUS3: mean = 4.58, SD = 1.38) and respondents strongly agree that anyone may suffer from digestive system problems if they do not don't adopt a healthy diet (SUS4: mean=5.49, SD = 1.12). Furthermore, the respondents agree that they might develop a digestive system problem in the future (SUS5: mean = 4.99, SD = 1.24), respondents also slightly agreed that they are concerned about getting digestive system problems (SUS6: mean = 4.29, SD = 1.57), respondents have an approximately neutral point of view that they could suffer a serious problem with their digestive system in the next year (SUS7: mean = 3.69, SD = 1.50) and respondents agreed that the thought of getting digestive system problems worries them (SUS8: mean = 4.23, SD = 1.63).

Table 6-8 Perceived Susceptibility

Subject	Item	Mean	Std dev.	Skewness	Kurtosis
Yoghurt	SUS1	5.10	1.270	-0.743	0.877
	SUS2	4.76	1.419	-0.477	-0.176
	SUS3	4.58	1.379	-0.203	-0.223
	SUS4	5.49	1.126	-0.651	0.681
	SUS5	4.99	1.246	-0.559	0.643
	SUS6	4.29	1.575	-0.154	-0.559
	SUS7	3.69	1.498	0.175	-0.158
	SUS8	4.23	1.637	-0.124	-0.638
Margarine	SUS1	5.29	1.259	-0.689	0.903
	SUS2	4.86	1.511	-0.622	0.021
	SUS3	4.50	1.369	-0.206	0.109
	SUS4	5.53	1.134	-0.562	0.207
	SUS5	5.10	1.140	-0.413	0.716
	SUS6	4.32	1.699	-0.252	-0.714
	SUS7	3.72	1.640	0.003	-0.559
	SUS8	4.29	1.706	-0.247	-0.695

Notes:

1. *SUS= Perceived Susceptibility*
2. *The original scale is specified as a seven-point agreement scale where 1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4= Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree*

6.4.2 Perceived Susceptibility for Cholesterol Lowering Margarine

The scale of Perceived Susceptibility for Cholesterol Lowering Margarine utilised the measurement of eight items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 4.

Table 6.8 provides the descriptive analysis of one of the EHBM constructs (Perceived Susceptibility). The results indicated that respondents strongly agree that if they do not adopt a healthy lifestyle, they could suffer from coronary heart disease (SUS1: mean = 5.29, SD = 1.25) and slightly agree that someone of their age is at the risk of getting coronary heart disease (SUS2: mean = 4.86, SD = 1.51). The respondents slightly agree that it is likely that they could suffer a coronary heart disease (SUS3: mean = 4.50, SD = 1.36) and respondents strongly agree that anyone may suffer from coronary heart disease if they do not don't adopt a healthy diet (SUS4: mean=5.53, SD = 1.13). Furthermore, the respondents agree that they might develop a coronary heart disease in the future (SUS5: mean = 5.10, SD = 1.14), respondents also slightly agreed that they are concerned about getting coronary heart disease (SUS6: mean = 4.32, SD = 1.69), respondents have an approximately neutral point of view that they could suffer a serious problem with their coronary heart disease in the next year (SUS7: mean = 3.72, SD = 1.64) and the respondents agree that the thought of getting coronary heart disease worries them (SUS8: mean = 4.29, SD = 1.70).

According to Gravetter and Wallnau (2014), the guidelines for detection of a non-normality distribution should be employed for the analysis. The guidelines indicated that the indices value of skewness and kurtosis should be close to zero (0). Precisely, the acceptable limits indices value of ±2.0 is desirable. From the summary presented in Table 6.8, items of Perceived Susceptibility indicate a normal range of distribution.

6.4.3 Perceived Severity for Yoghurt with Live Cultures

The scale of Perceived Severity for Yoghurt with Live Cultures utilised the measurement of seven items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 3.

Table 6.9 provides the descriptive analysis of one of the EHBM constructs (Perceived Severity). The results indicated that respondents agree that a digestive system problem would distract from their daily work activities (SEV1: mean = 5.07, SD = 1.28). The respondents also agree that a digestive system problem would have long-lasting effects (SEV2: mean = 5.05, SD = 1.18). Furthermore, the respondents strongly agree that a digestive system problem would make them less active if it was very serious (SEV3: mean = 5.53, SD = 1.07) and the respondents have an approximately at a neutral point of view that a digestive system problem would be financially damaging and result in loss of earnings (SEV4: mean = 4.01, SD = 1.67). Next, the respondents slightly disagree that a digestive system problem would harm their career (SEV5: mean = 3.67, SD = 1.70). The respondents agree that a digestive system problem would affect their social relationships (SEV6: mean = 4.28, SD = 1.53), and the respondents agree that a digestive system problem would affect their family life (SEV7: mean = 4.26, SD = 1.54).

Table 6-9 Perceived Severity

Subject	Item	Mean	Std dev.	Skewness	Kurtosis
Yoghurt	SEV1	5.07	1.289	-0.567	0.211
	SEV2	5.05	1.180	-0.101	-0.331
	SEV3	5.53	1.078	-0.722	1.172
	SEV4	4.01	1.679	-0.141	-0.595
	SEV5	3.67	1.703	-0.079	-0.746
	SEV6	4.28	1.535	-0.436	-0.257
	SEV7	4.26	1.540	-0.300	-0.340
Margarine	SEV1	5.49	1.373	-1.027	1.230
	SEV2	5.99	0.985	-0.832	0.939
	SEV3	5.97	1.151	-1.244	1.876
	SEV4	4.83	1.816	-0.683	-0.408
	SEV5	4.46	1.939	-0.421	-0.893
	SEV6	4.55	1.692	-0.511	-0.291
	SEV7	5.05	1.515	-0.755	0.336

Notes:

1. *SEV= Perceived Severity*
2. *The original scale is specified as a seven-point agreement scale where 1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4= Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree*

6.4.4 Perceived Severity for Cholesterol Lowering Margarine

The scale of Perceived Severity for Cholesterol Lowering Margarine utilised the measurement of seven items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 4.

Table 6.9 provides the descriptive analysis of one of the EHBM constructs (Perceived Severity). The results indicated that respondents strongly agree that a coronary heart disease would distract from their daily work activities (SEV1: mean = 5.49, SD = 1.37). The respondents strongly agree that a coronary heart disease would have long-lasting effects (SEV2: mean = 5.99, SD = 0.985). Furthermore, the respondents strongly agree that a coronary heart disease would make them less active if it was very serious (SEV3: mean = 5.97, SD = 1.15) and respondents slightly agree that a coronary heart disease would be financially damaging and result in loss of earnings (SEV4: mean = 4.83, SD = 1.81). Next, the respondents slightly agree that a coronary heart disease would harm their career (SEV5: mean = 4.46, SD = 1.93). The respondents agree that a coronary heart disease would affect their social relationships (SEV6: mean = 4.55, SD = 1.69), and the respondents agree that a coronary heart disease would affect their family life (SEV7: mean = 5.05, SD = 1.51).

From the summary presented in Table 6.9, items of Perceived Severity indicate a normal range of distribution, as skewness and kurtosis are within the acceptable limit's indices value of ±2.0 (Gravetter and Wallnau, 2014).

6.4.5 Perceived Benefits for Yoghurt with Live Cultures

The scale of Perceived Benefits for Yoghurt with Live Cultures utilised the measurement of six items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 3.

Table 6.10 presents the descriptive analysis of one of the EHBM constructs (Perceived Benefits). The results indicated that respondents agree that consuming Yoghurt with Live Cultures would protect them from getting digestive system problems (BEN1: mean=4.73, SD=1.25), the respondents also agree that consuming Yoghurt with Live Cultures would protect others in their household from getting digestive system problems (BEN2: mean= 4.40, SD=1.40), the respondents agree that the health benefits of consuming Yoghurt with Live Cultures would help them avoid being absent from work (BEN3: mean=4.02, SD=1.57). Furthermore, the respondents strongly agree that consuming Yoghurt with Live Cultures would be beneficial for their digestive system health (BEN4: mean=5.06, SD=1.32), and the respondents agree that consuming Yoghurt with Live Cultures would give them more confidence that they can avoid digestive system problems (BEN5: mean=4.52, SD=1.45) and finally the respondents also agree that consuming Yoghurt with Live Cultures would reduce the likelihood of getting other diseases related to an unhealthy digestive system (BEN6: mean=4.63, SD=1.36).

Table 6-10 Perceived Benefits

Subject	Item	Mean	Std dev.	Skewness	Kurtosis
Yoghurt	BEN1	4.73	1.251	-0.627	1.206
	BEN2	4.40	1.409	-0.535	0.414
	BEN3	4.02	1.570	-0.388	-0.225
	BEN4	5.06	1.323	-0.663	0.880
	BEN5	4.52	1.457	-0.576	0.213
	BEN6	4.63	1.367	-0.496	0.476
Margarine	BEN1	4.19	1.396	-0.351	0.037
	BEN2	4.10	1.527	-0.315	-0.232
	BEN3	3.83	1.586	-0.152	-0.413
	BEN4	4.58	1.449	-0.468	0.292
	BEN5	4.24	1.507	-0.353	-0.096
	BEN6	4.30	1.463	-0.355	0.161

Notes:

1. *BEN = Perceived Benefits*
2. *The original scale is specified as a seven-point agreement scale where 1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4= Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree*

6.4.6 Perceived Benefits for Cholesterol Lowering Margarine

The scale of Perceived Benefits for Cholesterol Lowering Margarine utilised the measurement of six items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 4.

Table 6.10 presents the descriptive analysis of one of the EHBM constructs (Perceived Benefits). The results indicated that respondents slightly agree that consuming Cholesterol Lowering Margarine would protect them from getting coronary heart disease (BEN1: mean=4.19, SD=1. 9), the respondents also slightly agree that consuming Cholesterol Lowering Margarine would protect others in their household from getting coronary heart disease (BEN2: mean= 4.10, SD=1.52), the respondents at a neutral standpoint that the health benefits of consuming Cholesterol Lowering Margarine would help them avoid being absent from work (BEN3: mean=3.83, SD=1.58). Furthermore, the respondents agree that consuming Cholesterol Lowering Margarine would be beneficial for the health of their heart in particular (BEN4: mean=4.58, SD=1.44), and the respondents agree that consuming Cholesterol Lowering Margarine would give them more confidence that they can avoid coronary heart disease (BEN5: mean=4.24, SD=1.50) and finally the respondents also agree that consuming Cholesterol Lowering Margarine would reduce the likelihood of getting other diseases related to an unhealthy cardiovascular system (BEN6: mean=4. 30, SD=1.46).

According to Gravetter and Wallnau (2014), the guidelines for detection of a non-normality distribution should be employed for the analysis. The guidelines indicated that the indices value of skewness and kurtosis should be close to zero (0). Precisely, the acceptable limits indices value of ±2.0 is desirable. From the summary presented in Table 6.10, items of Perceived Benefits indicate a normal range of distribution.

6.4.7 Perceived Barriers for Yoghurt with Live Cultures

The scale of Perceived Barriers for Yoghurt with Live Cultures utilised the measurement of eight items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 3.

Table 6.11 presents the descriptive analysis of one of the EHBM constructs (Perceived Barriers). The results indicated that respondents generally disagreed that consuming Yoghurt with Live Cultures is not convenient for them (BAR1: mean=2.79, SD 1.50), the respondents also disagree that in order to obtain the benefits of consuming Yoghurt with Live Cultures they would have to give up some of their favourite snacks/ foods (BAR2: mean=2.84, SD=1.42), the respondents also disagree that they do not like the taste of Yoghurt with Live Cultures (BAR3: mean=2.83, SD 1.70). Furthermore, the respondents also disagree that they think it would take too much effort to change their diet to include frequent consumption of Yoghurt with Live Cultures (BAR4: mean=2.61, SD=1.40), the respondents also disagree that consuming Yoghurt with Live Cultures would interfere with their daily routine (BAR5: mean=2.31, SD=1.24). In contrast, the respondents agree that consuming Yoghurt with Live Cultures might be risky for those who are intolerant to dairy products (BAR6: mean 4.48, SD=1.47). Next, the respondents at a neutral point of view to the statement that it is too difficult to frequently consume Yoghurt with Live Cultures as the price is higher than alternative food products (BAR7: mean=3.69, SD=1.69), and finally the respondents at a neutral point of view that they concerned about the uncertainty of the benefits of consuming Yoghurt with Live Cultures (BAR8: mean=3.58, SD 1.43).

Table 6-11 Perceived Barriers

Subject	Item	Mean	Std dev.	Skewness	Kurtosis
Yoghurt	BAR1	2.79	1.509	0.635	-0.126
	BAR2	2.84	1.420	0.358	-0.709
	BAR3	2.83	1.705	0.784	-0.126
	BAR4	2.61	1.404	0.587	-0.398
	BAR5	2.31	1.243	0.690	-0.111
	BAR6	4.48	1.477	-0.328	0.102
	BAR7	3.69	1.696	-0.042	-0.843
	BAR8	3.58	1.430	-0.125	-0.398
Margarine	BAR1	3.18	1.578	0.397	-0.449
	BAR2	3.74	1.698	-0.001	-0.809
	BAR3	3.70	1.738	0.248	-0.551
	BAR4	2.95	1.579	0.585	-0.251
	BAR5	2.63	1.457	0.761	0.215
	BAR6	3.50	1.364	-0.242	0.100
	BAR7	3.78	1.754	0.020	-0.717
	BAR8	3.99	1.604	-0.108	-0.345

Notes:

1. *BAR = Perceived Barriers*
2. *The original scale is specified as a seven-point agreement scale where 1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4= Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree*

6.4.8 Perceived Barriers consumer for Cholesterol Lowering Margarine

The scale of Perceived Barriers for Cholesterol Lowering Margarine utilised the measurement of eight items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 4.

Table 6.11 presents the descriptive analysis of one of the EHBM constructs (Perceived Barriers). The results indicated that respondents slightly disagreed that consuming Cholesterol Lowering Margarines not convenient for them (BAR1: mean=3.18, SD 1.57), the respondents slightly agree that in order to obtain the benefits of consuming Cholesterol Lowering Margarines they would have to give up some of their favourite snacks/ foods (BAR2: mean=3.74, SD=1.69), the respondents slightly agree that they don’t like the taste of Cholesterol Lowering Margarines (BAR3: mean=3.70, SD 1.73). Furthermore, the respondents show disagreement that they think it would take too much effort to change their diet to include frequent consumption of Cholesterol Lowering Margarines (BAR4: mean=2.95, SD=1.57), and the respondents also strongly disagree that consuming Cholesterol Lowering Margarines would interfere with their daily routine (BAR5: mean=2.63, SD=1.45). In contrast, the respondents at the neutral point of view that consuming Cholesterol Lowering Margarines might be risky for those having certain food allergies (BAR6: mean 3.50, SD=1.36). Next, the respondents slightly agree with the statement that it is too difficult to frequently consume Cholesterol Lowering Margarines as the price is higher than alternative ordinary margarine (BAR7: mean=3.78, SD=1.75), and finally, the respondents agree that they concerned about the uncertainty of the benefits of consuming Cholesterol Lowering Margarines (BAR8: mean=3.99, SD 1.60).

From the summary presented in Table 6.11, items of Perceived Barriers indicate a normal range of distribution, as skewness and kurtosis are within the acceptable limit indices value of ±2.0 (Gravetter and Wallnau, 2014).

6.4.9 Cues to Action for Yoghurt with Live Cultures

The scale of Cues to Action for Yoghurt with Live Cultures utilised the measurement of four items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 3.

Table 6.12 provides the descriptive analysis of one of the EHBM constructs (Cues to Action). The results indicated that respondents agree that they would more likely consume Yoghurts with Live Cultures if recommended by a doctor (CTA1: mean=4.93 SD=1.57), the respondents also agree that they would more likely consume Yoghurts with Live Cultures if recommended by their family (CTA2: mean= 3.98, SD=1.45), the respondents agree that they would more likely consume Yoghurts with Live Cultures if its health benefits were advertised on the mass media (press, magazines, newspaper, radio, television, internet), (CTA3: mean=3.92, SD=1.62). Furthermore, the respondents also agree that they would more likely consume Yoghurts with Live Cultures if recommended by their friends and colleagues (CTA4: mean=3.90, SD=1.48).

Table 6-12 Cue to Action

Subject	Items	Mean	Std dev	Skewness	Kurtosis
Yoghurt	CTA1	4.93	1.570	-0.709	-0.032
	CTA2	3.98	1.457	-0.305	-0.236
	CTA3	3.92	1.622	-0.284	-0.646
	CTA4	3.90	1.487	-0.354	-0.296
Margarine	CTA1	4.97	1.528	-0.850	0.418
	CTA2	3.97	1.481	-0.344	-0.131
	CTA3	3.78	1.645	-0.175	-0.712
	CTA4	3.71	1.532	-0.206	-0.428

Notes:

1. *CTA = Cues to Action*
2. *The original scale is specified as a seven-point agreement scale where 1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4= Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree*

6.4.10 Cues to Action for Cholesterol Lowering Margarine

The scale of Cues to Action for Cholesterol Lowering Margarine utilised the measurement of four items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 4.

Table 6.12 presents the descriptive analysis of one of the EHBM constructs (Cues to Action). The results indicated that respondents agree that they would more likely consume Cholesterol Lowering Margarine if recommended by a doctor (CTA1: mean=4.97, SD 1.52). Next, the respondents slightly agree that they would more likely consume Cholesterol Lowering Margarine if recommended by their family (CTA2: mean=3.97, SD=1.48), and, the respondents also slightly agree that they would more likely consume Cholesterol Lowering Margarine if its health benefits were advertised in the mass media (press, magazines, newspaper, radio, television, the internet) (CTA3: mean=3.78, SD 1.64). Furthermore, the respondents also agreed that they would more likely consume Cholesterol Lowering Margarine if recommended by their friends and colleagues (CTA4: mean=3.71, SD=1.53).

According to Gravetter and Wallnau (2014), the guidelines for detection of a non-normality distribution should be employed for the analysis. The guidelines indicated that the indices value of skewness and kurtosis should be close to zero (0). Precisely, the acceptable limit indices value of ±2.0 is desirable. From the summary presented in Table 6.12, items of Cues to Action indicate a normal range of distribution.

6.4.11 Self-Identity for Yoghurt with Live Cultures

The scale of Self-Identity for Yoghurt with Live Cultures utilised the measurement of three items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 3.

Table 6.13 presents the descriptive analysis of one of the EHBM constructs (Self-Identity). The results indicated that respondents agree that they think of themselves as the sort of person who is concerned about the long-term health effects of their food choices (SI 1: mean=4.99 SD=1.51), the respondents agree that they think of themselves as someone who generally thinks carefully about the health consequences of their food choices (SI 2: mean= 4.92, SD=1.45), the respondents agree that they think of themselves as a health-conscious person (SI 3: mean=4.96, SD=1.43).

Table 6-13 Self-Identity

Subject	Items	Mean	Std dev	Skewness	Kurtosis
Yoghurt	SI1	4.99	1.513	-0.613	-0.177
	SI2	4.92	1.455	-0.637	0.008
	SI3	4.96	1.439	-0.654	0.161
Margarine	SI1	4.90	1.507	-0.544	-0.345
	SI2	4.88	1.528	-0.487	-0.327
	SI3	4.78	1.528	-0.569	-0.067

Notes:

1. *SI = Self-Identity*
2. *The original scale is specified as a seven-point agreement scale where 1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4= Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree*

6.4.12 Self-Identity for Cholesterol Lowering Margarine

The scale of Self-Identity for Cholesterol Lowering Margarine utilised the measurement of three items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 4.

Table 6.13 presents the descriptive analysis of one of the EHBM constructs (Self-Identity). The results indicated that respondents agree that they think of themselves as the sort of person who is concerned about the long-term health effects of their food choices (SI 1: mean=4.90 SD=1.50), the respondents also agree that they think of themselves as someone who generally thinks carefully about the health consequences of their food choices (SI 2:

mean= 4.88, SD=1.52), the respondents agree that they think of themselves as a health-conscious person (SI 3: mean=4.78, SD=1.52).

According to Gravetter and Wallnau (2014), the guidelines for detection of a non-normality distribution should be employed for the analysis. The guidelines indicated that the indices value of skewness and kurtosis should be close to zero (0). Precisely, the acceptable limit indices value of ±2.0 is desirable. From the summary presented in Table 6.13, items of Self-Identity indicate a normal range of distribution.

6.4.13 Behavioural Intention to purchase and consume Yoghurt with Live Cultures

The scale of Behavioural Intentions to purchase and consume Yoghurt with Live Cultures utilised the measurement of three items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 3.

Table 6.14 presents the descriptive analysis of one of the EHBM constructs (Behavioural Intention). The results indicated that respondents agree that they will make an effort in future to eat Yoghurt with Live Cultures (BI1: mean=4.52 SD=1.64), the respondents also agree that they would encourage their friends and family to eat Yoghurt with Live Cultures in the future (BI2: mean= 4.19, SD=1.57). Finally, the respondents also agree that in the future they intend to eat a diet that includes Yoghurt with Live Cultures even if is more expensive (BI3: mean=4.30, SD=1.65).

Table 6-14 Behavioural Intention

Subject	Items	Mean	Std dev	Skewness	Kurtosis
Yoghurt	BI1	4.52	1.648	-0.608	-0.235
	BI2	4.19	1.574	-0.256	-0.419
	BI3	4.30	1.658	-0.405	-0.495
Margarine	BI1	4.02	1.817	-0.108	-0.885
	BI2	3.93	1.734	-0.074	-0.675
	BI3	3.85	1.771	-0.009	-0.847

Notes:

1. *BI = Behavioural Intention*
2. *The original scale is specified as a seven-point agreement scale where 1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4= Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree*

6.4.14 Behavioural Intention to purchase and consume Cholesterol Lowering Margarines

The scale of Behavioural Intention to purchase and consume Cholesterol Lowering Margarines utilised the measurement of three items with a seven-point Likert scale. The summary of each item in this construct is presented in Appendix 4.

Table 6.14 presents the descriptive analysis of one of the EHBM constructs (Behavioural Intention). The results indicated that respondents agree that they will make an effort in future to eat Cholesterol Lowering Margarines (BI1: mean=4.02 SD=1.81), however, the respondents slightly agree that they would encourage their friends and family to eat Cholesterol Lowering Margarines in the future (BI2: mean= 3.93, SD=1.73). Finally, the respondents have an approximately neutral point of view that in the future they intend to eat a diet that includes Cholesterol Lowering Margarines even if is more expensive (BI3: mean=3.85, SD=1.77).

According to Gravetter and Wallnau (2014), the guidelines for detection of a non-normality distribution should be employed for the analysis. The guidelines indicated that the indices value of skewness and kurtosis should be close to zero (0). Precisely, the acceptable limit indices value of ±2.0 is desirable. From the summary presented in Table 6.14, items of Behavioural Intention indicate a normal range of distribution.

6.4.15 Summary of the descriptive analysis

The analysis of the construct of both subjects Yoghurt with Live Cultures and Cholesterol Lowering Margarine has shown a very good result. All items showed a normal distribution based on the criteria stated by Gravetter and Wallnau (2014).

6.5 Reliability Analysis

According to De Vellis (2003), reliability analysis is a method that assesses the goodness level of measuring the scale which are a manifestation of a set of indicators. The most commonly assessment measures of the internal consistency utilise Cronbach's alpha.

The guideline criteria for a good internal consistency applied to each item in the EHBM construct is Cronbach's alpha to achieve a minimum threshold value of 0.7 **(**Nunnally, J. C., and Bernstein, 1994)**.** Besides that, the reliability analysis in this study also focused to the corrected item to total correlation coefficient (CITC) and the impact on an alpha of item deletion from the scale. The guideline criteria employed for a good internal consistency for each item in the EHBM construct is to achieve a minimum threshold value of 0.3 for CITC (Pallant, 2005).

6.5.1 Reliability for Yoghurt with Live Cultures

The results of reliability analysis for seven EHBM constructs (Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self- Identity and Behavioural Intention) in the context of products of Yoghurt with Live Cultures and Cholesterol Lowering Margarine is presented in Table 6.15.

6.5.2 Cronbach's alpha for Yoghurt with Live Cultures

Table 6.15 presents the Cronbach's alpha correlation coefficients. The Cronbach's alpha values for all constructs exceed the minimum desirable threshold of 0.7. The Cronbach's alpha correlation coefficients scored in this analysis between 0.836 and 0.949. Such results indicated the internal consistency of all items are good with Cronbach's alpha within the desirable threshold mentioned by Hair et al., (2010).

Table 6-15 Reliability

Construct	Items	Corrected item-total correlation (CITC)	Cronbach if Item Deleted	Cronbach's alpha	No. of items
Perceived Susceptibility *(Yoghurt)*	SUS1	0.602	0.892	0.898	8
	SUS2	0.689	0.884		
	SUS3	0.790	0.875		
	SUS4	0.590	0.893		
	SUS5	0.651	0.888		
	SUS6	0.785	0.875		
	SUS7	0.695	0.884		
	SUS8	0.671	0.887		
Perceived Susceptibility *(Margarine)*	SUS1	0.452	0.857	0.858	8
	SUS2	0.613	0.840		
	SUS3	0.720	0.829		
	SUS4	0.448	0.857		
	SUS5	0.666	0.838		
	SUS6	0.711	0.828		
	SUS7	0.629	0.839		
	SUS8	0.624	0.840		
Perceived Severity *(Yoghurt)*	SEV1	0.678	0.857	0.876	7
	SEV2	0.643	0.862		
	SEV3	0.519	0.875		
	SEV4	0.698	0.854		
	SEV5	0.701	0.853		
	SEV6	0.729	0.849		
	SEV7	0.672	0.856		
Perceived Severity *(Margarine)*	SEV1	0.616	0.833	0.853	7
	SEV2	0.526	0.848		
	SEV3	0.551	0.843		
	SEV4	0.711	0.818		
	SEV5	0.683	0.825		
	SEV6	0.675	0.824		
	SEV7	0.615	0.833		
Perceived Benefits *(Yoghurt)*	BEN1	0.863	0.902	0.925	6
	BEN2	0.747	0.916		
	BEN3	0.696	0.925		
	BEN4	0.798	0.910		
	BEN5	0.847	0.902		
	BEN6	0.778	0.912		
Perceived Benefits *(Margarine)*	BEN1	0.886	0.919	0.939	6
	BEN2	0.784	0.931		
	BEN3	0.708	0.942		
	BEN4	0.836	0.925		
	BEN5	0.840	0.924		
	BEN6	0.862	0.922		
Perceived Barriers *(Yoghurt)*	BAR1	0.617	0.810	0.836	8
	BAR2	0.548	0.819		
	BAR3	0.640	0.807		
	BAR4	0.723	0.797		
	BAR5	0.683	0.805		
	BAR6	0.248	0.855		
	BAR7	0.575	0.816		
	BAR8	0.544	0.820		

Perceived Barriers *(Margarine)*	BAR1	0.650	0.790	0.824	8
	BAR2	0.376	0.828		
	BAR3	0.554	0.803		
	BAR4	0.678	0.786		
	BAR5	0.668	0.789		
	BAR6	0.455	0.816		
	BAR7	0.516	0.809		
	BAR8	0.510	0.809		
Cues to Action *(Yoghurt)*	CTA1	0.636	0.872	0.872	4
	CTA2	0.778	0.817		
	CTA3	0.673	0.859		
	CTA4	0.832	0.794		
Cues to Action *(Margarine)*	CTA1	0.599	0.881	0.870	4
	CTA2	0.763	0.818		
	CTA3	0.741	0.827		
	CTA4	0.798	0.803		
Self-Identity *(Yoghurt)*	SI1	0.846	0.898	0.927	3
	SI2	0.871	0.878		
	SI3	0.835	0.906		
Self-Identity *(Margarine)*	SI1	0.847	0.901	0.928	3
	SI2	0.895	0.862		
	SI3	0.819	0.924		
Behavioural Intention *(Yoghurt)*	IB1	0.915	0.907	0.949	3
	IB2	0.845	0.960		
	IB3	0.920	0.904		
Behavioural Intention *(Margarine)*	IB1	0.915	0.912	0.950	3
	IB2	0.867	0.949		
	IB3	0.905	0.919		

6.5.3 Corrected item-total correlation for Yoghurt with Live Cultures

The results of the corrected item-total correlation (CITC) analysed according to the minimum threshold guideline by Pallant (2005). The value of CITC should achieve a minimum threshold value of 0.3 to be good. In the case of obtaining CITC value of less than 0.3, Pallant (2005) suggested such item does not really correlates and it measures something different in a particular construct. From the analysis in the Table 6.15, all items have values of exceeding 0.3 except BAR6 with a value of 0.248. This indicates the item of BAR6 was not really measuring the construct of Perceived Barriers. This was due to the statement of BAR6 ‘consuming Yoghurt with Live Cultures might be risky for those who are intolerant to dairy products’ which reflected the individual experience that varies among people. This low correlation value, causing the inability of BAR6 to represent a general item’s statement for Perceived Barriers. Therefore, BAR6 would have been considered to be deleted due to low loading value. However, the decision to delete this item is subject to next analysis of EFA. If this item (BAR6) produces low communalities value i.e. less than 0.5, then this item should be considered as a candidate for deletion in subsequent analysis.

6.5.4 If item deleted correlation coefficient for Yoghurt with Live Cultures

The other method to improve reliability of the construct in the model is by assessing the values in the column of "Cronbach if item deleted". According to Pallant (2005), if any of the items in the column produce greater Cronbach alpha value than the value of final Cronbach alpha, a decision to remove such item would improve the construct reliability. For this study, as explained and indicated earlier in Table 6.15 items BAR6 would increase the value of Cronbach's alpha from 0.816 to 0.855 if this item being deleted. The same scenario would apply if item IB2 is deleted because it might increase the Cronbach's alpha value from 0.949 to 0.960.

6.5.5 Reliability for Cholesterol Lowering Margarine

Table 6.15 presents a result summary of reliability for all seven constructs: Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self- Identity and Behavioural Intention.

6.5.6 Cronbach's alpha for Cholesterol Lowering Margarine

Table 6.15 presents the Cronbach's alpha correlation coefficients. The Cronbach's alpha values for all constructs exceed the minimum desirable threshold of 0.7. The Cronbach's alpha correlation coefficients scored in this analysis between 0.824 and 0.950. Such results indicated the internal consistency of all items are good with Cronbach's alpha within the desirable threshold mentioned by Hair et al., (2010).

6.5.7 Corrected item-total correlation for Cholesterol Lowering Margarine

The results of the corrected item-total correlation (CITC) analysed according to the minimum threshold guideline by Pallant (2005). The value of CITC should achieve a minimum threshold value of 0.3 to be good. In the case of obtaining CITC value of less than 0.3, Pallant (2005) suggested such item does not really correlates and it measures something different in a particular construct. From the analysis in the Table 6.15 all items have values of exceeding 0.3 which signal a good result as all items in each construct are measuring the same construct respectively.

6.5.8 If item deleted correlation coefficient for Cholesterol Lowering Margarine

The other method to improve reliability of the construct in the model is by assessing the values in the column of "Cronbach if item deleted". According to Pallant (2005), if any of the items in the column produce greater Cronbach alpha value than the value of final Cronbach alpha, a decision to remove such item would improve the construct reliability. In this study, as explained and indicated earlier in Table 6.15, there were 3 items to be considered to delete as it would increase the alpha value. The first item such as BEN3 would increase the alpha value from 0.939 to 0.942 if it being deleted. The second item to be considered was BAR2 as it would increase the Cronbach's alpha value from 0.824 to 0.828. The third item was CTA1 as it would increase the Cronbach's alpha value from 0.870 to 0.881 if it being deleted. However, prior to deleting these items, it must be supported by the result of next analysis, which is an EFA in order to make a decision.

In summary, this section presents the reliability assessments for all scales utilised in this study. It is considered to be acceptable for further statistical testing as it has successfully demonstrated good results.

6.6 Exploratory Factor Analysis (EFA)

In order to understand the strength of link between observed variables and their underlying factor, the assessment of Exploratory Factor Analysis (EFA) was employed. According to Baglin (2014), a common method to explore the underlying pattern of relationships among multiple observed variable utilises EFA. Another essential role of EFA includes the ability to assess underlying latent variables (constructs), in particular the dimensionality of questionnaire scales.

Although the study has adopted the constructs and items of the HBM model that have been employed in previous research and selected scale items used in this study have met the required minimum threshold reliability, EFA is still necessary as this study focused in a different context from previous other research.

Factor analysis applied to both data of Yoghurt and Margarine which focused on KMO and Bartlett's' Test of Sphericity- to confirm correlation amongst construct items. The study utilised EFA in respect of principal components analysis with Varimax rotation. In addition, the extraction criterion utilised to derive factors with eigenvalues greater than unity.

Furthermore, total variance explained, and communalities have been utilised to assess the goodness of fit. Precisely, “total variance explained is the combined contribution to the total variance of the set of derived factors. Communality is the proportion of the variance of a specific variable explained by all the derived factors. The threshold value of total variance explained, was set at 60%. The minimum acceptable value for communalities was set at 0.5” (Hair et al., 2010, p. 149).

In this study, the cut-off point for the inclusion of factor loadings consistent with a sample size of 345 was set as 0.35 (Hair et al., 2010, p. 117). Table 6.16 presents summary of critical values of sample size. The analysis of EFA in this study was conducted using IBM SPSS Statistics 22.0 (IBM Corp (2013).

Table 6-16 The Critical Values for Sample Size

Sample size	Minimum value
350	0.30
250	0.35
200	0.40
150	0.45
120	0.50
100	0.55
85	0.60
70	0.65
60	0.70
50	0.75

Source: Hair et al., (2010, p. 117)

The correlation of the items on the scale is assessed using KMO and Bartlett's test (Snedecor and Cochran, 1989). An essential condition for EFA is that the data are metric and correlated. If the data are not correlated, there is no point in proceeding further. This condition is confirmed by the application of the KMO and Bartlett’s test.

Technically, the KMO indicator measures sampling adequacy. “The value of KMO statistic are between 0 and 1. A value of 0 indicates that the sum of partial correlations is large relative to the sum of correlations, indicating diffusion in the pattern of correlations (hence, factor analysis is likely to be inappropriate). A value close to 1 indicates that the pattern of correlations is relatively compact and so factor analysis should yield distinct and reliable factors. Kaiser (1974) recommends accepting values greater than 0.5 as acceptable (value below this should lead the researcher to either collect more data or rethink which variable to include)" (Field et al., 2012, p. 920). The categorisation of KMO test is presented in Table 6.17.

Table 6-17 Categorisation of KMO Test

KMO Index	Description
0.9	Marvellous
0.8	Meritorious
0.7	Middling
0.6	Mediocre
0.5	Miserable
<0.5	Unacceptable

Source: Kaiser (1974)

The Bartlett's test evaluates the null hypothesis that the original correlation matrix is an identity matrix. For factor analysis to be suitable for the data it is essential to the variables to have some good relationships. Precisely, all correlation coefficient would be zero if the R-matrix were an identity matrix. Therefore, there is a need to get a significant result. The rejection of the null hypothesis indicates that the correlation and that the data are correlated. The Bartlett's' Test of Sphericity should obtain a score p-value of <0.001 as to indicate that suitable to proceed to factor analysis when the data's suitability is confirmed (Pallant, 2005).

Subsequently, it is necessary to examine the goodness of fit based on total variance explained and communalities. "Total variance explained is the share of total variance explained by the set of derived factors. Total variance explained should be at least 60% to be acceptable for social science data. Communality indicates the share of the variance of a single variable explained by the set of derived factors. The minimum threshold for communalities should be at least 0.5" (Hair et al., 2010, p. 149). Therefore, items that score below the minimum threshold value should be considered for deletion.

6.6.1 The EFA results

The data consist of the items used to measure each of the seven constructs of the EHBM model for the Yoghurt and Margarine product groups. All items are designed as a seven-point Likert scale (1 = Strongly disagree, 7 = Strongly agree). The data confirmed as metric because the scale design suggests interval, hence metric measurement.

The assessment of EFA in this study utilising IBM SPSS Statistics 22.0 (IBM Corp, 2013). The data analysis has been made for both subjects of Yoghurt with Live Cultures and

Cholesterol Lowering Margarine. The data analysis has been done separately for each construct. Table 6.18 presents a summary for EFA analysis.

Table 6-18 Summary of Exploratory Factor Analysis (EFA) Results

Subject	Constructs	KMO	Bartlett's' Test of Sphericity			
			Chi-Square	df	Significant	Total variance
Yoghurt	Perceived Susceptibility	0.856	1644.657	28	0.000	61.904
	Perceived Severity	0.821	1287.210	21	0.000	51.176
	Perceived Benefits	0.878	1663.722	15	0.000	68.593
	Perceived Barriers	0.860	1117.065	28	0.000	53.396
	Cues to Action	0.781	794.439	6	0.000	64.817
	Self-Identity	0.761	811.007	3	0.000	80.976
	Behavioural Intention	0.749	1086.067	3	0.000	86.370
Margarine	Perceived Susceptibility	0.797	1339.166	28	0.000	53.961
	Perceived Severity	0.785	1220.497	21	0.000	60.476
	Perceived Benefits	0.895	1912.007	15	0.000	72.821
	Perceived Barriers	0.852	888.352	28	0.000	38.986
	Cues to Action	0.778	749.333	6	0.000	63.745
	Self-Identity	0.742	849.299	3	0.000	81.514
	Behavioural Intention	0.763	1052.611	3	0.000	86.540

6.6.2 Perceived Susceptibility (Yoghurt)

EFA has been employed on all eight items scales of the Perceived Susceptibility for Yoghurt. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor components to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity value was statistically significant. As presented in Table 6.18, the KMO index achieved "marvellous" result with a value of 0.9 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=28, chi-square =1644.657, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 62%, which is considered acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 except for two items with a score slightly below the minimum threshold (SUS4 and SUS5). The communalities values range from 0.5 to 0.8. Table 6.19 presents the summary of factor analysis results for Perceived Susceptibility (for Yoghurt) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. Overall, eight items were retained for further analysis.

Table 6-19 Factor Analysis Result of Perceived Susceptibility Construct

Product group	Items	Factor loading	Communalities
Yoghurt	SUS1	.623	.551
	SUS2	.711	.654
	SUS3	.822	.700
	SUS4	.593	.471*
	SUS5	.677	.477*
	SUS6	.876	.835
	SUS7	.762	.620
	SUS8	.758	.645
	Total variance (%) = 61.904		
Margarine	SUS1	.425	.191*
	SUS2	.528	.461*
	SUS3	.701	.782
	SUS4	.399	.184*
	SUS5	.639	.559
	SUS6	.937	.928
	SUS7	.628	.548
	SUS8	.793	.663
	Total variance (%) = 53.961		

Note: * = low communalities

6.6.3 Perceived Susceptibility (Margarine)

EFA has been employed on all eight items scales of the Perceived Susceptibility for Margarine. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor components to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett’s Test of Sphericity value was statistically significant. As presented in Table 6.18, the KMO index achieved “meritorious” result with a value of 0.8 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=28, chi-square =1339.166, statistical significance = 0.000) proven by the assessment of Bartlett’s Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 54%, which does not satisfy the criteria of 60% as an acceptable value in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 except for three items with a score slightly below the minimum threshold (SUS1, SUS2 and SUS4). The communalities values range from 0.2 to 0.8. Table 6.19 provides the summary of factor analysis results for Perceived Susceptibility (for Margarine) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. Overall, eight items were retained for further analysis.

6.6.4 Perceived Severity (Yoghurt)

EFA has been employed on all seven items scales of the Perceived Severity in the context of Yoghurt. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor components to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity value was statistically significant. As presented in Table 6.18, the KMO index achieved "meritorious" result with a value of 0.8 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=21, chi-square =1287.2, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 51%, which does not satisfy the criteria of 60% as an acceptable value in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 except for two items with a score slightly below the minimum threshold (SEV2 and SEV3). The communalities values range from 0.3 to 0.6. Table 6.20 presents the summary of factor analysis results for Perceived Severity (for Yoghurt) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. Overall, seven items were retained for further analysis.

Table 6-20 Factor Analysis Result of Perceived Severity Construct

Product group	Items	Factor loading	Communalities
Yoghurt	SEV1	.721	.519
	SEV2	.678	.459*
	SEV3	.557	.310*
	SEV4	.751	.564
	SEV5	.760	.578
	SEV6	.785	.616
	SEV7	.732	.536
	Total variance (%) = 51.176		
Margarine	SEV1	.517	.491*
	SEV2	.667	.530
	SEV3	.701	.581
	SEV4	.843	.733
	SEV5	.998	.997
	SEV6	.550	.479*
	SEV7	.494	.422*
	Total variance (%) = 60.476		

Note: * = low communalities

6.6.5 Perceived Severity (Margarine)

EFA has been employed on all seven items scales of the Perceived Severity in the context of Margarine. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor components to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity value was statistically significant. As presented in Table 6.18, the KMO index achieved "meritorious" result with a value of 0.8 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=21, chi-square =1220.5, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 60%, which is considered acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 except for three items with a score slightly below the minimum threshold (SEV1, SEV6 and SEV7). The communalities values range from 0.4 to 1.00. Table 6.20 presents the summary of factor analysis results for Perceived Severity (for Margarine) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. Overall, seven items were retained for further analysis.

6.6.6 Perceived Benefits (Yoghurt)

EFA has been employed on all six items scale of the Perceived Benefits in the context of Yoghurt. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor components to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved "marvellous" result with a value of 0.9 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=15, chi-square =1663.72, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 69%, which is considered acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 for all six items. The communalities values range from 0.5 to 0.8. Table 6.21 presents the summary of factor analysis results for Perceived Benefits (for Yoghurt) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. For the purpose of further analysis, overall, six items were retained. Thus, it can be summarised that an acceptable result has been achieved for the goodness of fit.

Table 6-21 Factor Analysis Result of Perceived Benefits Construct

Product group	Items	Factor loading	Communalities
Yoghurt	BEN1	.907	.823
	BEN2	.789	.622
	BEN3	.709	.503
	BEN4	.860	.739
	BEN5	.882	.777
	BEN6	.807	.651
	Total variance (%) = 68.593		
Margarine	BEN1	.909	.826
	BEN2	.812	.659
	BEN3	.723	.523
	BEN4	.877	.769
	BEN5	.880	.775
	BEN6	.904	.817
	Total variance (%) = 72.821		

6.6.7 Perceived Benefits (Margarine)

EFA has been employed on all six items scale of the Perceived Benefits in the context of Margarine. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor components to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved "marvellous" result with a value of 0.9 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=15, chi-square =1912.00, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 73%, which is considered acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 for all six items. The communalities values range from 0.5 to 0.8. Table 6.21 provides the summary of factor analysis results for Perceived Benefits (for Margarine) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. For the purpose of further analysis, overall, six items were retained. Thus, it can be summarised that an acceptable result has been achieved for the goodness of fit.

6.6.8 Perceived Barriers (Yoghurt)

EFA has been employed on all eight items scales of the Perceived Barriers in the context of Yoghurt. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor components to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved "marvellous" result with a value of 0.9 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=28, chi-square =1117.06, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 53%, which does not satisfy the criteria of 60% as an acceptable value in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 except for three items with a score slightly below the minimum threshold (BAR1, BAR2 and

BAR8). The communalities values range from 0.2 to 0.8. Table 6.22 presents the summary of factor analysis results for Perceived Barriers (for Yoghurt) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. For the purpose of further analysis, overall, eight items were retained.

Table 6-22 Factor Analysis Result of Perceived Barriers Construct

Product group	Items	Factor loading	Communalities
Yoghurt	BAR1	.700	.493*
	BAR2	.609	.378*
	BAR3	.725	.528
	BAR4	.857	.743
	BAR5	.841	.745
	BAR6	.696	.524
	BAR7	.557	.507
	BAR8	.532	.353*
	Total variance (%) = 53.396		
Margarine	BAR1	.742	.550
	BAR2	.414	.171*
	BAR3	.597	.357*
	BAR4	.802	.644
	BAR5	.802	.643
	BAR6	.479	.229*
	BAR7	.526	.276*
	BAR8	.499	.249*
	Total variance (%) = 38.986		

Note: * = low communalities

6.6.9 Perceived Barriers (Margarine)

EFA has been employed on all eight items scales of the Perceived Barriers in the context of Margarine. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor component to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved "marvellous" result with a value of 0.9 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level χ2 (degrees of freedom df=28, chi-square =888.35, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 39%, which is below the minimum threshold and does not satisfy the criteria of 60% as an acceptable value in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 except for five items with a score below the minimum threshold (BAR2, BAR3, BAR6, BAR7 and BAR8). The communalities values range from 0.2 to 0.6. Table 6.22 presents the summary of factor analysis results for Perceived Barriers (for Margarine) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. For the purpose of further analysis, overall, eight items were retained.

6.6.10 Cues to Action (Yoghurt)

EFA has been employed on all four items scales of the Cue to Action in the context of Yoghurt. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor component to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved "meritorious" result with a value of 0.8 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level χ2 (degrees of freedom df=6, chi-square =794.44, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 65%, which is above the minimum threshold criteria of 0.6, and thus consider acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 except for one item with a score slightly below the minimum threshold (CTA1). The communalities values range from 0.4 to 0.9. Table 6.23 presents the summary of factor analysis results for Cue to Action (for Yoghurt) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. For the purpose of further analysis, overall, four items were retained.

Table 6-23 Factor Analysis Result of Cues to Action Construct

Product group	Items	Factor loading	Communalities
Yoghurt	CTA1	.651	.424*
	CTA2	.875	.766
	CTA3	.709	.503
	CTA4	.948	.899
	Total variance (%) = 64.817		
Margarine	CTA1	.611	.373*
	CTA2	.849	.721
	CTA3	.787	.620
	CTA4	.914	.836
	Total variance (%) = 63.745		

Note: * = low communalities

6.6.11 Cues to Action (Margarine)

EFA has been employed on all four items scales of the Cue to Action in the context of Margarine. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor component to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett’s Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved “meritorious” result with a value of 0.8 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=6, chi-square =749.33, statistical significance = 0.000) proven by the assessment of Bartlett’s Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 64%, which is above the minimum threshold criteria of 0.6, and thus consider acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 except for one item with a score slightly below the minimum threshold (CTA1). The communalities values range from 0.4 to 0.8. Table 6.23 presents the summary of factor analysis results for Cue to Action (for Margarine) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. For the purpose of further analysis, overall, four items were retained.

6.6.12 Self-Identity (Yoghurt)

EFA has been employed on all three items scales of the Self-Identity in the context of Yoghurt. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor component to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett’s Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved “meritorious” result with a value of 0.8 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=3, chi-square =811.00, statistical significance = 0.000) proven by the assessment of Bartlett’s Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 81%, which is above the minimum threshold criteria of 0.6, and thus consider acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 for all three items. The communalities values range from 0.8 to 0.9. Table 6.24 presents the summary of factor analysis results for Self-Identity (for Yoghurt) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. Overall, three items were retained for further analysis. Thus, it can be summarised that the goodness of fit was regarded as acceptable for this construct.

Table 6-24 Factor Analysis Result of Self-Identity Construct

Product group	Items	Factor loading	Component 1 (Extraction communalities)
Yoghurt	SI1	.893	.797
	SI2	.929	.862
	SI3	.878	.770
	Total variance (%) = 80.976		
Margarine	SI1	.891	.794
	SI2	.963	.928
	SI3	.851	.724
	Total variance (%) = 81.514		

6.6.13 Self-Identity (Margarine)

EFA has been employed on all three items scales of the Self-Identity in the context of Margarine. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor component to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett’s Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved “middling” result with a value of 0.742 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=3, chi-square =849.30, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 82%, which is above the minimum threshold criteria of 0.6, and thus consider acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 for all three items. The communalities values range from 0.7 to 0.9. Table 6.24 presents the summary of factor analysis results for Self-Identity (for Margarine) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. Overall, three items were retained for further analysis. Thus, it can be summarised that the goodness of fit was regarded as acceptable for this construct.

6.6.14 Behavioural Intention to purchase and consume (Yoghurt)

EFA has been employed on all three items scales of the Behavioural Intention scale in the context of Yoghurt. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor component to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett's Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved "middling" result with a value of 0.749 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=3, chi-square =1086.06, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 86%, which is above the minimum threshold criteria of 0.6, and thus consider acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 for all three items. The communalities values range from 0.7 to 0.9. Table 6.25 presents the summary of factor analysis results for Behavioural Intention (for Yoghurt) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. Overall, three items were retained for further analysis. Thus, it can be summarised that the goodness of fit was regarded as acceptable for this construct.

Table 6-25 Factor Analysis Result of Behavioural Intention Construct

Product group	Items	Factor loading	Communalities
Yoghurt	BI1	.958	.918
	BI2	.862	.743
	BI3	.965	.931
	Total variance (%) = 86.370		
Margarine	BI1	.958	.917
	BI2	.890	.791
	BI3	.942	.888
	Total variance (%) = 86.540		

6.6.15 Behavioural Intention to purchase and consume (Margarine)

EFA has been employed on all three items scales of the Behavioural Intention scale in the context of Margarine. The first step was to calculate the unrotated factor matrix. According to Pallant (2005), this assessment role to identify the number of factor component to be extracted. The assessment of data's suitability prior to factor analysis was done by calculating and further assessing the result of the correlation matrix of coefficients. The solution revealed a single factor. Hence the construct is unidimensional.

The KMO value was exceeded the minimum threshold of 0.5, and Bartlett’s Test of Sphericity produced significant value. As presented in Table 6.18, the KMO index achieved “meritorious” result with a value of 0.8 (Kaiser, 1974). This result confirms the existence of inter-correlation among variables. In addition to that, the rejection of the null hypothesis at the five percent significance level $\chi 2$ (degrees of freedom df=3, chi-square =1052.61, statistical significance = 0.000) proven by the assessment of Bartlett's Test of Sphericity.

Next, the total variance explained, and the communalities values were analysed to determine the goodness of fit. Eigenvalues of 1 or more were assessed to identify possible number of factor components to be extracted.

The result of total variance explained, represented by 87%, which is above the minimum threshold criteria of 0.6, and thus consider acceptable in the social science research. Meanwhile, the result indicated that the communalities are generally greater than the minimum threshold of 0.5 for all three items. The communalities values range from 0.8 to 0.9. Table 6.25 presents the summary of factor analysis results for Behavioural Intention (for Yoghurt) constructs.

In addition, each factor loading exceeds the critical value of 0.35 so that each item loads significantly on the single factor. Overall, three items were retained for further analysis. Thus, it can be summarised that the goodness of fit was regarded as acceptable for this construct.

In general, the EFA produces some promising results. Firstly, the value of above minimum threshold value of 0.5 obtained for all construct in the assessment of Kaiser-Meyer-Oklin Measure of Sampling Adequacy (KMO). Furthermore, statistical significance results obtained for Bartlett's Test of Sphericity assessment with an associated p-value of <0.001. Therefore, it can be concluded that the items in each construct are correlated and that the application of EFA was appropriate. With respect to goodness of fit, the results are mixed. Total variance explained satisfies the minimum threshold in 11 out of 14 analyses. The communalities generally exceed the minimum threshold of 0.5 in 6 out of 14 cases. Items associated with low communalities have been identified. A further satisfactory result is that all constructs are unidimensional and that items load significantly on the single factors for all constructs. However, notwithstanding some variations in an ideal solution for some constructs, no action is taken at this stage and the items for all constructs are retained for the next stage of the analysis.

6.7 Chapter summary

The chapter details appropriate descriptive statistics. A detail analysis and discussions made on reliability analysis for the EHBM constructs using Cronbach's alpha followed by an examination of the dimensionality of the constructs from EFA analysis. The conclusion can be made that the reliability and validity of the measurement scales utilised for each of EHBM constructs in this study are good. Furthermore, EFA reveals that all EHBM constructs are unidimensional. The study continues with the presentation of the results of the confirmatory factor analysis (CFA) in Chapter 7.

Chapter 7. Confirmatory Factor Analysis for the Measurement Models

7.1 Introduction

This chapter presents the results of confirmatory factor analysis (CFA) for the measurement models of the seven constructs in the conceptual models for the two product groups of Yoghurt with Live Cultures and Cholesterol Lowering Margarine. The constructs are respectively defined as Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self-Identity and Behavioural Intention. The reliability and dimensionality of the constructs in the two conceptual models have been established in Chapter 6. CFA analysis is employed to assess the acceptability of the measurement models of each construct and to confirm in terms of convergent validity. Confirmation of the measurement property of convergent validity should be established prior to the estimation of the structural models. The structure of the chapter is as follows. Section 7.2 explains the criteria employed in the confirmatory factor analysis (CFA). It is followed in Section 7.3 with the result of measurement models for Yoghurt with Live Cultures. Section 7.4 presents the results of the measurement models for Cholesterol Lowering Margarine. Finally, Section 7.5 provides a conclusion to the chapter.

7.2 Confirmatory Factor Analysis (CFA)

CFA is used to test and validate the theory by confirming the measurement models developed from relevant literature and the conceptual model derived from it. Only if the measurement models are satisfactory, the hypotheses positing the causal relationships between such constructs can be tested in the full structural equation models. The criteria used to evaluate the CFA for measurement models in terms of model validity in this study should be assessed and evaluated based on convergent validity criteria (Hair et al., 2010). In the aspect of "convergent validity, the items that are indicators of a specific construct should converge or share a high proportion of variance in common" (Hair et al., 2010, p. 709).

Measures of model fit are utilised to the evaluation of the models. Precisely, the utilised measures are NFI, TLI CFI and RMSEA. The unstandardised path estimates are evaluated for statistical significance and the acceptability of the sign. Standardised path estimates are assessed in term of magnitude. The squared multiple correlation coefficients (SMCC) are evaluated for acceptability. Finally, construct reliability (CR) and average variance extracted (AVE) are assessed for acceptability.

The criteria used to evaluate the convergent validity of the measurement models in this study are as follows. With respect to measures of model fit, a minimum threshold of 0.9 is employed for NFI, TLI and CFI whilst RMSEA should indicate a maximum threshold of 0.08 (Hair et al., 2010). The unstandardised path estimates are required to be statistically significant and should have positive signs. The standardised path estimates should indicate a minimum value of 0.5 ideally 0.7. The squared multiple correlations (SMCC) should achieve a minimum value of 0.3. Meanwhile, construct reliability (CR) should indicate a minimum threshold of 0.7 and average variance extracted (AVE) should indicate a minimum threshold of 0.5 (Hair et al., 2010). In addition to that, the value of CR should greater than AVE.

7.3 The Measurement Model (Yoghurt with Live Cultures)

The seven measurement models for the constructs of Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self- Identity and Behavioural Intention are presented in Table 7.1. The results for each model and the interpretation and evaluation are presented in subsections 7.3.1 to 7.3.7.

Table 7-1 Confirmatory Factor Analysis (CFA) of Measurement Models (Yoghurt with Live Cultures)

Constructs and measures	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
Perceived Susceptibility (SUS)	Measures of fit: NFI = 0.808, TLI=0.744, CFI=0.817, RMSEA=0.208				
	Construct reliability (CR) = 0.980, Average variance extracted (AVE) = 0.531				
Q8.1 → SUS	1.000	0.622[e]	na	na	0.387
Q8.2 → SUS	1.292	0.719	0.117	***	0.517
Q8.3 → SUS	1.465	0.840	0.119	***	0.705
Q8.4 → SUS	0.844	0.592[e]	0.089	***	0.351
Q8.5 → SUS	1.096	0.695	0.102	***	0.483
Q8.6 → SUS	1.663	0.834	0.135	***	0.696
Q8.7 → SUS	1.444	0.762	0.125	***	0.580
Q8.8 → SUS	1.503	0.725	0.135	***	0.526
Perceived Severity (SEV)	Measures of fit: NFI = 0.784, TLI=0.687, CFI=0.791, RMSEA=0.235				
	Construct reliability (CR) = 0.988, Average variance extracted (AVE) = 0.512				
Q9.1 → SEV	1.000	0.721	na	na	0.519
Q9.2 → SEV	0.861	0.678[e]	0.073	***	0.459
Q9.3 → SEV	0.646	0.557[e]	0.066	***	0.310
Q9.4 → SEV	1.358	0.751	0.104	***	0.564
Q9.5 → SEV	1.394	0.760	0.105	***	0.578
Q9.6 → SEV	1.298	0.785	0.095	***	0.616
Q9.7 → SEV	1.213	0.732	0.095	***	0.536
Perceived Benefits (BEN)	Measures of fit: NFI = 0.923, TLI=0.879, CFI=0.927, RMSEA=0.198				
	Construct reliability (CR) = 0.998, Average variance extracted (AVE) = 0.686				
Q10.1 → BEN	1.000	0.907	na	na	0.823
Q10.2 → BEN	0.979	0.789	0.050	***	0.622
Q10.3 → BEN	0.981	0.709	0.061	***	0.503
Q10.4 → BEN	1.002	0.860	0.043	***	0.739
Q10.5 → BEN	1.132	0.882	0.046	***	0.777
Q10.6 → BEN	0.972	0.807	0.048	***	0.651
Perceived Barriers (BAR)	Measures of fit: NFI = 0.870, TLI=0.839, CFI=0.885, RMSEA=0.136				
	Construct reliability (CR) = 0.987, Average variance extracted (AVE) = 0.426				
Q11.1 → BAR	1.000	0.708	na	na	0.501
Q11.2 → BAR	0.801	0.602[e]	0.076	***	0.363
Q11.3 → BAR	1.164	0.729	0.092	***	0.532
Q11.4 → BAR	1.133	0.862	0.077	***	0.743
Q11.5 → BAR	0.972	0.835	0.068	***	0.697
Q11.6 → BAR	0.230	0.166[e]	0.079	0.004	0.028
Q11.7 → BAR	0.834	0.525[e]	0.091	***	0.276
Q11.8 → BAR	0.696	0.520[e]	0.077	***	0.270
Cues to Action (CTA)	Measures of fit: NFI = 0.987, TLI=0.970, CFI=0.990, RMSEA=0.108				
	Construct reliability (CR) = 0.992, Average variance extracted (AVE) = 0.648				
Q12.1 → CTA	1.000	0.651[e]	na	na	0.424
Q12.2 → CTA	1.247	0.875	0.091	***	0.766
Q12.3 → CTA	1.125	0.709	0.097	***	0.503
Q12.4 → CTA	1.379	0.948	0.097	***	0.899
Self- Identity (SI)	Measures of fit: NFI =1.000, TLI= N/A, CFI=1.000, RMSEA=0.887				
	Construct reliability (CR) = 0.999, Average variance extracted (AVE) =0.810				
Q13.1 → SI	1.000	0.893	na	na	0.797
Q13.2 → SI	1.000	0.929	0.040	***	0.862
Q13.3 → SI	0.935	0.878	0.040	***	0.770
Behavioural Intention (BI)	Measures of fit: NFI =1.000, TLI=N/A, CFI=1.000, RMSEA=1.027				
	Construct reliability (CR) = 0.993, Average Variance extracted (AVE) = 0.864				
Q14.1 → BI	1.000	0.958	na	na	0.918
Q14.2 → BI	0.860	0.862	0.032	***	0.743
Q14.3 → BI	1.013	0.965	0.026	***	0.931

Notes:

a. Estimated regression coefficients: Unstandardised and Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

e. Item with standardised loading below 0.7 as candidate for deletion

f. na= not relevant for constrained item

7.3.1 *The Measurement Model for Perceived Susceptibility-Yoghurt with Live Cultures*

The construct of Perceived Susceptibility consists of eight items. The measures of fit NFI (0.808), TLI (0.744) and CFI (0.817) were below the minimum acceptable minimum threshold for model fit. Furthermore, the RMSEA (0.208) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.592 to 0.840. In order to improve model fit, a value of 0.7 is ideally preferable, and for that reason, Q8.1 and Q8.4 could be suitable candidates for deletion. However, at this stage, all eight items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.387 to 0.705. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.980, whilst average variance extracted (AVE) of 0.531 is greater than the minimum threshold of 0.5.

In summary, the measurement model for the construct of Perceived Susceptibility has not fully met all criteria for model fit as NFI, TLI and CFI do not satisfy the minimum threshold and RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that all coefficients are statistically significant and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Perceived Susceptibility has achieved convergent validity required for model fit and suitable to be used for further analysis in the structural equation model.

7.3.2 The Measurement Model for Perceived Severity-Yoghurt with Live Cultures

The construct of Perceived Severity consists of seven items. The measures of fit NFI (0.784), TLI (0.687) and CFI (0.791) were below the minimum threshold for model fit. Furthermore, the RMSEA (0.235) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.557 to 0.785. In order to improve model fit, a value of 0.7 is ideally preferable, and for that reason, Q9.2 and Q9.3 could be suitable candidates for deletion. However, at this stage, all seven items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.310 to 0.616. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.988, whilst average variance extracted (AVE) achieves the minimum threshold of 0.5 with the actual result of 0.512.

In summary, the measurement model for the construct of Perceived Severity has not fully met all criteria for model fit as NFI, TLI and CFI do not satisfy the minimum threshold and RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that all coefficients are statistically significant and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. It can be concluded that the measurement model of Perceived Severity has achieved convergent validity required for model fit and suitable to be used for further analysis in the structural equation model.

7.3.3 The Measurement Model for Perceived Benefits-Yoghurt with Live Cultures

The construct of Perceived Benefits consists of six items. The measures of fit showed scores of fit indices such as NFI (0.923), TLI (0.879) and CFI (0.927). Both NFI and CFI exceed the minimum threshold while TLI approximates the minimum value. These results have generally met the minimum acceptable threshold of 0.9 for model fit. However, the RMSEA (0.198) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.709 to 0.907. In order to improve model fit, a value of 0.7 is ideally preferable, and for that reason, none of the items could be suitable candidates for deletion. Therefore, at this stage, all six items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.503 to 0.823. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.998, whilst average variance extracted (AVE) is greater than the minimum threshold of 0.5 with the actual result of 0.686.

In summary, the measurement model for the construct of Perceived Benefits has not fully met all criteria for model fit as TLI do not satisfy the minimum threshold and RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that NFI and CFI above the minimum threshold, all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Perceived Benefits has achieved convergent validity required for model fit and suitable to be used for further analysis in the structural equation model.

7.3.4 The Measurement Model for Perceived Barriers-Yoghurt with Live Cultures

The construct of Perceived Barriers consists of eight items. The measures of fit NFI (0.870), TLI (0.839) and CFI (0.885) were slightly below the minimum acceptable minimum threshold for model fit although NFI and CFI approximate to a value of 0.9. Furthermore, the

RMSEA (0.136) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5 for seven items except for Q.11.6. The standardised regression weights are in the range 0.166 to 0.862. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, Q11.2, Q11.6, Q11.7 and Q11.8 could be suitable candidates for deletion. However, at this stage, all eight items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 for all items except 3 items of Q11.6 (0.028), Q11.7 (0.276) and Q11.8 (0.270). Overall items are in the ranged 0.028 to 0.743. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.987, whilst average variance extracted (AVE) is lower than the minimum threshold of 0.5 with the actual result of 0.426.

In summary, the measurement model for the construct of Perceived Barriers has not fully met all criteria for model fit as NFI, TLI and CFI do not satisfy the minimum threshold, RMSEA exceeds the maximum threshold and AVE below the minimum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients and construct reliability. A conclusion can be made that the measurement model of Perceived Barriers has achieved convergent validity required for model fit and suitable to be used for further analysis in the structural equation model.

7.3.5 The Measurement Model for Cues to Action-Yoghurt with Live Cultures

The construct of Cues to Action consists of four items. The measures of fit NFI (0.987), TLI (0.970) and CFI (0.990) were above the minimum threshold for model fit. Furthermore, the RMSEA (0.108) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.651 to 0.948. In order to improve model fit, a value of 0.7 is ideally preferable, and for that reason, Q12.1 could be suitable candidates for deletion. However, at this stage, all four items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.424 to 0.899. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.992, whilst average variance extracted (AVE) is greater than the minimum threshold of 0.5 with the actual result of 0.648.

In summary, the measurement model for the construct of Cues to Action has not fully met all criteria for model fit as RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that NFI, TLI and CFI above the minimum threshold, all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Cues to Action has achieved convergent validity required for model fit and suitable to be used for further analysis in the structural equation model.

7.3.6 The Measurement Model for Self-Identity – Yoghurt with Live Cultures

The construct of Self-Identity consists of three items. The measures of fit NFI (1.000), and CFI (0.1000) exceed the minimum threshold for model fit. Furthermore, the RMSEA (0.887) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.878 to 0.929. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, none of the items could be suitable candidates for deletion. Therefore, at this stage, all three items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.770 to 0.862. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.999, whilst average variance extracted (AVE) is greater than the minimum threshold of 0.5 with the actual result of 0.810.

In summary, the measurement model for the construct of Self-Identity has not fully met all criteria for model fit as RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that NFI and CFI above the minimum threshold, all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Self-Identity has achieved convergent validity required for model fit and suitable to be used for further analysis in the structural equation model.

7.3.7 The Measurement Model for Behavioural Intention- Yoghurt with Live Cultures

The construct of Behavioural Intention to purchase and consume (Yoghurt with Live Cultures) consists of three items. The measures of fit NFI (1.000), and CFI (0.1000) were above the minimum acceptable minimum threshold for model fit. Furthermore, the RMSEA (1.027) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.862 to 0.965. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, none of the items could be suitable candidates for deletion. Therefore, at this stage, all three items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.743 to 0.931. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.993, whilst average variance extracted (AVE) is greater than the minimum threshold of 0.5 with the actual result of 0.864.

In summary, the measurement model for the construct of Behavioural Intention has not fully met all criteria for model fit as RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that NFI and CFI above the minimum thresholds, all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Behavioural Intention has achieved convergent validity required for model fit and suitable to be used for further analysis on the structural equation model (SEM).

7.4 The Measurement Model (Cholesterol Lowering Margarine)

The seven measurement models of EHBM for the constructs of Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self- Identity and Behavioural Intention are presented in Table 7.2. The results for each model and the interpretation and evaluation are presented in subsections 7.4.1 to 7.4.7 respectively.

Table 7-2 Confirmatory Factor Analysis (CFA) of Measurement Models (Cholesterol Lowering Margarine)

Constructs and measures	**Coefficients[a]**		**Standard Error[b]**	**Probability[c]**	**SMCC[d]**
	Unstandardised	*Standardised*			
Perceived Susceptibility (SUS)	Measures of fit: NFI = 0.734, TLI=0.641, CFI=0.743, RMSEA=0.222				
	Construct reliability (CR) = 0.916, Average variance extracted (AVE) = 0.446				
Q8.1 → SUS	1.000	0.454[e]	na	na	0.206
Q8.2 → SUS	1.740	0.658[e]	0.228	***	0.433
Q8.3 → SUS	1.961	0.819	0.237	***	0.671
Q8.4 → SUS	0.902	0.455[e]	0.144	***	0.207
Q8.5 → SUS	1.479	0.741	0.185	***	0.550
Q8.6 → SUS	2.182	0.734	0.274	***	0.539
Q8.7 → SUS	2.092	0.729	0.263	***	0.532
Q8.8 → SUS	1.961	0.657[e]	0.257	***	0.432
Perceived Severity (SEV)	Measures of fit: NFI = 0.705, TLI=0.567, CFI=0.712, RMSEA=0.269				
	Construct reliability (CR) = 0.975, Average variance extracted (AVE) = 0.444				
Q9.1 → SEV	1.000	0.611[e]	na	na	0.373
Q9.2 → SEV	0.539	0.459[e]	0.072	***	0.210
Q9.3 → SEV	0.675	0.492[e]	0.085	***	0.242
Q9.4 → SEV	1.904	0.879	0.156	***	0.773
Q9.5 → SEV	2.004	0.866	0.165	***	0.750
Q9.6 → SEV	1.324	0.656[e]	0.132	***	0.430
Q9.7 → SEV	1.035	0.573[e]	0.114	***	0.328
Perceived Benefits (BEN)	Measures of fit: NFI = 0.932, TLI=0.894, CFI=0.936, RMSEA=0.198				
	Construct reliability (CR) = 0.998, Average variance extracted (AVE) = 0.728				
Q10.1 → BEN	1.000	0.909	na	na	0.826
Q10.2 → BEN	0.977	0.812	0.047	***	0.659
Q10.3 → BEN	0.904	0.723	0.053	***	0.523
Q10.4 → BEN	1.002	0.877	0.040	***	0.769
Q10.5 → BEN	1.046	0.880	0.042	***	0.775
Q10.6 → BEN	1.042	0.904	0.039	***	0.817
Perceived Barriers (BAR)	Measures of fit: NFI = 0.893, TLI=0.878, CFI=0.913, RMSEA=0.105				
	Construct reliability (CR) = 0.987, Average variance extracted (AVE) = 0.390				
Q11.1 → BAR	1.000	0.742	na	na	0.550
Q11.2 → BAR	0.600	0.414[e]	0.083	***	0.171
Q11.3 → BAR	0.887	0.597[e]	0.085	***	0.357
Q11.4 → BAR	1.082	0.802	0.077	***	0.644
Q11.5 → BAR	0.998	0.802	0.071	***	0.643
Q11.6 → BAR	0.558	0.479[e]	0.067	***	0.229
Q11.7 → BAR	0.788	0.526[e]	0.086	***	0.276
Q11.8 → BAR	0.683	0.499[e]	0.079	***	0.249
Cues to Action (CTA)	Measures of fit: NFI = 0.971, TLI=0.920, CFI=0.973, RMSEA=0.170				
	Construct reliability (CR) = 0.988, Average variance extracted (AVE) = 0.640				
Q12.1 → CTA	1.000	0.611[e]	na	na	0.373
Q12.2 → CTA	1.347	0.849	0.111	***	0.721
Q12.3 → CTA	1.387	0.787	0.120	***	0.620
Q12.4 → CTA	1.500	0.914	0.120	***	0.836
Self- Identity (SI)	Measures of fit: NFI = 1.000, TLI=N/A, CFI=1.000, RMSEA=0.908				
	Construct reliability (CR) = 0.999, Average variance extracted (AVE) = 0.815				
Q13.1 → SI	1.000	0.891	na	na	0.794
Q13.2 → SI	1.096	0.963	0.040	***	0.928
Q13.3 → SI	0.968	0.851	0.043	***	0.724
Behavioural Intention (BI)	Measures of fit: NFI = 1.000, TLI=N/A, CFI=1.000, RMSEA=1.011				
	Construct reliability (CR) = 0.999, Average variance extracted (AVE) = 0.865				
Q14.1 → BI	1.000	0.958	na	na	0.917
Q14.2 → BI	0.886	0.890	0.030	***	0.791
Q14.3 → BI	0.959	0.942	0.027	***	0.888

Notes:

a. Estimated regression coefficients: Unstandardised and Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the .001 level of significance.

d. SMCC = squared multiple correlation coefficient

e. Item with standardised loading below 0.7 as candidate for deletion

f. na= not relevant for constrained item

7.4.1 The Measurement Model for Perceived Susceptibility - Cholesterol Lowering Margarine

The construct of Perceived Susceptibility consists of eight items. The measures of fit NFI (0.734), TLI (0.641) and CFI (0.743) were below the minimum threshold for model fit. Furthermore, the RMSEA (0.222) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5 except for two items such as Q8.1=0.454 and Q8.4=0.455. The standardised regression weights are in the range 0.454 to 0.819. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, four items such as Q8.1, Q8.2, Q8.4 and Q8.8 could be suitable candidates for deletion. However, at this stage, all eight items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 except for two items (Q8.1= 0.206 and Q8.4=0.207) and are in the range 0.206 to 0.671. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.916, whilst average variance extracted (AVE) is below than the minimum threshold of 0.5 with the actual result of 0.446.

In summary, the measurement model for the construct of Perceived Susceptibility has not fully met all criteria for model fit as NFI, TLI and CFI do not satisfy the minimum threshold, RMSEA exceeds the maximum threshold and AVE below the minimum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that all coefficients are statistically significant and satisfy the requirements for the magnitude and signs of the standardised coefficients and construct reliability. A conclusion can be made that the measurement model of Perceived Susceptibility has achieved convergent validity required for model fit and suitable to be used for further analysis on structural equation model.

7.4.2 The Measurement Model for Perceived Severity-Cholesterol Lowering Margarine

The construct of Perceived Severity consists of seven items. The measures of fit NFI (0.705), TLI (0.567) and CFI (0.712) were below the minimum threshold for model fit. Furthermore, the RMSEA (0.269) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5 except for two items such as Q9.2=0.459 and Q9.3=0.492. The standardised regression weights are in the range 0.459 to 0.879. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, five items such as Q9.1, Q9.2, Q9.3, Q9.6 and Q9.7 could be suitable candidates for deletion. However, at this stage, all seven items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 except for two items (Q9.2=0.210 and Q9.3=0.242) and are in the range 0.210 to 0.773. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.975, whilst average variance extracted (AVE) is below than the minimum threshold of 0.5 with the actual result of 0.444.

In summary, the measurement model for the construct of Perceived Severity has not fully met all criteria for model fit as NFI, TLI and CFI do not satisfy the minimum threshold, RMSEA exceeds the maximum threshold and AVE below the minimum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that all coefficients are statistically significant and satisfy the requirements for the magnitude and signs of the standardised coefficients and construct reliability. A conclusion can be made that the measurement model of Perceived Severity has achieved convergent validity required for model fit and suitable to be used for further analysis on structural equation model.

7.4.3 Measurement model for Perceived Benefits-Cholesterol Lowering Margarine

The construct of Perceived Benefits consists of six items. The measures of fit showed scores of fit indices such as NFI (0.932), TLI (0.894) and CFI (0.936). Both NFI and CFI exceed the minimum recommended threshold while TLI approximates the minimum value. These results have generally met the minimum acceptable threshold of 0.9 for model fit. Furthermore, the RMSEA (0.198) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.723 to 0.909. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, none of the items could be suitable candidates for deletion. Therefore, at this stage, all six items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.523 to 0.826. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.998, whilst average variance extracted (AVE) is greater than the minimum threshold of 0.5 with the actual result of 0.728.

In summary, the measurement model for the construct of Perceived Benefits has not fully met all criteria for model fit as TLI do not satisfy the minimum threshold and RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that NFI and CFI above the minimum threshold, all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Perceived Benefits has achieved convergent validity required for model fit and suitable to be used for further analysis on structural equation model.

7.4.4 The Measurement Model for Perceived Barriers - Cholesterol Lowering Margarine

The construct of Perceived Barriers consists of eight items. The measures of fit NFI (0.893) and TLI (0.878) were slightly below the minimum threshold, but approximate to a value of 0.9, whilst CFI (0.913) has met the threshold for model fit. Furthermore, the RMSEA (0.105) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5 except for three items (Q.11.2=0.414, Q11.6=0.479, Q11.8=0.499). The standardised regression weights are in the range 0.414 to 0.802. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, the five items (Q11.2, Q11.3, Q11.6, Q11.7 and Q11.8) could be suitable candidates for deletion. However, at this stage, all eight items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 except the four items such as Q11.2 (0.171), Q11.6 (0.229), Q11.7 (0.276) and Q11.8 (0.249). Overall items are in the ranged 0.171 to 0.644. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.987, whilst average variance extracted (AVE) is lower than the minimum threshold of 0.5 with the actual result of 0.390.

In summary, the measurement model for the construct of Perceived Barriers has not fully met all criteria for model fit as NFI and TLI do not satisfy the minimum threshold, RMSEA exceeds the maximum threshold and AVE below the minimum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that CFI above the minimum threshold, all coefficients are statistically significant and satisfy the requirements for the magnitude and signs of the standardised coefficients and construct reliability. A conclusion can be made that the measurement model of Perceived Barriers has achieved convergent validity required for model fit and suitable to be used for further analysis on structural equation model.

7.4.5 The Measurement Model for Cues to Action-Cholesterol Lowering Margarine

The construct of Cues to Action consists of four items. The measures of fit NFI (0.971), TLI (0.920) and CFI (0.973) were greater than the minimum threshold for model fit. However, the RMSEA (0.170) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.611 to 0.914. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, Q12.1 could be suitable candidates for deletion. However, at this stage, all four items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.373 to 0.836. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.988, whilst average variance extracted (AVE) is greater than the minimum threshold of 0.5 with the actual result of 0.640.

In summary, the measurement model for the construct of Cues to Action has not fully met all criteria for model fit as RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that NFI, TLI and CFI above the minimum threshold, all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Cues to Action has achieved convergent validity required for model fit and suitable to be used for further analysis on structural equation model.

7.4.6 The Measurement Model for Self-Identity-Cholesterol Lowering Margarine

The construct of Self-Identity consists of three items. The measures of fit NFI (1.000), and CFI (0.1000) are greater than the minimum threshold for model fit. However, the

RMSEA (0.908) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.851 to 0.963. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, none of the items could be suitable candidates for deletion. Therefore, at this stage, all three items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.724 to 0.928. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.999, whilst average variance extracted (AVE) is greater than the minimum threshold of 0.5 with the actual result of 0.815.

In summary, the measurement model for the construct of Self-Identity has not fully met all criteria for model fit as RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that NFI and CFI above the minimum threshold, all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Self-Identity has achieved convergent validity required for model fit and suitable to be used for further analysis on structural equation model.

7.4.7 The Measurement Model for Behavioural Intention- Cholesterol Lowering Margarine

The construct of Behavioural Intention consists of three items. The measures of fit NFI (1.000), and CFI (0.1000) are greater than the minimum threshold for model fit. However, the RMSEA (1.011) indicates that the fit of the model is questionable as its value exceeds the maximum recommended threshold (Hu and Bentler, 1999).

The unstandardised path estimates show a very high degree of significance with the null hypothesis, that the true value of the coefficient is zero, rejected at the 0.001 level. The unstandardized coefficients confirm a priori expectation of positive signs.

The standardised coefficients are above the minimum value of 0.5. The standardised regression weights are in the range 0.890 to 0.958. In order to improve the model' fit, a value of 0.7 is ideally preferable, and for that reason, none of the items could be suitable candidates for deletion. Therefore, at this stage, all three items are retained for further analysis in the SEM analysis, which is discussed in the next Chapter 8.

The squared multiple correlation coefficients (SMCC) exceed the minimum threshold of 0.3 and are in the range 0.791 to 0.917. Construct reliability exceeds the minimum threshold of 0.7 with the result of (CR) = 0.999, whilst average variance extracted (AVE) is greater than the minimum threshold of 0.5 with the actual result of 0.865.

In summary, the measurement model for the construct of Behavioural Intention has not fully met all criteria for model fit as RMSEA exceeds the maximum threshold. However, the acceptability of the measurement model is based upon the goodness of fit indices were adequate and acceptable as the results that NFI and CFI above the minimum thresholds, all coefficients are statistically significant, and satisfy the requirements for the magnitude and signs of the standardised coefficients, construct reliability and average variance extracted. A conclusion can be made that the measurement model of Behavioural Intention has achieved convergent validity required for model fit and suitable to be used for further analysis on structural equation model.

7.5 Chapter Summary

This chapter presents the measurement models of the constructs and their evaluation for convergent validity. The findings, which have been presented in this chapter, showed that although there are a number of issues related to the achievements on minimum required threshold value for model fit indices, particularly in the analysis of RMSEA for all constructs in both products (Yoghurt with Live Cultures and Cholesterol Lowering Margarine), however all the constructs' measurement scales have obtained statistical significance (null hypothesis is rejected at the 0.001 level of significance for all items. Apart from one exception for the item of BAR6 for Cholesterol Lowering Margarine that obtained low scored (0.004), the overall results indicate a successful conclusion to the analyses for the products group of

Yoghurt with Live Cultures and Cholesterol Lowering Margarine. The results indicate that the seven constructs for both product groups possess the desirable measurement property of convergent validity. Therefore, although several numbers of items have been identified as suitable candidates for deletion to improve measurement model fit in each measurement model, all these items are retained for further analysis with structural equation modelling. In the next stage, all items in the measurement models will be used further to test the research hypotheses in the full structural equation models in Chapter 8.

Chapter 8. The Structural Equation Models

8.1 Introduction

The measurement models for the constructs in the two conceptual models for Yoghurt with Live Cultures and Cholesterol Lowering Margarine scales were validated by CFA in Chapter 7. The aim of this chapter is to present the structural equation models for both product groups. The relationships between EHBM constructs (latent variables) are tested utilising the structural models. The SEM estimates and evaluates the hypothesised structural model based on the EHBM conceptual framework. Prior to this preliminary analysis examines the impact on the dependent variable of Behavioural Intention, which derives from groups with consumption status (User Group vs Non-User Group) and the control variables (Gender, Age, Education level). For this purpose, MANOVA tests with post hoc analyses were conducted in two phases. The first phase is an examination of the difference between User Group and Non-User Group towards the dependent variable of Behavioural Intention for each product. The second phase of the MANOVA test explored of the impact of the control variables on the dependent variable (Behavioural Intention). Following to the results of the MANOVA test, the SEM analysis is undertaken accordingly.

The structure of the chapter is as follows. The analysis continues with Section 8.2 which describes the measures of fit employed for this structural model analysis. Section 8.3 presents the results of the assessment of MANOVA for Yoghurt with Live Culture as well as Cholesterol Lowering Margarine. Section 8.4 presents results of SEM analysis on the product of Yoghurt with Live Culture and Section 8.5 presents the SEM result for the Cholesterol Lowering Margarine. Section 8.6 presents the results of tests of hypotheses for the EHBM models among different groups (User Group and Non-User Group) of two different functional food products. Finally, Section 8.7 provides a conclusion to the chapter.

8.2 Evaluation of Structural Equation Model Fit

The assessment of SEM provides evidence of the hypothesised relationships. The validity of the model should be proven prior to acknowledge the outcome. The assessment process of model fit involves three phases. Firstly, the model estimations are obtained, followed by evaluation of the model fit and finally to make relevant modification in order to establish a good fit model with an acceptable threshold value of model fit indices.

Two types of model fit measures (Hair et al, 2010) are used in this study: First, an absolute fit index determines how well a model fits the sample data. The relevant measure for this is RMSEA that should indicate a value less than 0.08 as an indication of good fit (Hair et al, 2010). Nevertheless, according to MacCallum et al, (1996), in the assessment of a model, RMSEA is very sensitive to the estimated number of parameters. It works well with a model with a small number of parameters. In justifying the assessment of various models with different number of parameters, it is suggested that RMSEA of between 0.08 to 0.10 indicates a mediocre fit, whilst value of below 0.08 is considered a good fit (MacCallum et al, 1996); secondly, incremental fit index assesses how well the estimated model fits relative to some alternative baseline model. The relevant tests for incremental fit are NFI, TLI and CFI that should achieve a minimum threshold value of 0.90 (Hair et al, 2010). The model fit measurement thresholds used for the evaluation of structural equation models in this analysis are consistent with the CFA analysis of the measurement models which were discussed earlier in Chapter 7. A summary of the measures of fit employed in the analysis and criteria applied are presented in Table 8.1.

Table 8-1 Summary of Measurement of SEM Model Fit Indices

Measures-of-fit Indices		**Cut-off value**
Absolute fit index *(Measures based on the population discrepancy)*	RMSEA	< **0.08**
Comparison to a baseline model: incremental fit indices/ comparative indices	NFI	> **0.90**
	TLI	> **0.90**
	CFI	> **0.90**

Source: Hair et al. (2010); Arbuckle (2013)

The unstandardised path estimates are evaluated for statistical significance and the acceptability of signs. It is followed by an evaluation of standardised path estimates which are assessed in terms of magnitude. Finally, the Squared Multiple Correlation Coefficients (SMCC) are evaluated to justify acceptability of the models.

The adopted estimation strategy was to modify a model if it failed to meet the model fit criteria. In modifying the model, the initial nested model is revised, and an item for elimination is identified from the magnitude of the standardised coefficient. In order to improve the model fit, three approaches are applied. The first approach is to assess the modification indices. Modification indices (MI) provide for an improvement in model fit by adding additional covariance constraints between measurement errors of the construct indicators. The modification indices are included in the analysis. The indices are presented for possible pairwise covariance that exceeds a specified threshold value (usually 4) and indicates the reduction in Chi-square and specifies the value of the covariance. It is usual to consider a covariance that has the greatest impact on Chi-square. However, practitioners are advised that the use of covariance constraints should be justified in the context of the theory. Any high modification indices for items within the same construct would be suitable for the specification of a covariance constraint (Gaskin, 2012). The second approach to be considered is to delete an item with a low value of SMCC, typically less than 0.2 (Hooper et al., 2008). The third approach is to assess the value of standardised loading. A standardised loading value of 0.7 and above is preferable, hence any low value would be identified as a candidate for deletion (Gaskin, 2012). However, in maintaining the integrity of the model, items should be deleted only if there is justification with respect to theory and the existing literature. Once measures of model fit are acceptable, the findings of a final model will be further discussed and elaborated.

All the hypothesised relationships between EHBM constructs (latent variables) are tested using the full structural equation models. The effects of antecedents to the Behavioural Intention in the EHBM are assessed using SEM based on the hypotheses that has been explained earlier in Chapter Four.

In relation to the results of the measurement models which were discussed in Chapter 7. The models for both product groups were evaluated in terms of model fit and the desirable property of convergent validity. Although some of the criteria for acceptable model fit and standardised coefficient values were not satisfied for some constructs, in broad terms the measurement models were considered to be acceptable for the subsequent stages of structural equation model estimation and evaluation of the structural equation models. Nevertheless, prior to running the SEM analysis, a decision on suitability to conduct a separate analysis between the two samples of User Group and Non-User Group are made through the MANOVA test. It followed by another MANOVA test to assess significant control variables that would be included in the SEM analysis. The MANOVA tests are discussed in the following Sections.

8.3 MANOVA Analysis

The MANOVA analysis was conducted in two phases prior to the SEM analysis. This analysis is conducted on the samples for both products of Yoghurt with Live Cultures and Cholesterol Lowering Margarine. The first phase involves determination of whether the whole samples set for each of functional food products would evidence a significant difference of impact between two groups (User Group and Non-User Group) towards the dependent variable of Behavioural Intention (BI). Consequently, subjected to the evidences of significant differences, the model would further being split into two groups (User Group and Non-User Group) for the second phase of MANOVA analysis.

In the second phase of MANOVA analysis, the analysis of control variables was conducted on each of the models of User Group (consumer) and Non-User Group (non-consumer) to analyse their impact on the dependent variable of Behavioural Intention. Evidences of significant differences among groups in the control variable are used to determine a possible control variable to be included in the structural model analysis.

8.3.1 Phase 1 of MANOVA analysis (Yoghurt with Live Cultures)

The MANOVA analysis was conducted to assess the significant different impact between two groups (User Group and Non-User Group) of Yoghurt with Live Culture towards the dependent variable of Behavioural Intention (BI). Table 8.2 presents the results. The result shows the rejection of the null hypotheses that the group mean is equal ($F (3, 341) = 76.476$, $P=0.001$). There are significant differences between the two groups of respondents towards Behavioural Intention to consume Yoghurt with Live Cultures.

Table 8-2 MANOVA Analysis of Two Groups of Respondents and Behavioural Intention to Consume Yoghurt with Live Cultures

Dependent variable	Mean Scores			Sig
	User Group (Consumer)	Non-User Group (Non-consumers)	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	5.03	2.60	4.52	.000
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	4.58	2.71	4.19	.000
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	4.77	2.50	4.30	.000
Pillai's Trace: F (3, 341) = 64.650, p < .001				

The results indicate the mean of User Group (consumer) significantly higher than the Non-User Group (non-consumer). This significant result applies to all three items in the dependent variable of BI. The results suggest that User Group (consumer) have more positive intentions than Non-User Group (non-consumer) to consume Yoghurt with Live Cultures.

8.3.2 Phase 1 of MANOVA analysis (Cholesterol Lowering Margarine)

The MANOVA analysis was conducted to assess the significant different impact between two groups (User Group and Non-User Group) of Cholesterol Lowering Margarine towards the dependent variable of Behavioural Intention (BI). Table 8.3 presents the results. The result shows the rejection of the null hypotheses that the group mean is equal F (3, 341) = 76.476, p =0 .001. There are significant differences between the two groups of respondents towards Behavioural Intention to consume Cholesterol Lowering Margarine.

Table 8-3 MANOVA Analysis of Two Groups of Respondents and Behavioural Intention to Consume Cholesterol Lowering Margarine

Dependent variable	Mean Scores			Sig
	User Group (Consumer)	Non-User Group (Non-consumer)	Total	
BI 1 I will make an effort in future to eat cholesterol lowering margarine.	5.18	2.89	4.02	.000
BI 2 I would encourage my friends and family to eat cholesterol lowering margarine in the future.	4.85	3.04	3.93	.000
BI 3 In the future, I intend to eat a diet that includes cholesterol lowering margarine even it is more expensive.	4.88	2.84	3.85	.000
Pillai's Trace: F (3, 341) = 76.476, p < .001				

The results indicate the mean of the User Group (consumer) significantly higher than the Non-User Group (non-consumer). This significant result applies to all three items in the dependent variable of Behavioural Intention (BI). The results suggest that User Group (consumer) have more positive intentions to consume Cholesterol Lowering Margarine.

In summary, the results signify a significant different between two groups (User Group and Non-User Group) towards dependent variable of Behavioural Intention (BI). Such significant differences obtained for both products (Yoghurt with Live Culture and Cholesterol Lowering Margarine) in the study justify the separation of analysis (User Group and Non-User Group) in the structural model. However, prior to conducting the SEM analysis, determination of which control variables should be included in each group (User Group and Non-User Group), requires further MANOVA assessment which conducted in the Phase 2.

8.3.3 Phase 2 of MANOVA with Post-hoc Analysis for Yoghurt with Live Cultures

Since the first phase of MANOVA analysis has evidenced the result of significant differences between the two groups of consumers versus non-consumers, further MANOVA analysis was conducted on each of the groups. The subjects for the test were measures of Gender, Age and Education level. A MANOVA between groups with post hoc tests were computed for demographic variables. The null hypothesis is that the true mean scores of the set of dependent variables are equal between groups. The alternative hypothesis is that the true mean scores of the set of dependent variables are not equal between groups. Only control variable(s) with significant differences between group categories result were included in the SEM analysis.

Gender

The MANOVA test assessed the impact of Gender on Behavioural Intention to consume Yoghurt with Live Cultures. The assessments apply separately on two sets of samples, i.e. User Group (consumer) and Non-User Group (non-consumer). Respondents were divided into two groups according to their gender (Group 1: Male, Group 2: Female). The results are presented in Table 8.4. For the User Group of Yoghurt, the result shows the rejection of the null hypotheses that the group mean is equal, $F (3, 277) = 2.941$, $p=0.034$. There is a significant difference between identified groups in terms of intention to consume Yoghurt with Live Cultures. The results suggest that female respondents have higher positive Behavioural Intentions towards the purchase of Yoghurt with Live Cultures.

Table 8-4 The MANOVA Analysis of Gender and Behavioural Intention to Consume Yoghurt with Live Cultures (User Group)

Dependent variable	Mean Scores			Sig
	Group 1 Male	Group 2 Female	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	4.97	5.05	5.01	.034
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	4.39	4.74	4.57	.034
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	4.68	4.82	4.75	.034
Pillai's Trace: F (3, 277) = 2.941, p< 0.05				

Meanwhile, For the Non- User Group of Yoghurt, respondents were divided into two groups according to their gender (Group 1: Male, Group 2: Female). Table 8.5 presents the results. The result shows the acceptance of the null hypotheses that the group mean is equal (F (3, 69) = 0.296, p=0.828) and no significant differences between each group are obtained. The results suggest that the respondents of both Gender groups, i.e. male and female of Non-User Group category, have low intentions towards the purchase of Yoghurt with Live Cultures.

Table 8-5 MANOVA Analysis of Gender and Behavioural Intention to Consume Yoghurt with Live Cultures (Non-User Group)

Dependent variable	Mean Scores			Sig
	Group 1 Male	Group 2 Female	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	2.64	2.56	2.60	.828
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	2.67	2.76	2.71	.828
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	2.56	2.44	2.51	.828
Pillai's Trace: F (3, 69) = 0.296, p > .05				

In summary, the control variable of Gender is excluded for further analysis in the SEM models for Yoghurt with Live Cultures. This is due to the acceptance of the null hypotheses that the group mean is equal obtained for both groups, i.e. User Group and Non-User Group.

Age

A MANOVA test assessed the impact of Age on Behavioural Intention to consume Yoghurt with Live Cultures. For the User Group (consumer) of Yoghurt, respondents were divided into six groups according to their Age (Group 1: 18-24 years, Group 2: 25-34 years, Group 3: 35-44 years, Group 4: 45-54 years, Group 5: 55-64 years and Group 6: 65 plus years). The result presents in Table 8.6 shows the acceptance the null hypotheses that the group mean is equal F (15, 825) = 1.052, p=0.398 with no significant differences between groups regarding intentions. The results suggest that respondents of all Age groups have moderate Behavioural Intentions towards the purchase of Yoghurt with Live Cultures.

Table 8-6 MANOVA Analysis of Age and Behavioural Intention to Consume Yoghurt with Live Cultures (User Group)

Dependent variable	Mean Scores							Sig
	Group 1 18-24 years	Group 2 25-34 years	Group 3 35-44 years	Group 4 45-54 years	Group 5 55-64 years	Group 6 65 plus years	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	4.58	5.17	4.93	5.00	5.15	5.27	5.01	0.398
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	4.17	4.83	4.50	4.49	4.79	4.66	4.57	0.398
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	4.21	4.98	4.76	4.71	4.89	5.02	4.75	0.398
Pillai's Trace: F (15, 825) = 1.052, p > .05								

Meanwhile, for the Non-User Group (non-consumer) of Yoghurt, respondents were divided into six groups according to their age (Group 1: 18-24 years, Group 2: 25-34 years, Group 3: 35-44 years, Group 4: 45-54 years, Group 5: 55-64 years and Group 6: 65 plus years). Table 8.7 presents the result. The result shows the acceptance the null hypotheses that the group mean is equal F (15, 201) = 1.104, p=0.354 with no significant differences between groups regarding Behavioural Intentions. The results suggest that respondents have low intentions towards the purchase of Yoghurt with Live Cultures. Nevertheless, despite low intentions, the younger respondents show positive higher intention than older respondents.

Table 8-7 MANOVA Analysis of Age and Behavioural Intention to Consume Yoghurt with live Cultures (Non-User Group)

Dependent variable	Mean Scores							Sig
	Group 1 18-24 years	Group 2 25-34 years	Group 3 35-44 years	Group 4 45-54 years	Group 5 55-64 years	Group 6 65 plus years	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	3.80	2.13	3.18	2.33	1.85	2.67	2.60	0.354
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	3.40	2.00	3.12	2.83	2.31	2.67	2.71	0.354
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	3.60	2.00	3.06	2.42	1.69	2.56	2.51	0.354
Pillai's Trace: F (15, 201) = 1.104, p > .05								

Education

A MANOVA test assessed the impact of Education on Behavioural Intention (BI) to consume Yoghurt with Live Cultures. For the User Group (consumer) of Yoghurt, respondents were divided into six groups according to their education level (Group 1: No formal qualification, Group 2: O-Level/ GCSE, Group 3: Vocational qualification (e.g. NVQ), Group 4: A-Level, Group 5: Bachelor Degree (e.g. BA, BSc) and Group 6: Masters/ PhD). The results are presented in Table 8.8. The result shows the acceptance the null hypotheses that the group means are equal F (15, 825) = 0.910, p=0.552 and no significant differences between each group of Education in intention to consume Yoghurt with Live Cultures. The results suggest that respondents have moderate intentions towards the purchase of Yoghurt with Live Cultures. In addition to that, respondents with no formal qualification shows slightly more positive intentions than other Education groups.

Table 8-8 MANOVA Analysis of Education and Behavioural Intention to Consume Yoghurt with Live Cultures (User Group)

Dependent variable	Mean Scores							Sig
	Group 1 No formal qualification	**Group 2** O Level/ GCSE	**Group 3** Vocational qualification (e.g. NVQ)	**Group 4** A-Level	**Group 5** Bachelor Degree (e.g. BA, BSc)	**Group 6** Masters/ PhD	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	5.36	4.88	5.06	4.93	5.15	4.85	5.01	0.552
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	5.20	4.49	4.68	4.36	4.62	4.41	4.57	0.552
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	5.08	4.60	4.82	4.57	4.91	4.70	4.75	0.552
Pillai's Trace: F (15, 825) = 0.910, p > .05								

Meanwhile, for the Non-User Group (non-consumer) of Yoghurt with Live Cultures, respondents were divided into six groups according to their education level (Group 1: No formal qualification, Group 2: O-Level/ GCSE, Group 3: Vocational qualification (e.g. NVQ), Group 4: A-Level, Group 5: Bachelor Degree (e.g. BA, BSc) and Group 6: Masters/ PhD). Table 8.9 presents the results. The result shows the acceptance the null hypotheses that the group means are equal F (15, 201) = 0.668, p=0.814 and no significant differences between each group of Education in intention to consume Yoghurt with Live Cultures. The results suggest that respondents have low intentions towards the purchase of Yoghurt with Live Cultures.

Table 8-9 MANOVA Analysis of Education and Behavioural Intention to Consume Yoghurt with Live Cultures (Non-User Group)

Dependent variable	Mean Scores							Sig
	Group 1 No formal qualification	**Group 2** O Level/ GCSE	**Group 3** Vocational qualification (e.g. NVQ)	**Group 4** A-Level	**Group 5** Bachelor Degree (e.g. BA, BSc)	**Group 6** Masters/ PhD	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	2.67	2.76	2.64	3.27	2.33	1.90	2.60	0.814
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	3.17	2.76	2.71	3.27	2.20	2.50	2.71	0.814
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	2.67	2.65	2.57	3.18	2.13	1.90	2.51	0.814
Pillai's Trace: F (15, 201) = 0.668, p > .05								

8.3.4 Phase 2 of MANOVA with Post-hoc Analysis for Cholesterol Lowering Margarine

The MANOVA analysis conducted to show the impact of control variables on the dependent variable. In particular to provide justifications in the extent to identify whether there are significant differences between different groups in each of selected demographic variables towards the Behavioural Intention to purchase and consume Cholesterol Lowering Margarine. The assessment of demographic variables utilises MANOVA with post-hoc analysis. The null hypothesis is that the mean scores of the dependent variables are equal between groups. The alternative hypothesis is that the mean scores of the dependent variables are not equal between groups.

Gender

The MANOVA analysis assessed the impact of Gender on intention to consume Cholesterol Lowering Margarine. For the User Group (consumer) of Margarine, respondents were divided into two groups according to their gender (Group 1: Male, Group 2: Female). Table 8.10 presents the results. The result shows the acceptance of the null hypotheses that the group mean is equal F (3, 170) = 2.455, p=0.065 and no significant differences between Genders regarding their intentions to consume Cholesterol Lowering Margarine. The results indicate that respondents have a lower than average intention to purchase cholesterol lowering margarine.

Table 8-10 MANOVA Analysis of Gender and Behavioural Intention to Consume Cholesterol Lowering Margarine (User Group)

Dependent variable	Mean Scores			Sig
	Group 1 Male	Group 2 Female	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	5.23	5.09	5.18	.065
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	4.78	4.97	4.85	.065
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	4.83	4.98	4.89	.065
Pillai's Trace: F (3, 170) = 2.455, p > .05				

Meanwhile, for the Margarine Non-User Group (non-consumer), the MANOVA analysis assessed the impact of Gender on intention to consume Cholesterol Lowering Margarine. Respondents were divided into two groups according to their gender (Group 1: Male, Group 2: Female). Table 8.11 presents the results. The result shows the acceptance of the null hypotheses that the group mean is equal F (3, 173) = 1.951, p=0.123 and no significant differences between Genders regarding their intentions to consume Cholesterol Lowering Margarine. The results indicate that respondents have a lower than average intention to purchase Cholesterol Lowering Margarine.

Table 8-11 MANOVA Analysis of Gender and Behavioural Intention to Consume Cholesterol Lowering Margarine (Non-User Group)

Dependent variable	Mean Scores			Sig
	Group 1 Male	Group 2 Female	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	2.57	3.10	2.90	.123
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	2.78	3.22	3.05	.123
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	2.55	3.04	2.85	.123
Pillai's Trace: F (3, 173) = 1.951, p > .05				

Age

MANOVA analysis between groups assessed the differences of impact between Age groups on intention to consume Cholesterol Lowering Margarine. For the Margarine User Group (consumer), respondents were divided into six groups according to their age (Group 1: 18-24 years, Group 2: 25-34 years, Group 3: 35-44 years, Group 4: 45-54 years, Group 5: 55-64 years and Group 6: 65 plus years). The results appear in Table 8.12. The result shows the acceptance of the null hypotheses that the group mean is equal F (15, 504) = 1.447, p=0.121. Nevertheless, there are significant differences among several groups only indicated by Post-hoc analysis.

Despite several Age groups show significant differences of impact, however, based on the overall multivariate analysis, a conclusion is made that there are no valid statistically significant differences between majority of groups of Age on intention to consume Cholesterol Lowering Margarine as it did not achieve the minimum significant level required at the 0.05 level or below.

Table 8-12 MANOVA Analysis of Age and Behavioural Intention to Consume Cholesterol Lowering Margarine (User Group)

Dependent variable	Mean Scores							Sig
	Group 1 18-24 years (A)	Group 2 25-34 years (B)	Group 3 35-44 years (C)	Group 4 45-54 years (D)	Group 5 55-64 years (E)	Group 6 65 plus years (F)	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	5.29	5.18	5.32	4.60	5.73	5.04	5.18	0.121
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	5.18	4.95	4.92	4.30	5.15	4.60	4.85	0.121
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	5.00	4.75	5.08	4.17	5.54	5.00	4.89	0.121
Pillai's Trace: $F(15, 504) = 1.447$, $p > .05$								

Meanwhile, for the Non-User Group of Margarine, MANOVA analysis between groups assessed the differences of impact between Age groups on intention to consume Cholesterol Lowering Margarine. For the group of Margarine consumer, respondents were divided into six groups according to their age (Group 1: 18-24 years, Group 2: 25-34 years, Group 3: 35-44 years, Group 4: 45-54 years, Group 5: 55-64 years and Group 6: 65 plus years). Table 8.13 presents the results. The result shows the rejection of the null hypotheses that the group mean is equal, $F(15, 513) = 1.914$, $p=0.020$. There is a significant difference between identified groups in terms of intention to consume Cholesterol Lowering Margarine.

Table 8-13 MANOVA Analysis of Age and Behavioural Intention to Consume Cholesterol Lowering Margarine (Non-User Group)

Dependent variable	Mean Scores							Sig
	Group 1 18-24 years (A)	Group 2 25-34 years (B)	Group 3 35-44 years (C)	Group 4 45-54 years (D)	Group 5 55-64 years (E)	Group 6 65 plus years (F)	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	3.38	3.46	2.63	3.05	2.74	2.68	2.90	0.020
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	3.81^{AC}	3.77^{BC}	$2.61^{CA, CB}$	3.41	2.68	2.79	3.05	0.020
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	3.57	3.54	2.66	2.86	2.59	2.62	2.85	0.020
Pillai's Trace: $F(15, 513) = 1.914$, $p< .05$								

Notes:
Each pair of superscripts identifies the nature of significant differences between groups. For example, AC (CA) indicates that group A is significantly different from Group C.

The Post-hoc comparison using the Games-Howell test indicated that none of the groups in item BI 1 has a significant different between each other. Meanwhile, in relation to item of BI 2, the mean of Group 1 (3.81) significantly higher than the mean of Group 3 (2.61). In addition to that, the mean of group 2 (3.77) in item of BI 2 also significantly higher than the mean of Group 3 (2.61) in item of BI 2. Other three groups for item of BI 2, not significantly different among each other. In relation to item of BI 3, none of the groups have a significant different between each other. In summary, the results suggest that all groups of Age have a low level of intention to purchase cholesterol lowering margarine. Nevertheless, the younger respondents have more positive intentions to purchase cholesterol lowering margarine.

Education

A MANOVA analysis has been conducted to assess the impact of Education on intention to consume Cholesterol Lowering Margarine. Again, for the Margarine User Group (consumer), respondents were divided into six groups according to their education level (Group 1: No formal qualification, Group 2: O Level / GCSE, Group 3: Vocational qualification (e.g. NVQ), Group 4: A-Level, Group 5: Bachelor Degree (e.g. BA, BSc) and Group 6: Masters/ PhD). The results are presented in Table 8.14. The result shows the acceptance of the null hypotheses that the group mean is equal, F (15, 504) = 0.731, p=0.754. There is no significant difference between each group in terms of intention to consume Cholesterol Lowering Margarine. Generally, the results suggest that respondents have moderate intention, with lower levels of Education have slightly more positive intentions to purchase Cholesterol Lowering Margarine.

Table 8-14 MANOVA Analysis of Education and Behavioural Intention to Purchase and Consume Cholesterol Lowering margarine (User Group)

Dependent variable	Mean Scores							Sig
	Group 1 No formal qualification	**Group 2** O Level/ GCSE	**Group 3** Vocational qualification (e.g. NVQ)	**Group 4** A-Level	**Group 5** Bachelor Degree (e.g. BA, BSc)	**Group 6** Masters/ PhD	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	5.57	5.20	5.43	4.78	5.16	5.13	5.18	0.754
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	5.29	4.97	4.94	4.41	4.97	4.77	4.85	0.754
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	5.14	5.03	5.17	4.38	5.03	4.71	4.89	0.754
Pillai's Trace: F (15, 504) = 0.731, p > .05								

Meanwhile, for the Margarine Non-User Group (non-consumer), a MANOVA analysis conducted to assess the impact of Education on intention to consume Cholesterol Lowering Margarine. Respondents were divided into six groups according to their education level (Group 1: No formal qualification, Group 2: O Level / GCSE, Group 3: Vocational qualification (e.g. NVQ), Group 4: A-Level, Group 5: Bachelor Degree (e.g. BA, BSc) and Group 6: Masters/ PhD). Table 8.15 presents the results. The result shows the rejection of the null hypotheses that the group mean is equal F (15, 513) = 2.272, p=0.004. There is a significant difference between identified groups in terms of intention to consume Cholesterol Lowering Margarine.

Table 8-15 The MANOVA Analysis of Education and Behavioural Intention to Purchase and Consume Cholesterol Lowering Margarine (Non-User Group)

Dependent variable	Mean Scores							Sig
	Group 1 No formal qualification (A)	**Group 2** O Level/ GCSE (B)	**Group 3** Vocational qualification (e.g. NVQ) (C)	**Group 4** A-Level (D)	**Group 5** Bachelor Degree (e.g. BA, BSc) (E)	**Group 6** Masters/ PhD (F)	Total	
BI 1 I will make an effort in future to eat yoghurt with live cultures.	4.00 $^{AD, AF}$	3.00	3.41	2.65 ^{DA}	2.74	2.34 ^{FA}	2.90	0.004
BI 2 I would encourage my friends and family to eat yoghurt with live cultures in the future.	4.21$^{AE, AF}$	2.91	3.78 $^{CE, CF}$	2.95	2.68$^{EA, EC}$	2.59$^{FA, FC}$	3.05	0.004
BI 3 In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive.	3.71	2.76	3.37	2.78	2.74	2.34	2.85	0.004
Pillai's Trace: F (15, 513) = 2.272, p< .01								

Notes:
Each pair of superscripts identifies the nature of significant differences between groups. For example, AD (DA) indicates that group A is significantly different from Group D

The Post-hoc comparisons using the Games-Howell test identified the significant difference from the mean assessed for all three items of BI. For an item of BI 1, the mean of Group A (4.00) is significantly higher than Group D (2.65) and Group F (2.34). The mean of Group B (3.00), Group C (3.41) and Group E (2.74) are not significantly different from any other group for all three items of BI. In the assessment of item of BI 2, the mean of Group A (4.21) is significantly higher than Group E (2.68) and Group F (2.59). The mean of group C (3.78) is significantly higher than Group E (2.68) and Group F (2.59). Meanwhile, for the item of BI 3, none of the groups possess significant differences. The results suggest that respondents with lower levels of education have more positive intentions to purchase Cholesterol Lowering Margarine.

8.3.5 Conclusion for the Result of MANOVA Analysis

The MANOVA analysis of the first phase produces significant results for Yoghurt with Live Cultures as well as Cholesterol Lowering Margarine. Particularly, there is a significant difference between User Group (consumer) and Non-User Group (non-consumer) for both products, towards the dependent variable of Behavioural Intention (BI). Hence, the consumer and non-consumer group were split for further analysis. To conduct a comparative analysis between the two groups, i.e. User Group and Non-User Group, in each stage of SEM analysis, the models are estimated for each group.

Prior to the SEM analysis, it is essential to assess the significant difference of the mean between groups in each control variable to the dependent variable of Behavioural Intention (BI). For this reason, the second phase of MANOVA assessments conducted for each of the control variables on different sample groups (i.e. User Group and Non-User Group).

The results of the second phase of MANOVA analysis indicated that, for the product of Yoghurt with Live Cultures, the control variable of Gender indicates a significant difference towards Behavioural Intention (BI) in the User Group (consumer). For the other control variables assessment of Yoghurt models, it indicates no significant differences between groups. Hence, for Yoghurt models, only a control variable of Gender is included in the analysis in structural equation models for User Group (consumer), whilst none of the control variables are included in the Non-User Group (non-consumer) in the SEM analysis.

In relation to the MANOVA analysis of Cholesterol Lowering Margarine model, the results indicate that none of the control measures produce significant differences between User Group (consumer). Hence, for the User Group (consumer), none of the control variables are included in the analysis of structural equation models (SEM). On the other hand, the control variables of Age and Education are associated with significant differences between Non-User Group (non-consumer) of Cholesterol Lowering Margarine to the dependent variable of Behavioural Intention (BI). Therefore, control variables of Age and Education are included, and Gender is eliminated from the further analysis in structural equation models.

8.4 Structural Equation Models (SEM) Yoghurt with Live Culture

The assessment of SEM conducted on Yoghurt with Live Culture conducted in a series of models. In order to conduct comparative analysis, approaches done by assessing samples of User Group (consumer) versus Non-User Group (non-consumer) for both products.

The SEM is employed to assess the model fit for Yoghurt with Live Cultures. The analysis involves assessment of seven models. Precisely, there are three models from the sample of User Group and four models for the sample of and Non-User Group.

The SEM model for Yoghurt with Live Cultures specifies the seven constructs of Perceived Susceptibility, Perceived Severity, Perceived Benefit, Perceived Barriers, Cues to Action, Self-Identity and Behavioural Intention. The control variable of Gender is included in the models of User Group (consumer). Whilst, no control variable is specified in the models of Non-User Group following the acceptance of the null hypotheses in the MANOVA tests for the impact of Gender, Age and Education Level on the dependent construct of Behavioural Intention.

8.4.1 SEM Model 1 (Yoghurt with Live Cultures: User Group)

SEM Model 1 for Yoghurt with Live Cultures specifies the seven constructs. No control variables are specified. Table 8.16 presents the results. The assessment of model fit is based on the appraisal of NFI, TLI, CFI, RMSEA, the unstandardised path estimates, standardised path estimates and the SMCC.

The model fit indices for Model 1 (NFI=0.718, TLI=0.768, CFI=0.786, RMSEA=0.088) are not acceptable because NFI, TLI and CFI do not satisfy the minimum threshold of 0.9. However, RMSEA value 0f 0.088 is considered tolerable as achieved a mediocre fit between 0.08 to 0.10 (MacCallum et al, 1996), despite it is yet to achieve a good fit which value should less than the maximum threshold of 0.08.

RMSEA value is considered tolerable (mediocre fit between 0.08 to 0.10 MacCallum et al, 1996), however, it is yet to achieve a good fit which value should less than the maximum threshold of 0.08.

Table 8-16 Structural Equation Model Estimates- SEM Model 1 (Yoghurt with Live Cultures: User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	.342	.0235	.077	***	
SEV → **BI**	-.124	-.111	.054	.021	
BEN → **BI**	.617	.551	.071	***	
BAR → **BI**	-.281	-.274	.047	***	
CTA → **BI**	.203	.213	.042	***	
SI → **BI**	.172	.228	.032	***	
GENDER → **BI**	.031	.016	.063	.619	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.557[e]	na	na	.310
SUS → Q8.2	1.383	.669[e]	.162	***	.447
SUS → Q8.3	1.613	.794	.170	***	.630
SUS → Q8.4	.859	.544[e]	.116	***	.296[e]
SUS → Q8.5	1.244	.661[e]	.147	***	.437
SUS → Q8.6	1.948	.851	.198	***	.724
SUS → Q8.7	1.682	.769	.181	***	.591
SUS → Q8.8	1.812	.757	.197	***	.574
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.702	na	na	.492
SEV → Q9.2	.837	.645[e]	.084	***	.416
SEV → Q9.3	.625	.522[e]	.077	***	.273[e]
SEV → Q9.4	1.343	.717	.122	***	.514
SEV → Q9.5	1.330	.720	.120	***	.519
SEV → Q9.6	1.328	.797	.109	***	.636
SEV → Q9.7	1.292	.763	.111	***	.583
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.811	na	na	.658
BEN → Q10.2	1.018	.687[e]	.082	***	.472
BEN → Q10.3	1.147	.689[e]	.092	***	.474
BEN → Q10.4	.953	.769	.066	***	.592
BEN → Q10.5	1.282	.860	.076	***	.740
BEN → Q10.6	1.124	.789	.075	***	.623
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.708	na	na	.501
BAR → Q11.2	1.062	.697[e]	.096	***	.486
BAR → Q11.3	1.130	.786	.091	***	.618
BAR → Q11.4	1.215	.871	.089	***	.759
BAR → Q11.5	.989	.830	.076	***	.689
BAR → Q11.6	.338	.214[e]	.099	***	.046[e]
BAR → Q11.7	1.017	.579[e]	.111	***	.335
BAR → Q11.8	.771	.545[e]	.089	***	297[e]
Cues to Action (CTA)					
CTA → Q12.1	1.000	.681[e]	na	na	.463
CTA → Q12.2	1.098	.865	.086	***	.749
CTA → Q12.3	.964	.652	.096	***	.426
CTA → Q12.4	1.188	.914	.090	***	.836
Self- Identity (SI)					
SI → Q13.1	1.000	.886	na	na	.784
SI → Q13.2	.999	.922	.045	***	.851
SI → Q13.3	.914	.873	.045	***	.762
Behavioural Intention (BI)					
BI → Q14.1	1.000	.773	na	na	.598
BI → Q14.2	1.068	.768	.076	***	.590
BI → Q14.3	1.030	.742	.077	***	.550
RESULTS: Measures of fit: NFI=0.718, TLI=0.768, CFI=0.786, RMSEA=0.088					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

e. Item with standardised loading below 0.7 and lower SMCC as candidate for deletion

Further assessment is based on three elements. First, the square multiple correlation coefficients (SMCC) in the structural model (EHBM Yoghurt User Group, initial Model 1) indicate that variance exists for all three items in the dependent variable (Behavioural Intention). Meanwhile, SMCC also satisfies the minimum threshold of 0.3 for all independent variable items except for four items SUS → Q8.4 (0.296), SEV → Q9.3 (0.273), BAR →Q11.6 (0.046), and BAR→Q11.8 (0.297).

Second, in terms of the statistical significance of unstandardised path estimates in the structural model show a very high significant result with the null hypothesis rejected at the 0.001 level of significance for all three items in the dependent variable (Behavioural Intention).

Third, in order to improve the model fit, a standardised loading value of 0.7 is ideally preferable, and for that reason, thirteen items were selected as candidates for deletion. Table 8.16 presents these items, SUS→Q8.1 (0.557), SUS→Q8.2 (0.669), SUS→Q8.4 (0.544), SUS→Q8.5 (0.661), SEV→Q9.2 (0.645), SEV→Q9.3 (0.522), BEN→Q10.2 (0.687), BEN→Q10.3 (0.689), BAR→Q11.2 (0.697), BAR→Q11.6 (0.214), BAR→Q11.7 (0.579), BAR→Q11.8 (0.545) and CTA→Q12.1 (0.681). However, by taking other consideration such as to deal with the modification indices first, no item has been deleted at this stage.

In summary, the SEM for EHBM Yoghurt with Live Culture (User Group) initial Model 1 (Yoghurt 39 items) has not met model fit criteria as the indices of NFI, TLI, and CFI has yet to achieve the required threshold values implying that the estimated model has not achieved a good fit. Therefore, the next step taken was to revise and modify the initial model.

The model modification used a jack-knife approach. This approach utilised by removing identified individual items once the estimation of the full model was made (Larwin and Harvey, 2012). This procedure applies to item reduction (Rensvold and Cheung, 1999). The model re-estimating and item removal processes were done in accordance with several conditions. Among the conditions, including, firstly, an item may be removed provided it should have at least three remaining items (observed variables) in a construct (Sluis et al., 2005). Secondly, the removal of any identified items should not violate the integrity of the structural model (Bollen, 1989). Thirdly, the removal or deletion of the identified items should be justified by a demonstration of good fit to the modified model (Bollen, 1989).

SEM revised models

Since the initial estimated SEM result failed to achieve a good fit, model modification was explored. In making the modification to the initial model, two revised models are presented. The modifications to the initial model have been justified based on three elements. The first element is to examine the modification indices. The second element, in identifying a weak item, an assessment is made to the fit of each construct and its items individually. Hooper et al. (2008) suggest that "Items with low SMCC i.e. less than 0.20 should be removed from the analysis as this is an indication of very high levels of error" (Hooper et al., 2008, p. 56). The third element is based on the identification of items with standardised loadings of less than the ideal value of 0.7 for possible deletion.

8.4.2 SEM Model 2 (Yoghurt with Live Cultures: User Group)

The specification of the Model 2 did not involve item deletion, despite the identification of potential items. The modification was based upon the use of covariance constraints on item measurement errors from an assessment of modification indices.

Covariance constraints were imposed on items in Perceived Susceptibility and Perceived Severity, Perceived Benefits, Perceived Barriers and Cue to Action, whilst no covariance imposed on the Self-Identity based on no measurement errors found in the assessment of modification indices.

For the construct of Perceived Susceptibility, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (SUS2 ←→ SUS1 = .243), (SUS3←→ SUS1 = .147), (SUS3←→ SUS2 = .291), (SUS4←→ SUS1 = .284), (SUS4←→ SUS2 = .174), (SUS5←→ SUS3 = .163), (SUS5←→ SUS4 = .159), (SUS6←→ SUS1 = .-130), (SUS6←→ SUS2 = -.293), (SUS6←→ SUS4 = -.106), (SUS7←→ SUS1 = -.291), (SUS7←→ SUS4 = -.232), (SUS7←→ SUS5 = .170), and (SUS7←→ SUS6 = .122).

For the construct of Perceived Severity, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (SEV2 ←→ SEV1 = .132), (SEV3 ←→ SEV1 = .171), (SEV3 ←→ SEV2 = .275), (SEV4 ←→ SEV2 = -.141), (SEV4 ←→ SEV3 = -.207), (SEV5 ←→ SEV2 = -.218), (SEV5 ←→ SEV3 = -.281), (SEV5 ←→ SEV4 = .940), (SEV6 ←→ SEV2 = -.134), (SEV6 ←→

SEV4 = -.156), (SEV7 ←→ SEV1 = -.126), (SEV7 ←→ SEV4 = -.192), (SEV7 ←→ SEV5 = -.277) and (SEV7 ←→ SEV6 = .323).

For the construct of Perceived Benefits, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (BEN2 ←→ BEN1 = .336), (BEN3 ←→ BEN2 = .173), (BEN4 ←→ BEN1 = .108), (BEN4 ←→ BEN3 = -.186), (BEN6 ←→ BEN1 = -.107), (BEN6 ←→ BEN2 =- .134) and (BEN6 ←→ BEN5 = .141).

For the construct of Perceived Barriers, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value (BAR3 ←→ BAR2 = -.160), (BAR5 ←→ BAR4 = .084), (BAR6 ←→ BAR5 = -.177), (BAR7 ←→ BAR6 = .802), (BAR8 ←→ BAR4 = -.115), (BAR8 ←→ BAR6 = .405), and (BAR8 ←→ BAR7 = .272).

For the construct of Cue to Action, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (CTA3 ←→ CTA1 = .212), and (CTA3 ←→ CTA2 = -.173).

The justification for the use of the covariance constraint in the model is based upon a suggestion by Gaskin (2012) by selecting the pair of items of modification indices in the same construct. Hox and Bechger, (1998) suggested that the model fit could be improved by adding various covariance between error terms, which is based from modification indices. Theoretically, the minimum amount that the chi-square statistic is expected to decrease if the corresponding parameter is freed, indicated by the value of a modification index that could produce a larger improvement in fit. A covariance between items is done within the same construct only with a restriction to pair items between other constructs due to lack of theoretical justification. The model fit would improve by freeing the parameters based on modification indices, at the cost of one degree of freedom, and a theoretical justification is evaluated post hoc (Hox and Bechger, 1998).

The modification is theoretically justified as the covariance is made between identified items in the same construct. For example, the path coefficient for the added path in the construct of Cue to Action is negative (CTA3 ←→ CTA2 = -.173), which suggests that if the respondents are highly influenced by the family member, the amount of influence by mass media is less, in impacting consumer' intention to purchase and consume yoghurt. This is logical as a family is closer to influence the respondents, and it is decided to retain the modification. Hence, the modification of the model is theoretically justified as the covariance is made between identified items in the same construct only.

Table 8.17 presents the result of SEM Model 2 (User Group of Yoghurt with Live Cultures). The modification improved model fit. In summary, NFI=0.843, TLI=0.904, CFI=0.918 and RMSEA=0.057. Based on this result, the model almost but not quite achieves a good fit as only one of three incremental fit indices (i.e. NFI) is below the required minimum threshold value of 0.9 although it approximates to a value of 0.9. Therefore, a further modification was considered.

Table 8-17 Structural Equation Model estimates SEM Model 2- Yoghurt with Live Cultures (User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	.395	.269	.120	.001	
SEV → **BI**	-.044	-.041	.082	.589	
BEN → **BI**	.533	.496	.107	***	
BAR → **BI**	-.261	-.273	.066	***	
CTA → **BI**	.176	.194	.061	.004	
SI → **BI**	.160	.228	.047	***	
GENDER → **BI**	.066	.036	.095	.487	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.515[e]	na	na	.265[e]
SUS → Q8.2	1.491	.671[e]	.181	***	.451
SUS → Q8.3	1.663	.762	.190	***	.581
SUS → Q8.4	.920	.543[e]	.115	***	.295[e]
SUS → Q8.5	1.304	.646[e]	.178	***	.417
SUS → Q8.6	2.154	.875	.259	***	.765
SUS → Q8.7	1.803	.765	.240	***	.585
SUS → Q8.8	2.074	.807	.262	***	.651
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.687[e]	na	na	.472
SEV → Q9.2	.916	.692[e]	.093	***	.478
SEV → Q9.3	.636	.520[e]	.078	***	.271[e]
SEV → Q9.4	1.355	.707	.150	***	.500
SEV → Q9.5	1.361	.720	.139	***	.518
SEV → Q9.6	1.339	.787	.129	***	.620
SEV → Q9.7	1.349	.779	.142	***	.606
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.792	na	na	.628
BEN → Q10.2	.961	.633[e]	.066	***	.401
BEN → Q10.3	1.204	.707	.099	***	.499
BEN → Q10.4	.986	.778	.064	***	.605
BEN → Q10.5	1.305	.856	.086	***	.732
BEN → Q10.6	1.171	.803	.089	***	.645
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.714	na	na	.510
BAR → Q11.2	1 .090	.721	.097	***	.520
BAR → Q11.3	1.153	.808	.091	***	.653
BAR → Q11.4	1.178	.852	.089	***	.725
BAR → Q11.5	.966	.818	.075	***	.669
BAR → Q11.6	.284	.181[e]	.098	0.004	.033[e]
BAR → Q11.7	.981	.563[e]	.109	***	.317
BAR → Q11.8	.769	.548[e]	.089	***	.300[e]
Cues to Action (CTA)					
CTA → Q12.1	1.000	.672[e]	na	na	.445
CTA → Q12.2	1.166	.908	.092	***	.788
CTA → Q12.3	1.058	.708	.099	***	.585
CTA → Q12.4	1.158	.879	.092	***	.795
Self- Identity (SI)					
SI → Q13.1	1.000	.888	na	na	.808
SI → Q13.2	.997	.923	.045	***	.855
SI → Q13.3	.913	.874	.045	***	.766
Behavioural Intention (BI)					
BI → Q14.1	1.000	.727	na	na	.672
BI → Q14.2	1.075	.726	.057	***	.639
BI → Q14.3	1.019	.689	.046	***	.643
RESULTS: Measures of fit: NFI=0.843, TLI=0.904, CFI=0.918 and RMSEA=0.057					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

e. Item with standardised loading below 0.7 and lower SMCC as candidate for deletion

8.4.3 SEM Model 3 (Yoghurt with Live Cultures: User Group)

In the Model 3, twelve items were deleted because of low standardised coefficients. The twelve items were selected as candidates for deletion based on the Model 2. Table 8.17 presents these items of the Model 2 (SUS→Q8.1 (0.515), SUS→Q8.2 (0.671), SUS→Q8.4 (0.543), SUS→Q8.5 (0.646), SEV→Q9.1 (0.687), SEV→Q9.2 (0.692), SEV→Q9.3 (0.520), BEN→Q10.2 (0.633), BAR→Q11.6 (0.181), BAR→Q11.7 (0.563), BAR→Q11.8 (0.548) and CTA→Q12.1 (0.672).

The criteria of items deletion are based on convention, the latent variable which represents the indicator variables should have standardised regression weights of 0.7 or higher (Hoyle, 1995; Schumacker and Lomax, 2004). Therefore, the deletion of items with a standardised loading value of below 0.7 at this stage is justified with respect to theory and literature. Nevertheless, the integrity of the model has remained and given utmost priority as the total number of item deletion is limited by ensuring each construct must able to remain at least three items as the observed variables (Bagozzi, 1980). In addition, prior to the deletion, the construct validity has been achieved in the measurement model assessment. “If construct validity is supported by confirmation of a hypothesised dimensional structure, other types of scale refinement or assessment may be considered” (MacCallum and Austin, 2000, p. 208).

The deletion of selected 12 items produces a new model (SEM Final Model 3) of 27 items. Table 8.18 presents the results. The result of the new revised model is excellent as it has further improved the model fit scores.

Table 8-18 Structural Equation Model Estimates- SEM Model 3 Yoghurt with Live Cultures (User Group)

CONSTRUCTS AND MEASURES	**Coefficients[a]**		**Standard Error[b]**	**Probability[c]**	**SMCC[d]**
	Unstandardised	*Standardised*			
SUS → **BI**	.254	.287	.067	***	
SEV → **BI**	-.037	-.046	.059	.532	
BEN → **BI**	.538	.499	.105	***	
BAR → **BI**	-.256	-.268	.067	***	
CTA → **BI**	.135	.177	.050	.007	
SI → **BI**	.168	.238	.046	***	
GENDER → **BI**	.057	.031	.095	.550	
Perceived Susceptibility (SUS)					
SUS → Q8.3	1.000	.761	na	na	.578
SUS → Q8.6	1.293	.874	.108	***	.763
SUS → Q8.7	1.062	.750	.095	***	.562
SUS → Q8.8	1.338	.864	.117	***	.746
Perceived Severity (SEV)					
SEV → Q9.4	1.000	.697	na	na	.486
SEV → Q9.5	1.013	.716	.091	***	.512
SEV → Q9.6	1.040	.815	.135	***	.665
SEV → Q9.7	1.122	.865	.149	***	.749
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.793	na	na	.629
BEN → Q10.3	1.202	.706	.099	***	.498
BEN → Q10.4	.979	.773	.064	***	.597
BEN → Q10.5	1.309	.858	.087	***	.737
BEN → Q10.6	1.177	.808	.091	***	.652
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.715	na	na	.511
BAR → Q11.2	1.098	.728	.098	***	.529
BAR → Q11.3	1.156	.812	.092	***	.660
BAR → Q11.4	1.166	.844	.089	***	.712
BAR → Q11.5	.972	.824	.076	***	.678
Cues to Action (CTA)					
CTA → Q12.2	1.000	.931	na	na	.867
CTA → Q12.3	.907	.726	.078	***	.527
CTA → Q12.4	.943	.857	.071	***	.735
Self- Identity (SI)					
SI → Q13.1	1.000	.886	na	na	.786
SI → Q13.2	1.000	.924	.045	***	.854
SI → Q13.3	.914	.873	.045	***	.763
Behavioural Intention (BI)					
BI → Q14.1	1.000	.728	na	na	.531
BI → Q14.2	1.075	.686	.057	***	.530
BI → Q14.3	1.012	.802	.046	***	.471
RESULTS: Measures of fit: NFI= 0.902, TLI=0.944, CFI=0.954, RMSEA=0.053					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

Maintaining the integrity of the model, Marsh et al., (2004) argued, although the model fit could be achieved by deleting an item with low loading, however, too many deletions will result in poor model integrity. Therefore, by considering the validity of the items from the prior measurement model analysis, the analysis in this study has not proceeded with further deletion of items after the second model revision.

The result of model fit indices in the modified model indicated that the modified model has achieved better value, respectively, and all model fit indices scores are acceptable and achieved the minimum required thresholds according to model fit criteria explained earlier. This result implies a good fit has been achieved by the estimated model.

Further explanation of these findings is supported by five justifications. First, the square multiple correlation coefficients (SMCC) in the structural model (EHBM Model 3) proven variance existed for all three items in the dependent variable of Behavioural Intention. Meanwhile, SMCC also satisfies the minimum threshold of 0.3 for all independent variable items.

Second, in terms of the statistical significance of unstandardised path estimates in the structural model showed a very high significant result with the null hypothesis is rejected at the 0.001 level of significance for all three items in the dependent variable of Behavioural Intention.

Third, on the other hand, in terms of the statistical significance of unstandardised path estimates in the measurement model showed a very high significant result with the null hypothesis is rejected at the 0.001 level of significance for all 27 items in seven latent variables of EHBM constructs. In the analysis of unstandardised path coefficients in the structural model the null hypothesis is rejected at the $p < 0.001$ level of significance in the case of four constructs (Perceived Susceptibility, Perceived Benefits, Perceived Barriers, and Self-Identity). Whilst for the construct of Cue to Action, the null hypothesis is rejected at the 0.01 level of significance. Meanwhile, the null hypothesis is accepted in the case of one construct of Perceived Severity ($p > 0.05$).

Fourth, the magnitude of the standardised path estimates for all items in seven EHBM constructs of SEM Model 3 Yoghurt with Live Culture User Group, has improved as compared to the previous Model 2 and has achieved positive sign above the minimum value of 0.5.

In summary, finally, SEM with 27 items produce a model with an acceptable level of fit is established as the final model. All model fit indices thresholds have been met accordingly. The absolute fit index of RMSEA has achieved an actual value of 0.053 (below 0.1 of the maximum threshold). On the other hand, the incremental fit indices achieve its threshold as well.

The measures of model fit for Model 3 are NFI=0.902, TLI=0.944 and CFI=0.954. All incremental fit indices have achieved acceptable model fit values as the sample size of Yoghurt with Live Cultures-User Group is adequate (N=273) for the assessment of these three indices. For example, NFI assessment requires a sample size of minimum 200, whilst other indices such as TLI and CFI may apply to a smaller sample size (Bentler, 1990).

Technically, the revised model (SEM Model 3 with 27 items for Yoghurt with Live Cultures -User Group) has achieved and fulfilled all model fit indices requirement and therefore the model has achieved a significant result. Details of the hypothesised relationship and its respective significant level of this analysis result of SEM final model (Model 3-Yoghurt with Live Cultures- User Group) are further discussed in Section 8.6. The summary of the modelling results in the SEM analysis of EHBM for Yoghurt with Live Cultures-User Group is presented in Table 8.19.

Table 8-19 Summary of Measures of Fit Indices of the Structural Equation Models Yoghurt with Live Cultures (User Group)

Measures-of-fit Indices		**Cut-off value**	**Results**		
			Model 1 **(Independent model)** 39 items	**Model 2** (Revised 39 items with modification)	**Model 3** (Revised 27 items with modification)
Absolute fit (Measures based on the population discrepancy)	RMSEA	**< 0.08**	0.088	0.057	**0.053**
Comparison to a baseline model: incremental fit indices/ comparative indices	NFI	**> 0.90**	0.718	0.843	**0.902**
	TLI	**> 0.90**	0.768	0.904	**0.944**
	CFI	**> 0.90**	0.786	0.918	**0.954**

8.4.4 Impacts of significant constructs on Behavioural Intention (Yoghurt with Live Culture-User Group)

Based on result of each of the final model in terms of the significant influences on Behavioural Intention and also, the relative importance of the impacts of all significant constructs on Behavioural Intention based upon the magnitude of the standardised regression coefficients, conclusions can be made that in the case of Yoghurt with Live Cultures-User Group, the significant influences in descending order of importance are Perceived Benefits (.499), Perceived Susceptibility (.287), Perceived Barriers (-.268), Self-Identity (.238), and

Cues to Action (.177). These results are essential in the treatment of the marketing implications which further discussed in Chapter 9.

In making a comparative study, the assessment continues with structural models of Yoghurt with Live Culture Non-User Group. Similar approaches of SEM analysis applied to the Non-User Group.

8.4.5 SEM Model 1 (Yoghurt with Live Culture: Non-User Group)

SEM Model 1 for Yoghurt with Live Cultures specifies the seven constructs. No control variables are specified. Table 8.20 presents the results. The assessment of model fit is based on the appraisal of NFI, TLI, CFI, RMSEA, the unstandardised path estimates, standardised path estimates and the SMCC.

The model fit indices for Model 1 (NFI=0.566, TLI=0.680, CFI=0.705, RMSEA=0.125) are not acceptable because NFI, TLI and CFI do not satisfy the minimum threshold of 0.9. Whilst RMSEA is also not acceptable as the value exceeds the maximum threshold of 0.08.

Table 8-20 Structural Equation Model Estimates - SEM Model 1 Yoghurt with Live Cultures (Non-User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	-.842	-.732	.262	.001	
SEV → **BI**	.089	.063	.256	.729	
BEN → **BI**	.441	.389	.184	.016	
BAR → **BI**	-1.795	-.833	.532	***	
CTA → **BI**	1.502	.897	.396	***	
SI → **BI**	.354	.346	.157	.025	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.876	na	na	.768
SUS → Q8.2	1.043	.890	.096	***	.792
SUS → Q8.3	.973	.883	.091	***	.779
SUS → Q8.4	.866	.809	.096	***	.655
SUS → Q8.5	.716	.799	.081	***	.638
SUS → Q8.6	.992	.782	.117	***	.611
SUS → Q8.7	.776	.634[e]	.126	***	.401
SUS → Q8.8	.856	.684[e]	.125	***	.468
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.738	na	na	.545
SEV → Q9.2	.944	.795	.142	***	.632
SEV → Q9.3	.815	.695[e]	.141	***	.484
SEV → Q9.4	1.223	.730	.201	***	.533
SEV → Q9.5	1.309	.729	.215	***	.531
SEV → Q9.6	1.259	.772	.195	***	.595
SEV → Q9.7	1.187	.743	.191	***	.551
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.958	na	na	.918
BEN → Q10.2	.904	.821	.082	***	.674
BEN → Q10.3	.684	.611[e]	.109	***	.373
BEN → Q10.4	1.034	.958	.054	***	.918
BEN → Q10.5	1.031	.892	.073	***	.796
BEN → Q10.6	.892	.842	.076	***	.709
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.438[e]	na	na	.192[e]
BAR → Q11.2	.556	.285[e]	.280	.047	.081[e]
BAR → Q11.3	.960	.356[e]	.408	.019	.127[e]
BAR → Q11.4	.828	.381[e]	.336	.014	.145[e]
BAR → Q11.5	.770	.355[e]	.329	.019	.126[e]
BAR → Q11.6	.540	.286[e]	.271	.046	.082[e]
BAR → Q11.7	.511	.222[e]	.316	.106	.049[e]
BAR → Q11.8	.647	.299[e]	.313	.039	.090[e]
Cues to Action (CTA)					
CTA → Q12.1	1.000	.536[e]	na	na	.287[e]
CTA → Q12.2	1.553	.852	.322	***	.727
CTA → Q12.3	1.539	.798	.330	***	.637
CTA → Q12.4	1.670	.924	.335	***	.853
Self- Identity (SI)					
SI → Q13.1	1.000	.881	na	na	.821
SI → Q13.2	1.006	.940	.078	***	.884
SI → Q13.3	.995	.906	.088	***	.776
Behavioural Intention (BI)					
BI → Q14.1	1.000	.975	na	na	.952
BI → Q14.2	.661	.688	.085	***	.473
BI → Q14.3	.948	.981	.038	***	.963
RESULTS: Measures of fit: NFI=0.566, TLI=0.680, CFI=0.705, RMSEA=0.125					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

e. Item with standardised loading below 0.7 and lower SMCC as candidate for deletion

Further assessment is based on three elements. First, the square multiple correlation coefficients (SMCC) in the structural model (EHBM Yoghurt with Live Cultures, Non-User Group, initial Model 1) indicate that variance exists for all three items in the dependent variable (Behavioural Intention). Meanwhile, SMCC also satisfies the minimum threshold of 0.3 for all independent variable items except for nine items BAR→ Q11.1 (0.192), BAR→ Q11.2 (0.081), BAR→ Q11.3 (0.127), BAR→ Q11.4 (0.145), BAR→ Q11.5 (0.126), BAR →Q11.6 (0.082), BAR→ Q11.7 (0.049), BAR→Q11.8 (0.090) and CTA→ Q12.1 (0.287). In relation to SMCC assessment, there is an issue identified, specifically for the construct of Perceived Barriers as all eight items in the construct produce below the minimum threshold value.

Second, in terms of the statistical significance of unstandardised path estimates in the structural model show a very high significant result with the null hypothesis rejected at the 0.001 level of significance for all three items in the dependent variable (Behavioural Intention).

Third, in order to improve the model fit, a standardised loading value of 0.7 is ideally preferable, and for that reason, thirteen items were selected as candidates for deletion. Table 8.20 presents these items, SUS→Q8.7 (0.634), SUS→Q8.8 (0.684), SEV→Q9.3 (0.695), BEN→Q10.3 (0.611), BAR→Q11.1 (0.438), BAR→Q11.2 (0.285), BAR→Q11.3 (0.356), BAR→Q11.4 (0.381), BAR→Q11.5 (0.355), BAR→Q11.6 (0.286), BAR→Q11.7 (0.222) and BAR→Q11.8 (0.299) and CTA→Q12.1 (0.536). However, by taking other consideration such as to deal with the modification indices first, no item has been deleted at this stage.

In summary, the SEM for EHBM Yoghurt with Live Cultures (initial Model 1 Non-User Group with 39 items) has not met model fit criteria as the indices of NFI, TLI, and CFI has yet to achieve the required threshold values implying that the estimated model has not achieved a good fit. Therefore, the next step taken was to revise and modify the initial model.

8.4.6 SEM Model 2 (Yoghurt with Live Cultures: Non-User Group)

The specification of the Model 2 did not involve item deletion, despite the identification of potential items. The modification was based upon the use of covariance constraints on item measurement errors from an assessment of modification indices. The justifications for the use of the covariance constraint in the model are based upon similar explanation made on previous models in this Chapter.

Covariance constraints were imposed on items in Perceived Susceptibility and Perceived Severity, Perceived Benefits, and Perceived Barriers, whilst no covariance imposed on the Cue to Action and Self-Identity based on no measurement errors found in the assessment of modification indices.

For the construct of Perceived Susceptibility, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (SUS2 ←→ SUS1 = .192), (SUS4 ←→ SUS1 = .307), (SUS5 ←→ SUS4 = .161), (SUS6 ←→ SUS1 = -.281), (SUS6 ←→ SUS4 = -.341), (SUS7 ←→ SUS1 = -.430), (SUS7 ←→ SUS3 = .197), (SUS7 ←→ SUS4 = -.377), (SUS7 ←→ SUS6 = .578), (SUS8 ←→ SUS1 = -.274), (SUS8 ←→ SUS2 = -.249), (SUS8 ←→ SUS4 = -.303), (SUS8 ←→ SUS6 = .774), and (SUS8 ←→ SUS7 = .872).

For the construct of Perceived Severity, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (SEV3 ←→ SEV1 = .219), (SEV4 ←→ SEV3 = -.308), (SEV5 ←→ SEV1 = -.340), (SEV5 ←→ SEV3 = -.427), and (SEV5 ←→ SEV4 = 1.186).

For the construct of Perceived Benefits, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (BEN3 ←→ BEN2 = .255), (BEN4 ←→ BEN2 = -.108), (BEN4 ←→ BEN3 = -.136), (BEN5 ←→ BEN1 = -.083), and (BEN5 ←→ BEN2 = .142).

For the construct of Perceived Barriers, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value (BAR4 ←→ BAR1 = .580), (BAR4 ←→ BAR2 = .561), (BAR5 ←→ BAR2 = .664), (BAR5 ←→ BAR4 = 1.146), (BAR6 ←→ BAR5 = -.604), and (BAR7 ←→ BAR6 = .568).

Table 8.21 presents the result of SEM Model 2 (Yoghurt with Live Cultures Non-User Group). The modification improved model fit. In summary, NFI=0.669, TLI=0.799, CFI=0.824 and RMSEA=0.099. Based on this result, the model is yet to satisfy a good fit as all three incremental fit indices (i.e. NFI, TLI and CFI) are below required minimum threshold value of 0.9 or approximates to a value of 0.9. Therefore, a further modification was considered.

Table 8-21 Structural Equation Model Estimates - SEM Model 2 Yoghurt with Live Cultures (Non-User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	-.140	-.149	.154	.365	
SEV → **BI**	-.150	-.129	.165	.362	
BEN → **BI**	.353	.383	.113	.002	
BAR → **BI**	-.569	-.387	.236	.016	
CTA → **BI**	1.112	.770	.292	***	
SI → **BI**	.144	.170	.098	.143	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.891	na	na	.795
SUS → Q8.2	1.018	.879	.087	***	.773
SUS → Q8.3	.960	.882	.091	***	.778
SUS → Q8.4	.852	.804	.075	***	.647
SUS → Q8.5	.696	.786	.082	***	.618
SUS → Q8.6	1.009	.805	.134	***	.648
SUS → Q8.7	.771	.640[e]	.146	***	.410
SUS → Q8.8	.835	.677[e]	.138	***	.459
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.744	na	na	.553
SEV → Q9.2	.944	.801	.141	***	.642
SEV → Q9.3	.865	.740	.125	***	.548
SEV → Q9.4	1.139	.686[e]	.206	***	.470
SEV → Q9.5	1.213	.672[e]	.251	***	.451
SEV → Q9.6	1.245	.769	.197	***	.592
SEV → Q9.7	1.179	.743	.191	***	.553
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.972	na	na	.944
BEN → Q10.2	.898	.828	.080	***	.686
BEN → Q10.3	.660	.592[e]	.109	***	.350
BEN → Q10.4	1.014	.953	.052	***	.908
BEN → Q10.5	1.036	.908	.080	***	.825
BEN → Q10.6	.867	.830	.075	***	.689
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.530	na	na	.281
BAR → Q11.2	.557	.345[e]	.274	.042	.119[e]
BAR → Q11.3	1.052	.473	.399	.008	.224
BAR → Q11.4	.826	.462[e]	.296	.005	.214[e]
BAR → Q11.5	.966	.551	.342	.005	.303
BAR → Q11.6	.261	.170[e]	.236	.269	.029[e]
BAR → Q11.7	.447	.236[e]	.292	.126	.055[e]
BAR → Q11.8	.724	.406[e]	.304	.017	.164[e]
Cues to Action (CTA)					
CTA → Q12.1	1.000	.513[e]	na	na	.263[e]
CTA → Q12.2	1.643	.864	.356	***	.747
CTA → Q12.3	1.591	.790	.358	***	.625
CTA → Q12.4	1.773	.939	.373	***	.883
Self- Identity (SI)					
SI → Q13.1	1.000	.908	na	na	.824
SI → Q13.2	1.005	.940	.078	***	.883
SI → Q13.3	.993	.881	.088	***	.776
Behavioural Intention (BI)					
BI → Q14.1	1.000	.806	na	na	.651
BI → Q14.2	.889	.764	.118	***	.584
BI → Q14.3	.943	.807	.042	***	.650
RESULTS: Measures of fit: NFI=0.669, TLI=0.799, CFI=0.824 and RMSEA=0.099					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

e. Item with standardised loading below 0.7 and lower SMCC as candidate for deletion

8.4.7 SEM Model 3 (Yoghurt with Live Cultures: Non-User Group)

In Model 3, eleven items were deleted due to low standardised coefficients. The eleven items were selected as candidates for deletion based on the Model 2. Table 8.22 presents these items of the Model 2 (SUS→Q8.7 (0.640), SUS→Q8.8 (0.677), SEV→Q9.4 (0.686), SEV→Q9.5 (0.672), BEN→Q10.3 (0.592), BAR→Q11.2 (0.345), BAR→Q11.4 (0.462), BAR→Q11.6 (0.170), BAR→Q11.7 (0.236) BAR→Q11.8 (0.406) and CTA→Q12.1 (0.513).

The criteria of items deletion are like the explanation on previous models which based on convention. Although there are other items with low standardised coefficients in the construct of Perceived Barrier, they were retained as to maintain the integrity of the model which require each construct to have minimum three observed variables (Bagozzi, 1980).

The deletion of selected 11 items produces a new model (SEM Model 3) of 28 items. In summary, incremental fit indices indicate NFI=0.771, TLI=0.875 and CFI= 0.895. While the absolute fit index of RMSEA shows a tolerable value of 0.093 within the range of fair fit value range of 0.05 to 0.10 (MacCallum et al., 1996). The RMSEA value in Model 3 is slightly over 0.08 of the maximum thresholds of a good fit. Table 8.22 presents the results. The result of the new revised model is yet to achieve the required model fit indices hence, it needs further revision.

Table 8-22 Structural Equation Model Estimates- SEM Model 3 Yoghurt with Live Cultures (Non-User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	-.097	-.104	.150	.516	
SEV → **BI**	-.259	-.219	.180	.151	
BEN → **BI**	.414	.459	.121	***	
BAR → **BI**	-.580	-.364	.269	.031	
CTA → **BI**	.598	.697	.120	***	
SI → **BI**	.140	.169	.098	.154	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.883	na	na	.779
SUS → Q8.2	1.032	.882	.087	***	.778
SUS → Q8.3	.973	.884	.093	***	.782
SUS → Q8.4	.863	.808	.076	***	.653
SUS → Q8.5	.707	.790	.083	***	.624
SUS → Q8.6	1.014	.801	.135	***	.642
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.717	Na	na	.514
SEV → Q9.2	.961	.786	.157	***	.618
SEV → Q9.3	.888	.735	.135	***	.541
SEV → Q9.6	1.301	.775	.215	***	.600
SEV → Q9.7	1.264	.768	.210	***	.590
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.975	na	na	.951
BEN → Q10.2	.891	.823	.080	***	.678
BEN → Q10.4	1.007	.951	.051	***	.904
BEN → Q10.5	1.032	.908	.080	***	.824
BEN → Q10.6	.863	.829	.074	***	.688
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.481	na	na	.231
BAR → Q11.3	1.334	.543	.523	.011	.295
BAR → Q11.5	1.174	.594	.450	.009	.352
Cues to Action (CTA)					
CTA → Q12.2	1.000	.868	na	na	.753
CTA → Q12.3	.964	.791	.115	***	.625
CTA → Q12.4	1.074	.939	.096	***	.882
Self- Identity (SI)					
SI → Q13.1	1.000	.908	na	na	.825
SI → Q13.2	1.005	.940	.077	***	.884
SI → Q13.3	.992	.880	.088	***	.774
Behavioural Intention (BI)					
BI → Q14.1	1.000	.791	na	na	.625
BI → Q14.2	.945	.771	.122	***	.595
BI → Q14.3	.914	.793	.042	***	.630
RESULTS: Measures of fit: NFI=0.771, TLI=0.875 and CFI= 0.895. RMSEA=0.093					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

8.4.8 SEM Model 4 (Yoghurt with Live Cultures: Non-User Group)

In the final revision, the attempts made by further deleting identified items in constructs that proven not significantly impact the dependent variable, which based on the results of earlier models, i.e. Perceived Susceptibility and Perceived Severity. Two items were selected, SUS→Q8.5 (0.790) and SEV→Q8.1 (0.717). Although both items have a standardised coefficient value of above 0.7, the selection was made based upon the basis that the item’s value is the lowest in their respective constructs. The selection is also justified as it represents the lowest value among other remaining items in the model (except for items in the Perceived Barrier construct which three items has to be remained despite contain the lower standardised coefficient value as to maintain the model integrity).

The result of model fit indices in the revised model (Final Model 4) indicated that the modified model has progressed well and achieving better value. The incremental fit indices indicate NFI=0.789, TLI=0.886 and CFI= 0.906. While the absolute fit index of RMSEA shows a tolerable value of 0.091 within the range of mediocre fit level of between 0.08 to 0.10 (MacCallum et al., 1996) as it is slightly over 0.08 of the maximum thresholds of a good fit. In this case, such the result is considered within the fair fit value (range of 0.05 to 0.10) and it is acceptable (MacCallum et al., 1996). In relation to the incremental fit indices, although only CFI has achieved the required minimum value among the others in incremental fit indices, the model fit is considered acceptable to explain the result. This issue occurs due to the small sample size (N=72) to the Non-User Group of Yoghurt with Live Cultures which obtained by the system that randomly select the respondents from the Qualtrics panel. In this regard, to resolve a model fit issue related with a small sample size, it is suggested that CFI is more reliable to explain the result than NFI which requires a larger sample of more than 200 (Mulaik et al., 1989; Bentler, 1990). An underestimating fit of the model may occur when solely relied on NFI (Kline, 2005). In other words, NFI is suitable for estimating models with large sample size, whilst alternatively Tucker-Lewis index (TLI) suitable for simpler models, and Comparative Fit Index (CFI) is good for the estimation of models with small sample size (Tabachnick and Fidell, 2007; Hooper et al., 2008). In relation to the result in final Model 4, no further item deletion was considered as to maintain the model integrity. Table 8.23 presents the result of the Model 4.

Table 8-23 Structural Equation Model Estimates- SEM Model 4 Yoghurt with Live Cultures (Non-User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	-.009	-.010	.130	.944	
SEV → **BI**	-.307	-.238	.189	.105	
BEN → **BI**	.423	.455	.117	***	
BAR → **BI**	-.883	-.402	.416	.034	
CTA → **BI**	.579	.655	.118	***	
SI → **BI**	.085	.099	.092	.357	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.894	na	na	.800
SUS → Q8.2	1.010	.875	.087	***	.766
SUS → Q8.3	.948	.873	.094	***	.763
SUS → Q8.4	.865	.821	.076	***	.674
SUS → Q8.6	1.014	.812	.136	***	.659
Perceived Severity (SEV)					
SEV → Q9.2	1.000	.775	na	na	.600
SEV → Q9.3	0.935	.734	.151	***	.539
SEV → Q9.6	1.408	.794	.208	***	.631
SEV → Q9.7	1.315	.757	.205	***	.573
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.976	na	na	.953
BEN → Q10.2	.888	.822	.079	***	.676
BEN → Q10.4	1.004	.949	.051	***	.900
BEN → Q10.5	1.034	.911	.080	***	.829
BEN → Q10.6	.861	.828	.074	***	.686
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.358	na	na	.128
BAR → Q11.3	2.372	.721	1.072	.027	.520
BAR → Q11.5	1.206	.455	.584	.039	.207
Cues to Action (CTA)					
CTA → Q12.2	1.000	.869	na	na	.755
CTA → Q12.3	.965	.792	.115	***	.627
CTA → Q12.4	1.071	.938	.096	***	.879
Self- Identity (SI)					
SI → Q13.1	1.000	.910	na	na	.827
SI → Q13.2	1.001	.939	.077	***	.881
SI → Q13.3	.991	.881	.087	***	.775
Behavioural Intention (BI)					
BI → Q14.1	1.000	.815	na	na	.664
BI → Q14.2	.894	.777	.117	***	.604
BI → Q14.3	.949	.820	.041	***	.673
RESULTS: Measures of fit: NFI=0.789, TLI=0.886 and CFI= 0.906. RMSEA=0.091					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

Further explanation of these findings is supported by five justifications. First, the square multiple correlation coefficients (SMCC) in the structural model (EHBM Model 4) proven variance existed for all three items in the dependent variable (Behavioural Intention). Meanwhile, SMCC also satisfies the minimum threshold of 0.3 for all independent variable items, except for BAR1=0.128 and BAR5=0.207.

Second, in terms of the statistical significance of unstandardised path estimates in the structural model showed a very high significant result with the null hypothesis is rejected at the 0.001 level of significance for all three items in the dependent variable Behavioural Intention.

Third, on the other hand, in terms of the statistical significance of unstandardised path estimates in the measurement model showed a very high significant result with the null hypothesis is rejected at the 0.001 level of significance for all items in seven latent variables of EHBM constructs, except for two items of BAR5 and BAR3 which the null hypothesis is rejected at the 0.05 level of significance ($p<0.05$). In the analysis of unstandardised path coefficients in the structural model the null hypothesis is rejected at the 0.001 level of significance ($p<0.001$) in the case of two constructs (Perceived Benefits and Cue to Action). Whilst for the construct of Perceived Barriers, the null hypothesis is rejected at the 0.05 level of significance ($p<0.05$). Meanwhile, the null hypothesis is accepted in the case of one construct of Perceived Susceptibility, Perceived Severity and Self-Identity ($p > 0.05$).

Fourth, the magnitude of the standardised path estimates for all items in seven EHBM constructs of SEM Model 4 Yoghurt with Live Culture Non-User Group, has improved as compared to the previous Models 1, 2 and 3 and has achieved positive sign above the minimum value of 0.5.

In summary, finally, SEM with 26 items produce a model with an acceptable level of model fit is established as the final model. Details of the hypothesised relationship and its respective significant level of this analysis result of SEM final model (Model 4- Yoghurt with Live Cultures, Non-User Group) are further discussed in Section 8.6. The summary of the modelling results in the SEM analysis of EHBM for Yoghurt with Live Cultures Non-User Group is presented in Table 8.24.

Table 8-24 Summary of Measures of Fit Indices of the Structural Equation Models Yoghurt with Live Cultures (Non-User Group)

Measures-of-fit Indices		Cut-off value	Results			
			Model 1 **(Independent model)** 39 items	**Model 2** (Revised 39 items with modification)	**Model 3** (Revised 28 items with modification)	**Model 4** (Revised 26 items with modification)
Absolute fit (Measures based on the population discrepancy)	RMSEA	**< 0.1**	0.125	0.099	0.093	**0.091**
Comparison to a baseline model: incremental fit indices/ comparative indices	NFI	**> 0.90**	0.566	0.669	0.771	**0.789**
	TLI	**> 0.90**	0.680	0.799	0.875	**0.886**
	CFI	**> 0.90**	0.705	0.824	0.895	**0.906**

8.4.9 Impacts of significant constructs on Behavioural Intention (Yoghurt with Live Culture-Non-User Group)

Based on result of each of the final model in terms of the significant influences on Behavioural Intention and also, the relative importance of the impacts of all significant constructs on Behavioural Intention based upon the magnitude of the standardised regression coefficients, conclusions can be made that in the case of Yoghurt with Live Cultures (Non-User Group), the significant influences in descending order of importance are Cues to Action (.655), Perceived Benefits (.455) and Perceived Barriers (-.402). These results are essential in the treatment of the marketing implications which further discussed in Chapter 9.

8.5 Structural Equation Models (SEM) Cholesterol Lowering Margarine

The SEM model for Cholesterol lowering Margarine specifies the seven constructs of Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self-Identity and Behavioural Intention. In relation to the assessment of the impact of Gender, Age, and Education Level on the dependent variable construct of Behavioural Intention, none of the control variables are included in the structural model of Cholesterol Lowering Margarine User Group, following the acceptance of the null hypothesis in the MANOVA tests. Whilst, the control variables of Age and Education level are specified in the structural model of Cholesterol Lowering Margarine Non-User Group, following the rejection of the null hypotheses in the MANOVA tests.

8.5.1 SEM Model 1 (Cholesterol Lowering Margarine: User Group)

Model 1 specifies the seven constructs of EHBM without the control variables. The results are presented in Table 8.25. The results of model fit indices for Model 1 (NFI=0.640, TLI=0.711, CFI=0.734, RMSEA=0.99) are not fully acceptable according to the model fit criteria. Precisely, NFI, TLI and CFI do not achieve the minimum threshold of 0.9. At the same time, assessment of RMSEA indicates the value shows a tolerable mediocre fit as it is slightly over the maximum threshold of 0.08 of a good fit. According to MacCallum et al, (1996), mediocre fit between value between 0.08 to 0.10.

The squared multiple correlation coefficients (SMCC) in the structural model (EHBM Model 1) prove that variance existed for all three items in the dependent variable (Behavioural Intention). Meanwhile, SMCC also satisfies the minimum threshold of 0.3 for all independent variable items except for six items SUS→Q8.1 (0.240), SEV→Q9.2 (0.226), SEV→Q9.3 (0.228), BAR→Q11.2 (0.251), BAR→Q11.6 (0.245) and CTA→Q12.1 (0.234).

Table 8-25 Structural Equation Model estimates- SEM Model 1 Cholesterol Lowering Margarine (User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	.171	-.097	.089	.056	
SEV → **BI**	-.120	-.073	.076	.115	
BEN → **BI**	.895	.784	.105	***	
BAR → **BI**	-.232	-.254	.045	***	
CTA → **BI**	.269	.155	.116	.021	
SI → **BI**	.141	.157	.045	.002	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.489[e]	na	na	.240
SUS → Q8.2	1.729	.674[e]	.295	***	.454
SUS → Q8.3	1.749	.814	.275	***	.663
SUS → Q8.4	1.019	.555[e]	.193	***	.308
SUS → Q8.5	1.369	.722	.226	***	.522
SUS → Q8.6	1.705	.707	.285	***	.500
SUS → Q8.7	1.830	.711	.305	***	.505
SUS → Q8.8	1.475	.584[e]	.272	***	.342
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.549[e]	na	na	.301
SEV → Q9.2	.641	.475[e]	.125	***	.266
SEV → Q9.3	.730	.477[e]	.141	***	.228
SEV → Q9.4	2.252	.867	.302	***	.752
SEV → Q9.5	2.217	.834	.302	***	.696
SEV → Q9.6	1.530	.668[e]	.235	***	.446
SEV → Q9.7	1.247	.616[e]	.202	***	.380
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.825	na	na	.681
BEN → Q10.2	1.032	.720	.097	***	.518
BEN → Q10.3	1.076	.682[e]	.108	***	.466
BEN → Q10.4	.994	.826	.076	***	.682
BEN → Q10.5	1.035	.798	.084	***	.637
BEN → Q10.6	1.124	.858	.081	***	.736
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.821	na	na	.675
BAR → Q11.2	.688	.501[e]	.103	***	.251
BAR → Q11.3	.893	.671[e]	.094	***	.450
BAR → Q11.4	1.062	.827	.085	***	.684
BAR → Q11.5	1.014	.838	.080	***	.702
BAR → Q11.6	.585	.495[e]	.089	***	.245
BAR → Q11.7	.923	.659[e]	.100	***	.434
BAR → Q11.8	.799	.622[e]	.093	***	.387
Cues to Action (CTA)					
CTA → Q12.1	1.000	.483[e]	na	na	.234
CTA → Q12.2	1.479	.731	.253	***	.534
CTA → Q12.3	1.677	.701	.292	***	.492
CTA → Q12.4	1.791	.846	.292	***	.715
Self- Identity (SI)					
SI → Q13.1	1.000	.902	na	na	.813
SI → Q13.2	1.045	.908	.062	***	.824
SI → Q13.3	.973	.838	.065	***	.702
Behavioural Intention (BI)					
BI → Q14.1	1.000	.805	na	na	.647
BI → Q14.2	1.081	.813	.087	***	.662
BI → Q14.3	.996	.755	.089	***	.570
RESULTS: Measures of fit: NFI= 0.640, TLI=0.711, CFI=0.734, RMSEA=0.099					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

e. Item with standardised loading below 0.7 and lower SMCC as candidate for deletion

Since the SEM for Model 1 did not meet the model fit criteria discussed above, the next step taken was to revise and modify the initial model. The consideration for selection of a candidate for deletion is based on two criteria. The first criteria based on the SMCC value below the minimum threshold of 0.3 and secondly, it is based on low standardised factor loading of less than 0.7. Meanwhile, at this stage, there are 16 items have been identified as suitable candidates for deletion. These include SUS→Q8.1, SUS→Q8.2, SUS→Q8.4, SUS→Q8.8, SEV→Q9.1, SEV→Q9.2, SEV→Q9.3, SEV→Q9.6, SEV→Q9.7, BEN→Q10.3, BAR→Q11.2, BAR→Q11.3, BAR→Q11.6, BAR→Q11.7, BAR→Q11.8 and CTA→Q12.1.

In the search for the improvement of the model fit, the model modification was done using a jack-knife approach. The approach is made when the full model already estimated, by removing individual items (Larwin and Harvey, 2012). The criteria for the deletion items was based on convention, which the indicator variables should have standardised coefficients of 0.7 or higher (Hoyle, 1995; Schumacker and Lomax, 2010). Meanwhile, the integrity of the model is maintained by limiting the deletion to ensure each construct in the model should have at least three items as the observed variables (Bagozzi, 1980).

SEM revised models

As the result of initial estimated SEM, the result did not achieve a good fit, further analysis has been conducted. In making the modification to the initial model, two revised models are discussed. The modification is made based on the justifications explained in the previous section which focused on items with low SMCC and low standardised factor loading. In addition, to improve model fit, covariance constraints were imposed on the measurement errors of items following examination of modification indices. Constraints were only imposed on items within the same construct if there was a theoretical justification. No covariance constraints were imposed on items across constructs due to a lack of theoretical reasoning.

8.5.2 SEM Model 2 (Cholesterol Lowering Margarine: User Group)

The consideration of replicating the similar step method which is conducted earlier in the Yoghurt Models is given to assess the Margarine Models. Particularly, the previous steps taken in the modification of the Yoghurt Model were initially tested to modify the Margarine model (i.e. impose covariance constraints first, rather than deleting the identified items with low standardised coefficients). Such a technique produces an improvement in Model 2 (Cholesterol Lowering Margarine User Group).

The specification of Model 2 (Cholesterol Lowering Margarine User Group) did not involve item deletion, despite the identification of potential items. The modification was based upon the use of covariance constraints on item measurement errors from an assessment of modification indices. Covariance constraints were imposed on some items. Covariance constraints were imposed on items in Perceived Susceptibility and Perceived Severity, Perceived Benefits, Perceived Barriers and Cues to Action whilst no covariance imposed on the Self-Identity based on no measurement errors found in the assessment of modification indices.

For the construct of Perceived Susceptibility, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value (SUS3↔ SUS1 = -.259), (SUS3↔ SUS2 = .198), (SUS4↔ SUS1 = .339), (SUS4↔ SUS3 = -.154), (SUS5↔ SUS2 = -.234), (SUS5↔ SUS3 = .185), (SUS5↔ SUS4 = .143), (SUS6↔ SUS2 = -.322), (SUS6↔ SUS3 = -.156), (SUS7↔ SUS1 = -.327), (SUS7↔ SUS2 = .329), (SUS7↔ SUS3 = .264), (SUS7↔ SUS4 = -.237), (SUS8↔ SUS3 = -.206), (SUS8↔ SUS5 = -.220), and (SUS8↔ SUS6 = .831).

For the construct of Perceived Severity, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (SEV2 ↔ SEV1 = .357), (SEV3 ↔ SEV1 = .260), (SEV3 ↔ SEV2 = .433), (SEV4 ↔ SEV2 = -.187), (SEV4 ↔ SEV3 = -.159), (SEV5 ↔ SEV2 = -.297), (SEV5 ↔ SEV3 = -.437), (SEV5 ↔ SEV4 = .493), (SEV6 ↔ SEV1 = -.229), (SEV6 ↔ SEV4 = -.244), (SEV7 ↔ SEV3 = .197), (SEV7 ↔ SEV4 = -.225), (SEV7 ↔ SEV5 = -.229) and (SEV7 ↔ SEV6 = .539).

For the construct of Perceived Benefits, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (BEN2 ↔ BEN1 = .342), (BEN3 ↔ BEN2 = .278), (BEN6 ↔ BEN2 = -.122) and (BEN6 ↔ BEN5 = .133).

For the construct of Perceived Barriers, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value (BAR5 ←→ BAR4 = .143), (BAR6 ←→ BAR1 = -.206), (BAR7 ←→ BAR6 = .375), (BAR8 ←→ BAR6 = .506) and (BAR8 ←→ BAR7 = .446).

For the construct of Cues to Action, pairwise covariance constraint was imposed on one measurement error which modification index exceeds a specified threshold value (CTA4 ←→ CTA1 = .173).

The justification for the use of the covariance constraint in the model is similar as being mentioned in the Yoghurt model modification before. It is based upon a suggestion by Gaskin (2012) by selecting the pair of items of modification indices in the same construct.

Hox and Bechger, (1998) suggested that the model fit could be improved by adding various covariance between error terms, which is based from modification indices. Theoretically, the minimum amount that the chi-square statistic is expected to decrease if the corresponding parameter is freed, indicated by the value of a modification index that could produce a larger improvement in fit. A covariance between items is done within the same construct only with a restriction to pair it between other constructs due to lack of theoretical justification. At the cost of one degree of freedom, freeing the parameters based on modification indices would improve the model fit, and a theoretical justification is evaluated post hoc (Hox and Bechger, 1998). As an example of the assessment result of modification indices, (BAR5 ←→ BAR4 = .143) suggests a positive relationship between items BAR5 and BAR4. Concisely, if (BAR5): consuming cholesterol lowering margarine would interfere with the respondent's daily routine, therefore, it would give more positive effect to BAR4: it would take too much effort to change the respondent's diet to include frequent consumption of cholesterol lowering margarine. This does make theoretical sense. Hence, the modification of the model is theoretically justified as the covariance is made between identified items in the same construct only.

The results are presented in Table 8.26. The model implies an improvement in the results of model fit indices. The measures reveal that NFI= 0.750, TLI=0.830, CFI=0.853 and RMSEA=0.076. NFI and TLI are lower than the minimum threshold of 0.9, whilst CFI approximates to reach a value of 0.9. RMSEA has achieved an acceptable value lower than the maximum threshold of 0.08 for a good fit. Therefore, the search for improvement in model fit led to further revision and modification.

Table 8-26 Structural Equation Model Estimates- SEM Model 2 Cholesterol Lowering Margarine (User Group)

CONSTRUCTS AND MEASURES	**Coefficients[a]**		**Standard Error[b]**	**Probability[c]**	**SMCC[d]**
	Unstandardised	*Standardised*			
SUS → **BI**	-.181	-.132	.106	.086	
SEV → **BI**	.095	.060	.099	.339	
BEN → **BI**	.781	.705	.132	***	
BAR → **BI**	-.213	-.254	.056	***	
CTA → **BI**	.414	.233	.174	.017	
SI → **BI**	.139	.164	.057	.015	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.594[e]	na	na	.352
SUS → Q8.2	1.323	.623[e]	.235	***	.388
SUS → Q8.3	1.264	.719	.238	***	.518
SUS → Q8.4	.923	.607[e]	.140	***	.369
SUS → Q8.5	1.074	.687	.168	***	.472
SUS → Q8.6	1.417	.714	.215	***	.509
SUS → Q8.7	1.338	.629[e]	.245	***	.395
SUS → Q8.8	1.157	.556[e]	.210	***	.309
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.543[e]	na	na	.295[e]
SEV → Q9.2	.842	.613[e]	.141	***	.376
SEV → Q9.3	1.117	.720	.200	***	.518
SEV → Q9.4	2.083	.791	.439	***	.625
SEV → Q9.5	2.035	.757	.409	***	.572
SEV → Q9.6	1.505	.649[e]	.278	***	.422
SEV → Q9.7	1.336	.650[e]	.289	***	.423
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.804	na	na	.647
BEN → Q10.2	.994	.679[e]	.077	***	.461
BEN → Q10.3	1.080	.668[e]	.115	***	.446
BEN → Q10.4	1.051	.851	.082	***	.724
BEN → Q10.5	1.065	.800	.091	***	.641
BEN → Q10.6	1.179	.877	.089	***	.769
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.848	na	na	.719
BAR → Q11.2	.672	.505[e]	.100	***	.255[e]
BAR → Q11.3	.870	.675	.091	***	.455
BAR → Q11.4	1.008	.811	.085	***	.658
BAR → Q11.5	.966	.824	.080	***	.679
BAR → Q11.6	.522	.458[e]	.091	***	.209[e]
BAR → Q11.7	.848	.625[e]	.098	***	.390
BAR → Q11.8	.726	.584[e]	.091	***	.340
Cues to Action (CTA)					
CTA → Q12.1	1.000	.446[e]	na	na	.199[e]
CTA → Q12.2	1.556	.709	.268	***	.502
CTA → Q12.3	1.805	.696	.343	***	.484
CTA → Q12.4	1.993	.867	.361	***	.752
Self- Identity (SI)					
SI → Q13.1	1.000	.903	na	na	.816
SI → Q13.2	1.043	.908	.061	***	.824
SI → Q13.3	.970	.837	.065	***	.701
Behavioural Intention (BI)					
BI → Q14.1	1.000	.761	na	na	.580
BI → Q14.2	1.121	.798	.081	***	.637
BI → Q14.3	.958	.687	.064	***	.472
RESULTS: Measures of fit: NFI= 0.750, TLI=0.830, CFI=0.853, RMSEA=0.076					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised
b. The standard error of estimated unstandardised coefficient
c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.
d. SMCC = squared multiple correlation coefficient
e. Item with standardised loading below 0.7 and lower SMCC as candidate for deletion

8.5.3 SEM Model 3 (Cholesterol Lowering Margarine: User Group)

In Model 3 seventeen items were deleted following the identification of an item with a low value of the SMCC and standardised coefficient. The process of deleting items with identification of low SMCC value was undertaken with very carefully as to ensure the integrity of the model is not compromised which criteria mentioned in past sections.

In the first round, based on the Model 2, there were four items identified with SMCC below than 0.3), SEV→Q9.1, BAR→Q11.2, BAR→Q11.6, and CTA→12.1. However, after items were deleted, the model fit is yet to achieve the required value. Following to this, the deletion process continues by utilising the same convention, however at this time only one item with the lowest SMCC value is selected for each round until model fit indices good acceptable value is met. Eventually, seventeen items have been deleted and the model evidenced the model fit (SUS→Q8.1, SUS→Q8.4, SUS→Q8.5, SUS→Q8.6, SUS→Q8.8, SEV→Q9.1, SEV→Q9.2, SEV→Q9.3, SEV→Q9.4, BEN→Q10.2, BEN→Q10.3, BAR→Q11.2, BAR→Q11.3, BAR→Q11.6, BAR→Q11.7, BAR→Q11.8 and CTA→Q12.1.

The deletion of selected seventeen items produces a new model (SEM Model 3) of 22 items, which has achieved an improvement in model fit. In summary, incremental fit indices indicate NFI=0.878, TLI=0.929 and CFI= 0.944. While the absolute fit index of RMSEA shows an acceptable good fit value of 0.065 which is below 0.080 of the maximum thresholds. Table 8.27 presents the results. Concisely, the result of the new revised model (Model 3) is considered has achieved the required model fit indices. Despite NFI is below the minimum threshold of 0.9, however, TLI and CFI are more relevant to explain the model fit in this case based upon the sample size consideration. According to Hooper et al., (2008), NFI suitable for an assessment of a sample size of N>200, whilst Tucker-Lewis index (TLI) suitable for simpler models, and Comparative Fit Index (CFI) is better to estimate the smaller sample size model. In this study, the sample size for the Cholesterol Lowering Margarine User Group N= 170, hence the result provides by TLI and CFI which have achieved the minimum good fit threshold is reasonable to conclude the assessment of the final model fit.

To further explain this result, the model is close to satisfying the acceptable model fit thresholds for NFI while the RMSEA achieves the required value below the maximum threshold. In relation to incremental fit indices, NFI index in this study did not achieve the acceptable threshold value, whilst TLI and CFI satisfy the good fit, therefore further modification of the model could be considered. However, in considering the fact that both incremental fit indices of TLI and CFI, together with RMSEA have achieved a good fit value, and in order to maintain the integrity of the model, no further deletion of items were made. In supporting this result, Marsh, et al., (2004) further argued the stringent model fit criteria established by Hu and Bentler (1999) that would also affect by different sample size used, i.e. when sample size is small (N<250), most of the combinational rules of model fit criteria have a slight tendency to over-reject true-population models under non-robustness condition.

In addition to that, McDonald (1985) suggested that the constructs should be represented by at least three items or variables. Therefore, based on this justification, the study has set at least 3 as the minimum number of items to properly represent each construct, hence, no further item deletion was considered in the SEM model 3 (22 items) as to maintain the model integrity, and the results obtained in the Model 3 are concluded as a final model. The result implies that the model's fit is good and acceptable.

Table 8-27 Structural Equation Model estimates- SEM Model 3 Cholesterol Lowering Margarine (User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	-.023	-.026	.057	.687	
SEV → **BI**	-.010	-.010	.063	.875	
BEN → **BI**	.769	.700	.137	***	
BAR → **BI**	-.133	-.185	.052	.010	
CTA → **BI**	.269	.239	.110	.014	
SI → **BI**	.143	.171	.058	.013	
Perceived Susceptibility (SUS)					
SUS → Q8.2	1.000	.733	na	na	.537
SUS → Q8.3	.966	.846	.104	***	.716
SUS → Q8.7	1.073	.784	.117	***	.614
Perceived Severity (SEV)					
SEV → Q9.5	1.000	.597	na	na	.356
SEV → Q9.6	1.321	.914	.286	***	.836
SEV → Q9.7	.887	.695	.122	***	.483
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.798	na	na	.637
BEN → Q10.4	1.060	.851	.084	***	.724
BEN → Q10.5	1.066	.795	.094	***	.632
BEN → Q10.6	1.192	.880	.091	***	.774
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.969	na	na	.939
BAR → Q11.4	.781	.718	.114	***	.515
BAR → Q11.5	.760	.741	.109	***	.550
Cues to Action (CTA)					
CTA → Q12.2	1.000	.709	na	na	.502
CTA → Q12.3	1.128	.676	.141	***	.458
CTA → Q12.4	1.293	.875	.138	***	.766
Self- Identity (SI)					
SI → Q13.1	1.000	.901	na	na	.811
SI → Q13.2	1.050	.911	.062	***	.830
SI → Q13.3	.972	.836	.066	***	.699
Behavioural Intention (BI)					
BI → Q14.1	1.000	.749	na	na	.561
BI → Q14.2	1.135	.795	.083	***	.632
BI → Q14.3	.981	.692	.065	***	.479
RESULTS: Measures of fit: NFI= 0.878, TLI=0.929, CFI=0.944, RMSEA=0.065					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised
b. The standard error of estimated unstandardised coefficient
c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.
d. SMCC = squared multiple correlation coefficient

Further explanation of these findings is supported by five justifications. First, the square multiple correlation coefficients (SMCC) in the structural model (EHBM Final Model Cholesterol Lowering Margarine User Group - 22 items) proved that variance exists for all three items in the dependent variable (Behavioural Intention). Meanwhile, SMCC also satisfies the minimum threshold of 0.3 for all independent variable items.

Second, in terms of the statistical significance of unstandardised path estimates in the structural model shows a very high significant result with the null hypothesis is rejected at the

0.001 level of significance for all three items in the dependent variable (Intention to consume Cholesterol Lowering Margarine).

Third, in terms of the statistical significance of unstandardised path estimates in the measurement model shows a very high significant result with the null hypothesis is rejected at the 0.001 level of significance for all 22 items in seven latent variables of EHBM constructs. In the analysis of unstandardised path coefficients in the structural model, the null hypothesis is rejected at the 0.001 level of significance in the case of one construct (Perceived Benefits) whilst another three constructs the null hypothesis is rejected at the 0.05 level of significance, $p < 0.05$ (Perceived Barriers, Cues to Action and Self-Identity). In contrast, for another, the two constructs of Perceived Susceptibility and Perceived Severity, the null hypothesis is accepted ($p > 0.05$).

Fourth, the magnitude of the standardised path estimates for all items in the seven EHBM constructs of Final Model 3 achieves a positive sign above the minimum value of 0.5.

Table 8-28 Summary of Measures of Fit Indices of the Structural Equation Models Cholesterol Lowering Margarine (User Group)

Measures-of-fit Indices		**Cut-off value**	**Results**		
			Model 1 **(Independence model)** 39 items	**Model 2** (Revised 39 items with covariance)	**Model 3** (Revised 22 items)
Absolute fit (Measures based on the population discrepancy)	RMSEA	**< 0.08**	0.099	0.076	**0.065**
Comparison to a baseline model: incremental fit indices/ comparative indices	NFI	**> 0.90**	0.640	0.750	**0.878**
	TLI	**> 0.90**	0.711	0.830	**0.929**
	CFI	**> 0.90**	0.734	0.853	**0.944**

In summary, eventually, SEM Model 3 has been established as a final model for Cholesterol Lowering Margarine User Group, in this study. Table 8.28 shows that the SEM model 3 has achieved an improvement as compared to the previous models.

8.5.4 Impacts of significant constructs on Behavioural Intention (Cholesterol Lowering Margarine: User Group)

Based on result of each of the final model in terms of the significant influences on Behavioural Intention and also, the relative importance of the impacts of all significant constructs on Behavioural Intention based upon the magnitude of the standardised regression coefficients, conclusions can be made that in the case of Cholesterol Lowering Margarine User Group, the significant influences in descending order of importance are Perceived Benefits (.700), Cues to Action (.239), Perceived Barriers (-.185) and Self-Identity (.171). These results are essential in the treatment of the marketing implications which further discussed in Chapter 9.

The next section explains the results in regard to the assessment of SEM Cholesterol Lowering Margarine Non-User Group.

8.5.5 SEM Model 1 (Cholesterol Lowering Margarine: Non-User Group)

Model 1 specifies the seven constructs of EHBM without the control variables. Table 8.25 presents the results. The results of model fit indices for Model 1 (NFI= 0.638, TLI=0.707, CFI=0.729, RMSEA=0.102) are not acceptable according to the model fit criteria. All incremental fit indices assessed i.e. NFI, TLI and CFI, do not achieve the minimum threshold of 0.9. The assessment of RMSEA also indicates the model is yet to fulfil model fit requirements.

The squared multiple correlation coefficients (SMCC) in the structural model (EHBM Model 1) prove that variance existed for all three items in the dependent variable (Behavioural Intention). Meanwhile, SMCC also satisfies the minimum threshold of 0.3 for all independent variable items except for nine items SUS→Q8.1 (0.172), SUS→Q8.4 (0.166), SEV→Q9.2 (0.294), BAR→Q11.2 (0.197), BAR→Q11.3 (0.181), BAR→Q11.6 (0.197) BAR→Q11.7 (0.109), BAR→Q11.8 (0.060), and CTA→Q12.1 (0.273).

Table 8-29 Structural Equation Model Estimates-SEM Model 1 Cholesterol Lowering Margarine (Non-User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	.558	.211	.186	.003	
SEV → **BI**	-.463	-.373	.088	***	
BEN → **BI**	.225	-.246	.088	.004	
BAR → **BI**	-.074	-.051	.083	.376	
CTA → **BI**	1.929	1.243	.273	***	
SI → **BI**	-.017	-.018	.048	.730	
AGE → **BI**	-.068	-.082	.034	.045	
EDUCATION → **BI**	.008	.009	.034	.821	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.415[e]	na	na	.172
SUS → Q8.2	1.731	.621[e]	.350	***	.385
SUS → Q8.3	2.054	.746	.389	***	.557
SUS → Q8.4	.907	.408[e]	.227	***	.166
SUS → Q8.5	1.524	.704	.294	***	.495
SUS → Q8.6	2.903	.842	.531	***	.708
SUS → Q8.7	2.274	.691[e]	.442	***	.478
SUS → Q8.8	2.711	.795	.504	***	.632
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.720	na	na	.518
SEV → Q9.2	.545	.542[e]	.081	***	.294
SEV → Q9.3	.691	.585[e]	.096	***	.342
SEV → Q9.4	1.274	.747	.139	***	.557
SEV → Q9.5	1.374	.745	.150	***	.555
SEV → Q9.6	1.197	.720	.135	***	.519
SEV → Q9.7	.967	.643[e]	.122	***	.414
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.922	na	na	.850
BEN → Q10.2	.961	.824	.060	***	.679
BEN → Q10.3	.816	.700	.070	***	.490
BEN → Q10.4	1.004	.872	.055	***	.761
BEN → Q10.5	.997	.889	.052	***	.790
BEN → Q10.6	1.002	.903	.050	***	.816
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.598[e]	na	na	.358
BAR → Q11.2	.836	.444[e]	.168	***	.197
BAR → Q11.3	.715	.426[e]	.149	***	.181
BAR → Q11.4	1.457	.833	.190	***	.694
BAR → Q11.5	1.236	.779	.165	***	.607
BAR → Q11.6	.628	.443[e]	.127	***	.197
BAR → Q11.7	.612	.330[e]	.160	***	.109
BAR → Q11.8	.408	.246[e]	.140	***	.060
Cues to Action (CTA)					
CTA → Q12.1	1.000	.523[e]	na	na	.273
CTA → Q12.2	1.248	.737	.180	***	.543
CTA → Q12.3	1.384	.752	.198	***	.566
CTA → Q12.4	1.365	.788	.190	***	.620
Self- Identity (SI)					
SI → Q13.1	1.000	.889	na	na	.789
SI → Q13.2	1.109	.994	.051	***	.988
SI → Q13.3	.970	.864	.057	***	.747
Behavioural Intention (BI)					
BI → Q14.1	1.000	.923	na	na	.851
BI → Q14.2	1.000	.893	.052	***	.797
BI → Q14.3	1.003	.930	.046	***	.866
RESULTS: Measures of fit: NFI= 0.638, TLI=0.707, CFI=0.729, RMSEA=0.102					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

e. Item with standardised loading below 0.7 and lower SMCC as candidate for deletion

Since the SEM for Model 1 did not meet the model fit criteria discussed above, the next step taken was to revise and modify the initial model. The consideration for selection of a candidate for deletion is based on two criteria. The first criteria based on the SMCC value below the minimum threshold of 0.3 and secondly, it is based on low standardised factor loading of less than 0.7. Meanwhile, at this stage, there are 14 items have been identified as suitable candidates for deletion. These include SUS→Q8.1, SUS→Q8.2, SUS→Q8.4, SUS→Q8.7, SEV→Q9.2, SEV→Q9.3, SEV→Q9.7, BAR→Q11.1, BAR→Q11.2, BAR→Q11.3, BAR→Q11.6, BAR→Q11.7, BAR→Q11.8 and CTA→Q12.1.

In the search for the improvement of the model fit, the model modification was done using a jack-knife approach. The approach is made when the full model already estimated, by removing individual items (Larwin and Harvey, 2012). The criteria for the deletion items was based on convention, which the indicator variables should have standardised coefficients of 0.7 or higher (Hoyle, 1995; Schumacker and Lomax, 2010). Thus, items with a standardised coefficient value less than 0.7 would be considered as a candidate for deletion. Meanwhile, the integrity of the model is maintained by limiting the deletion to ensure each construct in the model should have at least three items as the observed variables (Bagozzi, 1980).

SEM revised models

As the result of initial estimated SEM, the result did not achieve a good fit, further analysis has been conducted. In making the modification to the initial model, two revised models are discussed. The modification is made based on the justifications explained in the previous section which focused on items with low SMCC and low standardised factor loading. In addition, to improve model fit, covariance constraints were imposed on the measurement errors of items following examination of modification indices. Constraints were only imposed on items within the same construct if there was a theoretical justification (Gaskin, 2012). No covariance constraints were imposed on items across constructs due to a lack of theoretical reasoning.

8.5.6 SEM Model 2 (Cholesterol Lowering Margarine: Non-User Group)

The consideration of replicating the similar step method which was conducted earlier in the previous models is given to assess the Cholesterol Lowering Margarine- the Non-User Group model. Particularly, the previous steps taken in the modification of the Yoghurt with Live Cultures Model (User Group and Non-User Group) were initially tested to modify the

Cholesterol Lowering Margarine model- the Non-User Group (i.e. impose covariance constraints first, rather than deleting the identified items with low SMCC and low standardised coefficients). Such technique produces improvement on the Model 2 (Cholesterol Lowering Margarine- the Non-User Group).

The specification of Model 2 (Cholesterol Lowering Margarine- the Non-User Group) did not involve item deletion, despite the identification of potential items. The modification was based upon the use of covariance constraints on item measurement errors from an assessment of modification indices. Covariance constraints were imposed on some items. Covariance constraints were imposed on items in Perceived Susceptibility and Perceived Severity, Perceived Benefits, Perceived Barriers and Cues to Action whilst no covariance imposed on the Self-Identity with the basis of no measurement errors found in the assessment of modification indices.

For the construct of Perceived Susceptibility, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value SUS2←→ SUS1 = .361, (SUS3←→ SUS2 = .247), (SUS4←→ SUS1 = .370), (SUS5←→ SUS1 = .161), (SUS5←→ SUS3 = .326), (SUS5←→ SUS4 = .150), (SUS6←→ SUS2 = -.282), (SUS6←→ SUS3 = -.218), (SUS6←→ SUS5 = -.144), (SUS7←→ SUS1 = -.425), (SUS7←→ SUS2 = .374), (SUS7←→ SUS3 = .393), (SUS7←→ SUS4 = -.350), (SUS8←→ SUS1 = -.216), (SUS8←→ SUS2 = -.347), (SUS8←→ SUS3 = -.321), (SUS8←→ SUS5 = -.215) and (SUS8←→ SUS6 = .688).

For the construct of Perceived Severity, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (SEV2 ←→ SEV1 = .229), (SEV3 ←→ SEV1 = .299), (SEV3 ←→ SEV2 = .331), (SEV4 ←→ SEV2 = -.278), (SEV5 ←→ SEV1 = -.285), (SEV5 ←→ SEV2 = -.389, (SEV5 ←→ SEV3 = -.396), (SEV5 ←→ SEV4 = 1.442), (SEV6 ←→ SEV4 = -.365), (SEV7 ←→ SEV4 = -.423), (SEV7 ←→ SEV5 = -.504), and (SEV7 ←→ SEV6 =.808).

For the construct of Perceived Benefits, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value, (BEN2 ←→ BEN1 = .313), (BEN4 ←→ BEN2 = -.118), (BEN5 ←→ BEN1 = -.077), (BEN5 ←→ BEN2 = -.137), (BEN6 ←→ BEN1 = -.083), (BEN6 ←→ BEN2 = -.135) and (BEN6 ←→ BEN5 = .177).

For the construct of Perceived Barriers, pairwise covariance constraints were imposed on the measurement errors which modification indices exceed a specified threshold value (BAR7 ←→ BAR2 = .395), (BAR7 ←→ BAR5 = -.259), (BAR8 ←→ BAR1 = .356), (BAR8 ←→ BAR3 = .479) and (BAR8 ←→ BAR5 = -.347).

For the construct of Cues to Action, pairwise covariance constraint was imposed on one measurement error which modification index exceeds a specified threshold value (CTA2 ←→ CTA1 = .432), (CTA3 ←→ CTA1 = .586), (CTA3 ←→ CTA2 = .341), (CTA4 ←→ CTA1 = .313), (CTA4 ←→ CTA2 = .637) and (CTA4 ←→ CTA3 = .476).

The justification for the use of the covariance constraint in the model is similar to the modification of Yoghurt with Live Cultures models (User Group and Non-User Group) as well as Cholesterol Lowering Margarine models (User Group). It is based upon a suggestion by Gaskin (2012) by selecting the pair of items of modification indices in the same construct.

Hox and Bechger, (1998) suggested that the model fit could be improved by adding various covariance between error terms, which is based from modification indices. Theoretically, the minimum amount that the chi-square statistic is expected to decrease if the corresponding parameter is freed, indicated by the value of a modification index that could produce a larger improvement in fit. A covariance between items is done within the same construct only with a restriction to pair it between other constructs due to lack of theoretical justification. At the cost of one degree of freedom, freeing the parameters based on modification indices would improve the model fit, and a theoretical justification is evaluated post hoc (Hox and Bechger, 1998).

The results are presented in Table 8.30. The model implies an improvement in the results of model fit indices. The measures reveal that NFI= 0.765, TLI=0.846, CFI=0.867, RMSEA=0.074. NFI and TLI are lower than the minimum threshold of 0.9, whilst CFI approximates to reach a value of 0.9. RMSEA has achieved an acceptable value lower than the maximum threshold of 0.08 for a good fit. Therefore, the search for improvement in model fit led to further revision and modification.

Table 8-30 Structural Equation Model estimates- SEM Model 2 Cholesterol Lowering Margarine (Non-User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	.353	.139	.301	.241	
SEV → **BI**	-.418	-.384	.136	.002	
BEN → **BI**	-.455	-.447	.178	.011	
BAR → **BI**	-.138	-.097	.146	.345	
CTA → **BI**	2.317	1.398	.429	***	
SI → **BI**	.028	.031	.087	.750	
AGE → **BI**	-.080	-.098	.043	.063	
EDUCATION → **BI**	-.059	-.072	.043	.174	
Perceived Susceptibility (SUS)					
SUS → Q8.1	1.000	.424	na	na	.180
SUS → Q8.2	1.527	.561	.345	***	.315
SUS → Q8.3	1.532	.571	.389	***	.326
SUS → Q8.4	1.001	.456	.219	***	.208
SUS → Q8.5	1.551	.729	.337	***	.532
SUS → Q8.6	2.733	.805	.609	***	.648
SUS → Q8.7	2.115	.643	.517	***	.413
SUS → Q8.8	2.670	.796	.603	***	.634
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.798	na	na	.638
SEV → Q9.2	.616	.682	.085	***	.465
SEV → Q9.3	.671	.629	.088	***	.395
SEV → Q9.4	.970	.631	.163	***	.398
SEV → Q9.5	1.331	.799	.187	***	.639
SEV → Q9.6	.946	.631	.147	***	.399
SEV → Q9.7	.821	.606	.139	***	.368
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.916	na	na	.839
BEN → Q10.2	.938	.799	.055	***	.639
BEN → Q10.3	.821	.700	.074	***	.490
BEN → Q10.4	1.022	.882	.064	***	.779
BEN → Q10.5	.993	.880	.059	***	.774
BEN → Q10.6	1.007	.903	.057	***	.815
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.592	na	na	.350
BAR → Q11.2	.811	.426	.170	***	.182
BAR → Q11.3	.698	.411	.150	***	.169
BAR → Q11.4	1.443	.816	.190	***	.666
BAR → Q11.5	1.299	.811	.173	***	.658
BAR → Q11.6	.650	.454	.128	***	.206
BAR → Q11.7	.660	.353	.171	***	.125
BAR → Q11.8	.435	.261	.144	.002	.068
Cues to Action (CTA)					
CTA → Q12.1	1.000	.477	na	na	.228
CTA → Q12.2	1.240	.669	.169	***	.447
CTA → Q12.3	1.439	.713	.185	***	.509
CTA → Q12.4	1.382	.728	.190	***	.530
Self- Identity (SI)					
SI → Q13.1	1.000	.889	na	na	.790
SI → Q13.2	1.109	.994	.051	***	.988
SI → Q13.3	.970	.864	.057	***	.747
Behavioural Intention (BI)					
BI → Q14.1	1.000	.913	na	na	.834
BI → Q14.2	1.027	.907	.063	***	.824
BI → Q14.3	1.008	.926	.044	***	.857
RESULTS: Measures of fit: NFI= 0.765, TLI=0.846, CFI=0.867, RMSEA=0.074					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

8.5.7 SEM Model 3 (Cholesterol Lowering Margarine: Non-User Group)

The deletion of ten items creates Model 3. The basis of the deletion is justified by low SMCC and standardised coefficient value (Gaskin, 2012). The deletion processes were undertaken with very carefully as to ensure the integrity of the model is not compromised. Several attempts have been made in search for the best model fit by deleting several numbers of identifying items, and finally selected ten items to be deleted were identified.

The ten items deleted were SUS→Q8.1, SUS→Q8.2, SUS→Q8.4, SUS→Q8.7, BAR→Q11.2, BAR→Q11.3, BAR→Q11.6, BAR→Q11.7, BAR→Q11.8 and CTA→Q12.1.

The deletion of selected ten items produces a new model (SEM Model 3) of 29 items, which has achieved an improvement in model fit. In summary, incremental fit indices indicate the value of NFI= 0.847, TLI=0.907, and CFI=0.923. While the absolute fit index of RMSEA shows an acceptable good fit value of 0.069 which is below 0.080 of the maximum thresholds. Table 8.31 presents the results. Concisely, the result of the new revised model (Model 3) is considered has achieved the required model fit indices. Despite NFI is below the minimum threshold of 0.9, however, TLI and CFI are more relevant to explain the model fit in this case based upon the sample size consideration. According to Hooper et al., (2008), NFI suitable for an assessment of a sample size of N>200, whilst Tucker-Lewis index (TLI) suitable for simpler models, and Comparative Fit Index (CFI) is better to estimate the smaller sample size model. In this study, the sample size for the Cholesterol Lowering Margarine (Non-User Group) N= 175, hence the result provides by TLI and CFI which have achieved the minimum good fit threshold is reasonable to conclude the assessment of the final model fitness.

To further explain this result, the model is close to satisfying the acceptable model fit thresholds for NFI while the RMSEA achieves the required value below the maximum threshold. In relation to incremental fit indices, NFI index in this study did not achieve the acceptable threshold value, whilst TLI and CFI satisfy the good fit, therefore further modification of the model could be considered. However, in considering the fact that both incremental fit indices of TLI and CFI, together with RMSEA have achieved a good fit value, and in order to maintain the integrity of the model, no further deletion of items were made despite some items produce of standardised coefficient value of below 0.7 in the Model 3, i.e. items of Perceived Severity. In supporting this result, Marsh, et al., (2004) further argued the stringent model fit criteria established by Hu and Bentler (1999) that would also affect by different sample size used, i.e. when sample size is small (N<250), most of the combinational rules of model fit criteria have a slight tendency to over-reject true-population models under non-robustness condition.

In addition, McDonald (1985) suggested that the constructs should be represented by at least three items or variables. Therefore, based on this justification, the study has set at least 3 as the minimum number of items to properly represent each construct, hence, no further item deletion was considered in the SEM model 3 (29 items) as to maintain the model integrity, and the results obtained in the Model 3 are concluded as a final model. The result implies that the model's fit is good and acceptable.

Table 8-31 Structural Equation Model Estimates- SEM Model 3 Cholesterol Lowering Margarine (Non-User Group)

CONSTRUCTS AND MEASURES	Coefficients[a]		Standard Error[b]	Probability[c]	SMCC[d]
	Unstandardised	*Standardised*			
SUS → **BI**	-.024	-.014	.191	.898	
SEV → **BI**	-.423	-.378	.142	.003	
BEN → **BI**	-.474	-.455	.187	.011	
BAR → **BI**	-.122	-.083	.162	.451	
CTA → **BI**	2.028	1.465	.300	***	
SI → **BI**	.058	.063	.092	.529	
AGE → **BI**	-.068	-.082	.043	.117	
EDUCATION → **BI**	.-.062	-.075	.044	.155	
Perceived Susceptibility (SUS)					
SUS → Q8.3	1.000	.549	na	na	.301
SUS → Q8.5	1.103	.762	.172	***	.581
SUS → Q8.6	2.196	.962	.286	***	.926
SUS → Q8.8	1.933	.856	.310	***	.733
Perceived Severity (SEV)					
SEV → Q9.1	1.000	.792	na	na	.627
SEV → Q9.2	.621	.681	.085	***	.464
SEV → Q9.3	.677	.630	.088	***	.396
SEV → Q9.4	.987	.636	.163	***	.405
SEV → Q9.5	1.350	.805	.188	***	.648
SEV → Q9.6	.954	.632	.145	***	.399
SEV → Q9.7	.827	.606	.138	***	.367
Perceived Benefits (BEN)					
BEN → Q10.1	1.000	.913	na	na	.834
BEN → Q10.2	.932	.792	.055	***	.628
BEN → Q10.3	.826	.702	.075	***	.493
BEN → Q10.4	1.028	.885	.064	***	.784
BEN → Q10.5	.991	.876	.059	***	.767
BEN → Q10.6	1.007	.899	.057	***	.809
Perceived Barriers (BAR)					
BAR → Q11.1	1.000	.583	na	na	.340
BAR → Q11.4	1.474	.821	.208	***	.675
BAR → Q11.5	1.340	.824	.189	***	.678
Cues to Action (CTA)					
CTA → Q12.2	1.000	.657	na	na	.432
CTA → Q12.3	1.181	.714	.104	***	.509
CTA → Q12.4	1.120	.719	.070	***	.517
Self- Identity (SI)					
SI → Q13.1	1.000	.887	na	na	.787
SI → Q13.2	1.113	.995	.051	***	.991
SI → Q13.3	.970	.863	.057	***	.745
Behavioural Intention (BI)					
BI → Q14.1	1.000	.930	na	na	.864
BI → Q14.2	.995	.894	.050	***	.800
BI → Q14.3	1.006	.941	.044	***	.886
RESULTS: Measures of fit: NFI= 0.847, TLI=0.907, CFI=0.923, RMSEA=0.069					

Notes:

a. Estimated regression coefficients: Unstandardised & Standardised

b. The standard error of estimated unstandardised coefficient

c. The probability of a t-value equal to or greater than the actual t value in a two-tailed test for significance of coefficient under the null hypothesis that the true value is zero. The symbol *** indicates that the null hypothesis is rejected at the 0.001 level of significance.

d. SMCC = squared multiple correlation coefficient

Further explanation of these findings is supported by five justifications. First, the square multiple correlation coefficients (SMCC) in the structural model (EHBM Final Model Cholesterol Lowering Margarine Non-User Group - 29 items) proved that variance exists for all three items in the dependent variable (Behavioural Intention). Meanwhile, SMCC also satisfies the minimum threshold of 0.3 for all independent variable items.

Second, in terms of the statistical significance of unstandardised path estimates in the structural model shows a very high significant result with the null hypothesis is rejected at the 0.001 level of significance for all three items in the dependent variable (Intention to consume Cholesterol Lowering Margarine).

Third, in terms of the statistical significance of unstandardised path estimates in the measurement model shows a very high significant result with the null hypothesis is rejected at the 0.001 level of significance for all 29 items in seven latent variables of EHBM constructs. In the analysis of unstandardised path coefficients in the structural model, the null hypothesis is rejected at the 0.001 level of significance in the case of one construct (Cues to Action) whilst another three constructs the null hypothesis is rejected at the 0.05 level of significance, $p < 0.05$ (Perceived Severity and Perceived Benefits). In contrast, for another, the three constructs of Perceived Susceptibility, Perceived Barrier and Self-Identity, the null hypothesis is accepted ($p > 0.05$). Similarly, in the assessment of control variables of Age and Education, the null hypothesis is accepted ($p > 0.05$).

Fourth, the magnitude of the standardised path estimates for all items in the seven EHBM constructs of Final Model 3 achieves a positive sign above the minimum value of 0.5.

Table 8-32 Summary of Measures of Fit Indices of the Structural Equation Models Cholesterol Lowering Margarine (the Non-User Group)

Measures-of-fit Indices		**Cut-off value**	**Results**		
			Model 1 **(Independence model)** 39 items	**Model 2** (Revised 39 items with covariance)	**Model 3** (Revised 29 items)
Absolute fit (Measures based on the population discrepancy)	RMSEA	**< 0.08**	0.102	0.074	**0.069**
Comparison to a baseline model: incremental fit indices/ comparative indices	NFI	**> 0.90**	0.638	0.765	**0.847**
	TLI	**> 0.90**	0.707	0.846	**0.907**
	CFI	**> 0.90**	0.729	0.867	**0.923**

In summary, eventually, SEM Model 3 has been established as a final model for Cholesterol Lowering Margarine (Non-User Group) in this study. Table 8.32 indicates the SEM model 3 has achieved an improvement as compared to the previous models. Therefore, the analysis of hypotheses in the final Model 3 is discussed in Section 8.6.

8.5.8 Impacts of significant constructs on Behavioural Intention (Cholesterol Lowering Margarine: Non-User Group)

Based on result of each of the final model in terms of the significant influences on Behavioural Intention and also, the relative importance of the impacts of all significant constructs on Behavioural Intention based upon the magnitude of the standardised regression coefficients, conclusions can be made that in the case of Cholesterol Lowering Margarine: Non-User Group, the significant influences in descending order of importance are Cues to Action (1.465) and Perceived Severity (-.378). In this case, despite the negative magnitude of Perceived Severity contradicts with the initial hypothesis of positive magnitude, the result is significant (p=.003), thus provide a signal to marketers. Nevertheless, the emphasis in this study is given to the hypothesis developed. These results are essential in the treatment of the marketing implications which further discussed in Chapter 9.

8.6 Test of Hypotheses

As the structural models have satisfied the minimum threshold of the goodness of fit indices, the following analysis focuses on tests of the nine hypotheses for the two product models. All the tests are based upon the sign and significance of relevant unstandardized path coefficients between the construct and Behavioural Intention and are conducted using a five percent significance level. The test is conducted for each model and an overall conclusion is presented for the set of models. Table 8.33 presents the results of the structural model for the coefficients of the paths in the models (User Group vs Non-User Group) for the Yoghurt with Live Cultures, whilst Table 8.34 presents the results of the structural model for the coefficients of the paths in the models (User Group vs Non-User Group) for the Cholesterol Lowering Margarine.

Table 8-33 SEM Structural Final Model Results of Yoghurt with Live Cultures (User Group vs Non-User Group)

Hypothesis and magnitude relationship		**Unstandardised estimates and P value**						**Summary of overall results**
		Yoghurt with Live Cultures *(User Group)*			Yoghurt with Live Cultures *(Non-User Group)*			
Main EHBM constructs		Unstandardised estimates	P value	*Result*	Unstandardised estimates	P value	*Result*	
H_1 SUS → BI	+	.254	***	Supported	-.009	.944	Not supported	**Partially supported**
H_2 SEV→ BI	+	-.037	.532	Not supported	-.307	.105	Not supported	**Not supported**
H_3 BEN → BI	+	.538	***	Supported	.423	***	Supported	**Fully supported**
H_4 BAR → BI	**-**	-.256	***	Supported	-.883	*	Supported	**Fully supported**
H_5 CTA → BI	+	.135	**	Supported	.579	***	Supported	**Fully supported**
H_6 SI → BI	+	.168	***	Supported	.085	.357	Not supported	**Partially supported**
Control variables								
H_7 Gender → BI	**0**	.057	.550	Not supported	NA	NA	NA	**Not supported**
H_8 Age → BI	**0**	NA	NA	NA	NA	NA	NA	**Not supported**
H_9 Education → BI	**0**	NA	NA	NA	NA	NA	NA	**Not supported**

Table 8-34 SEM Structural Final Models Results of Cholesterol Lowering Margarine (User Group vs Non-User Group)

Hypothesis and magnitude relationship		**Unstandardised estimates and P value**						**Summary of overall results**
		Cholesterol Lowering Margarine *(User Group)*			Cholesterol Lowering Margarine *(Non-User Group)*			
Main EHBM constructs		Unstandardised estimates	P value	*Result*	Unstandardised estimates	P value	*Result*	
H_1 SUS → BI	+	-.023	0.687	Not supported	-.024	.898	Not supported	**Not supported**
H_2 SEV→ BI	+	-.010	.875	Not supported	-.423	**	Not supported	**Not supported**
H_3 BEN →BI	+	.769	***	Supported	-.474	*	Not supported	**Partially supported**
H_4 BAR →BI	-	-.133	**	Supported	-.122	.451	Not supported	**Partially supported**
H_5 CTA →BI	+	.269	*	Supported	2.028	***	Supported	**Fully supported**
H_6 SI →BI	+	.143	*	Supported	.058	.529	Not supported	**Partially supported**
Control variables								
H_7 Gender → BI	**0**	NA	NA	NA	NA	NA	NA	**Not supported**
H_8 Age → BI	**0**	NA	NA	NA	-.068	.117	Not supported	**Not supported**
H_9 Education → BI	**0**	NA	NA	NA	-.062	.155	Not supported	**Not supported**

Hypothesis H1: Perceived Susceptibility has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

The results of SEM Yoghurt with Live Cultures product models, the path SUS→BI is statistically significant at the level of $p<0.001$ for the User Group, whilst not significant for the Non-User Group ($p>0.05$). Therefore, the hypothesis H1 is partially supported.

In the context of Cholesterol Lowering Margarine product model, for both the User Group and the Non-User Group the path SUS→BI is not statistically significant ($p>0.05$). Therefore, the hypothesis H1 is not supported.

Hypothesis H2: Perceived Severity has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

In relation to the results of SEM Yoghurt with Live Cultures product models, it reveals that for both the User Group and the Non-User Group, the path SEV (BI is not statistically significant (p>0.05). Therefore, the hypothesis H2 is not supported.

Similarly, in the context of Cholesterol Lowering Margarine product models, for both the User Group and the Non-User Group models, the path SEV→BI is not significant (p>0.05). Therefore, the hypothesis H2 is not supported.

Hypothesis H3: Perceived Benefits has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

For the Yoghurt with Live Cultures model the path BEN→BI is statistically significant and has the correct positive sign for both the User Group and the Non-User Group at the level of p<0.001. Hence, the hypothesis H3 is fully supported.

However, for the Cholesterol Lowering Margarine model the path BEN→BI is statistically significant for the User Group at the level of p<0.001. In the case of the Non-User Group, although the coefficient is statistically significant, it has a contradictory negative sign. Hence, the hypothesis H3 is partially supported.

Hypothesis H4: Perceived Barriers have a negative effect on Behavioural Intention (intention to purchase and consume functional foods).

In the context of Yoghurt with Live Cultures, for both models (User Group and Non-User Group) the path BAR→BI is statistically significant and has the correct negative sign. The User Group indicates significant at the level of p<0.001, whilst the Non-User Group significant at the level of p<0.05. Therefore, the hypothesis H4 is fully supported.

Meanwhile, for Cholesterol Lowering Margarine models, the path BAR→BI is statistically significant at the level of p<0.01 and has the correct negative sign for the User Group only. Whilst the Non-User Group the result is not significant (p>0.05). Therefore, the hypothesis H4 is partially supported.

Hypothesis H5: Cues to Action has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

For both models of Yoghurt with Live Cultures (User Group vs Non-User Group), the path CTA→BI is statistically significant and has the correct positive sign. Precisely the User Group statistically significant at $p<0.01$, whilst for the Non-User Group statistically significant at $p<0.001$. Therefore, the hypothesis H5 is fully supported.

Similarly, both models of Cholesterol Lowering Margarine (User Group vs Non-User Group), the path CTA→BI is statistically significant and has the correct positive sign. Precisely the User Group statistically significant at $p<0.05$, whilst for the Non-User Group statistically significant at $p<0.001$. Therefore, the hypothesis H5 is fully supported.

Hypothesis H6: Self-Identity has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

For the Yoghurt with Live Cultures model the path SI (BI is statistically significant at $p<0.001$ and has the correct positive sign of the User Group only, whilst it is not significant ($p>0.05$) in relation to the Non-User Group. Hence, the hypothesis H6 is partially supported.

Similar results apply to the Cholesterol Lowering Margarine model. The path SI→BI is statistically significant at the level of $p<0.05$ and has the correct positive sign of the User Group only, whilst it is not significant in relation to the Non-User Group ($p>0.05$). Hence, the hypothesis H6 is partially supported.

Hypothesis H7: Females have a higher Behavioural Intention (intention to purchase and consume functional foods) compared to males.

In the assessment of Yoghurt with Live Cultures model, the control variable of Gender was included in the User Group only based on the preliminary MANOVA analysis. However, the result is not significant ($p>0.05$). Hence, the hypothesis H7 is not supported.

Whilst in the context of Cholesterol Lowering Margarine, the control variable of Gender was not included in either the User Group or the Non-User Group, which based on the preliminary MANOVA analysis. Hence, the hypothesis H7 is not supported by default.

Hypothesis H8: Older people have a higher Behavioural Intention (intention to purchase and consume functional foods).

In the Yoghurt model, the control variable of Age was not included in both the User Group and the Non-User Group following the preliminary MANOVA test. Hence, the hypothesis H8 is not supported by default.

However, for the Margarine model, the path Age→BI is only applied to the Non-User Group based on the preliminary MANOVA test. However, the SEM result indicates it is not statistically significant ($p>0.05$) and has a contradictory negative sign. Hence the hypothesis is not supported. Therefore, the conclusion over both group models is that the hypothesis H8 is not supported.

Hypothesis H9: Higher educated people have a higher Behavioural Intention (intention to purchase and consume functional foods).

For the Yoghurt model, the control variable of Education was not included following the preliminary MANOVA test. Hence, the hypothesis H9 is not supported by default.

However, for the Margarine model (Non-User Group) the path Education→BI is not statistically significant ($p>0.05$) and has a contradictory negative sign. Hence, the hypothesis H9 is not supported. Whilst this control variable is not applicable to the model of the User Group following to the result of the MANOVA test. Therefore, the conclusion over both models is that the hypothesis H9 is not supported.

In summary, the estimated models for Yoghurt with Live Cultures and Cholesterol Lowering Margarine and the results of the hypothesis tests provide support for the EHBM model. The result varies among different type products of functional food.

In the context of Yoghurt with Live Cultures, the assessment between the User Group vs the Non-User Group provides some interesting findings. Concisely, three of the nine hypotheses indicate significant relationships and are fully supported (i.e. Perceived Benefits, Perceived Barriers and Cues to Action are statistically significant), meanwhile, two hypotheses are partially supported (i.e. Perceived Susceptibility and Self-Identity are statistically significant for the User Group only). Whilst the test for another four hypotheses indicate the relationships are not significant and are not supported (i.e. Perceived Severity, Gender, Age and Education). In terms of hypothesis related to control variables, Gender is the only control variable that applicable in the SEM analysis of the User Group. Whilst none of the control variables applicable to the Non-User Group. The non-utilisation of the control variable is based upon the prior analysis of MANOVA, which proved there was no significant impact of the control variables to the dependent variable (Behavioural Intention) in the Non-User Group.

Whilst in the context of Cholesterol Lowering Margarine, the assessment of six EHBM independent constructs and three control variables between the User Group vs the Non-User Group provides significantly different effect to the dependent variables of Behavioural Intention. In particular, only one of the nine hypotheses have significant relationships and is fully supported for both the User Group and the Non-User Group (i.e. Cues to Action). Meanwhile, three constructs are partially supported (i.e. Perceived Benefits, Perceived Barriers and Self-Identity are statistically significant for the User Group only). In addition, another five hypotheses are not statistically significant ($p>0.05$). Precisely, Perceived Susceptibility and Perceived Severity are not significant for both groups (User Group and Non-User Group). The control variable of Gender also not significant for both groups (User Group and Non-User Group). Following to the significant result of the MANOVA test, the control variable of Age and Education were included in the SEM of Non-User Group, however both control variables have no significant effect to the Behavioural Intention.

8.7 Chapter Summary

Chapter Eight presents the results of structural equation modelling (SEM). The result suggests a mix of similarities and differences between the two functional foods in this study. For the model of Yoghurt with Live Cultures (User Group), the dependent variable (Behavioural Intention to consume Yoghurt with Live Cultures) is predicted by five factors that are Perceived Susceptibility, Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity thus, supporting H1, H3, H4, H5 and H6 only. The result of the Non-User Group indicated that only three factors have an effect, which comprising of Perceived Benefits, Perceived Barriers and Cues to Action, thus supporting H3, H4 and H5 only.

Whereas for the model of Cholesterol Lowering Margarine, the dependent variable (Behavioural Intention to consume Cholesterol Lowering Margarine) is predicted by four factors for the User Group. It comprises of Perceived Benefits, Perceived Barriers, Cues to

Action and Self-Identity thus, supporting H3, H4, H5 and H6 only. Such findings contradict with the Non-User Group which indicates only one factor of Cues to Action affects the Behavioural Intention, thus supporting H5. In relation to this, despite H2 ($p<0.01$) and H3 ($p<0.05$) have obtained the significant value, however, the magnitude of estimate values is negative hence they are not supported statistically. In addition, there is no support for the control variables being a significant determinant of Behavioural Intention to purchase and consume on both groups (User Group and Non-User Group). The study continues with a discussion of the results in the context of the existing literature in Chapter 9.

Chapter 9. Discussion

9.1 Introduction

This chapter presents the results of the estimated EHBM models and provides a discussion in the context of the hypotheses formulated in Chapter 3 and the current literature. The discussion is based on the estimated final models, which are summarised in Chapter 8. The discussion in this Chapter starts with Section 9.2, which elaborates the relationships between the EHBM constructs which are Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity and Behavioural Intention to purchase and consume functional foods. It also discusses the results of the hypotheses testing for all independent variables to the endogenous variable in the EHBM with regards to the current literature. Section 9.3 discusses the findings from testing the control variables (demographic characteristics) in relation to all the variables using MANOVA test between groups with a post hoc test. It also discusses the impact of the control variables on the endogenous construct (Behavioural Intention). Finally, this chapter concludes with a brief summary (Section 9.4).

9.2 Relationship between EHBM Constructs and Behavioural Intention

This section discusses the SEM findings in relation to the current literature.

9.2.1 The effect of Perceived Susceptibility on Behavioural Intention

H1: Perceived Susceptibility has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

<u>Results: Yoghurt with Live Cultures (User Group vs Non-User Group)</u>

The results supported the hypothesis for Yoghurt with Live Cultures (the User Group) whilst not supported for Yoghurt with Live Cultures (the Non-User Group). Thus, the result partially supported the hypothesis.

The result of Hypothesis 1, particularly for the Yoghurt with Live Cultures (the User Group) is in line with *a priori* expectations. In relation to Perceived Susceptibility, previous research has regarded Perceived Susceptibility to have significant impacts. For instance, Hsieh and Tsai (2013) focused HBM on telehealth and demonstrated that Perceived Susceptibility is one of health belief factors which have significant impacts on usage intention. Deshpande et al., (2009) showed an intention to consume a healthy diet is significantly predicted by Perceived Susceptibility. Nevertheless, previous research did not distinguish respondents based on consumption status (i.e. User Group vs Non-User Group). Hence, this study provides a new insight that the significant effect of Perceived Susceptibility towards Behavioural Intention is more applicable to existing users rather than non-user.

On the other hand, the results for Yoghurt with Live Culture (Non-User Group) indicate that Perceived Susceptibility does not have a significant positive effect on consumer intention to purchase and consume general types of functional foods. These results contradict previous related research.

A possible explanation for this contradictory result is due to the prevalence of behavioural perception over the threat of getting digestive system disease for consumers of Yoghurt with Live Cultures. This result indicates that current consumers have a low concern about the risk of suffering a problem with their general health as well as the risk of suffering a problem with their cardiovascular system. Both functional food products draw the same conclusion with no impact on consumers' Behavioural Intention.

Furthermore, this could be explained in the context of consumer behaviour such that consumers may not consider possible risk factors of specific diseases when deciding to consume functional food. However, descriptive statistics reveal that consumers appear to be aware of the relationship between disease and risk factors, as proven by the high means of Perceived Susceptibility, as presented in Chapter 6. However, the focus thoughts among consumer of potential health benefits of the product may divert their attention to give priority attention to the related risks as consequences from having diseases. To support this argument, as mentioned by Vassallo et al., (2009), the weak on influence of risk or threat perception (Perceived Susceptibility) variables may due to the consumption of functional foods among consumers does not reflect the specific motive to reduce the potential health threat.

Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)

In the case of Cholesterol Lowering Margarine, the results for both the User Group and the Non-User Groups show no support. Therefore, the hypothesis is not supported. The result indicates that the Non-User Group has a very little concern and knowledge of

Perceived Susceptibility. Some previous research has shown that Perceived Susceptibility may not influence food behaviour. For example, Kim et al., (2012) found that Perceived Susceptibility to diseases (i.e. osteoporosis, diabetes, CVD and obesity) did not affect college students' food behaviour. In this relation, the result suggests that young people in particular, may discount Perceived Susceptibility.

In a related development, the health properties of Cholesterol Lowering Margarine associated with its potential to reduce specific disease related to the cardiovascular system. In this regard, such insignificant result of Perceived Susceptibility to convince both users and non-user towards consuming this product provides some important insights, i.e. the intention of the existing population. The result may suggest that currently, the consumers collectively have a very low concern or awareness on susceptibility to a specific disease related and the potentiality of functional food for the reduction of the diseases. Thus, it is also a sign that the marketers seem yet to effectively utilise the element of Perceived Susceptibility in their marketing communications.

9.2.2 The effect of Perceived Severity on Behavioural Intention

H2: Perceived Severity has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

Results: Yoghurt with Live Cultures (User Group vs Non-User Group)

The hypothesis is not supported for the final model for both groups of population (User Group and Non-User Group) in this study. As such the hypothesis is not supported.

Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)

The result of the final model of the Cholesterol Lowering Margarine-User Group indicates the insignificant impact of Perceived Severity to Behavioural Intention. Meanwhile, for the Non-User Group, the relationship is significant, but has a contradictory negative sign, thus the hypothesis is not supported.

Comparison of results between the two products

The results indicate that Perceived Severity does not have a significant positive effect on Behavioural Intention for both products of Yoghurt with Live Cultures as well as

Cholesterol Lowering Margarine regardless of the sample population status (i.e. User Group or Non-User Group).

A plausible explanation for this result in both functional food products can be found from the existing marketing efforts. It is a reflection of ineffectiveness of marketers to properly utilise Perceived Severity elements in functional foods marketing approaches. Precisely, the marketers should have better knowledge about the related Perceived Severity, which focuses on severity in accordance with the health belief of an individual. Perceived Severity in this study emphasises the importance of being aware of the health consequences of not consuming the healthier functional food. In particular, Perceived Severity considered in two regards, i.e. severity of the general health of digestive system problem to influence the consumption of Yoghurt with Live Culture (a general type of functional food) and severity of the cardiovascular disease to influence the consumption of Cholesterol Lowering Margarine (a specific type of functional food).

The results in this study contrast with those of Mooney et al., (2001) which found Perceived Severity to positively influence college students' food consumption. Another previous study by Deshpande et al., (2009) also indicated a significant impact of Perceived Severity in influencing eating habits.

This study indicates that consumers do not link perceived severity with a specific medical problem such as cardiovascular (heart and circulatory) disease or a general health food such as probiotic yoghurt. This may reflect that consumers associate severe health problems with medicines and surgery rather than foods. Similarly, Hosseini et al. (2017) found an insignificant impact of Perceived Severity on the daily consumption of milk. In fact, consumers tend to pay greater attention to Perceived Severity related directly to diseases, rather than Perceived Severity associated with foods, i.e., which risks of disease would be reduced by a right selection of food intake. This has been supported based on research by Ma et al., (2013) which indicated a significant impact of Perceived Severity to influence women to undertake cervical cancer screening.

The result also may suggest that food is yet to be seen as a solution to severe medical problems. In other words, consumers in this study do not see widely functional foods as a preventative measure to avoid the risk of getting digestive system problems as well as cardiovascular diseases.

9.2.3 The effect of Perceived Benefits on Behavioural Intention

H3: Perceived Benefits has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

Results: Yoghurt with Live Cultures (User Group vs Non-User Group)

The results fully supported the hypothesis for both sample population groups (the User Group and the Non-User Group) in the study for Yoghurt with Live Cultures. The findings show that consumers' Perceived Benefits positively influences Behavioural Intention. However, the effect is stronger in the case of the User Group as opposed to the Non-User Group of the product.

These findings are in keeping with other academic studies. For instance, Dobrenova et al., (2015) found a link between the perceived benefits of probiotics in functional food product in Japan with the likelihood of the consumption. It also corroborates the study by Cazacu et al., (2014) that suggests positive impact of Perceived Benefits in regard to the purchase intention of water buffalo milk products in Greece. Rezai et al., (2014) also confirmed that Perceived Benefits positively impact on purchase intentions, in the case the synthetic functional foods in Malaysia.

Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)

In the case of Cholesterol Lowering Margarine, the relationship is significant for the User Group. The result for the User Group of Cholesterol Lowering Margarine in this study, is in line with the studies, i.e. Dobrenova et al., (2015), Cazacu et al., (2014) and Rezai et al., (2014), elaborated earlier.

Contrary to this, the assessment of the Non-User Group produces significant results, but with a contradictory negative sign, thus the hypothesis for the Non-User Group is not supported. For the Non-User Group, Perceived Benefits do not translate into Behavioural Intentions. This might due to the lack confidence among the Non-User Group about the health properties offered by Cholesterol Lowering Margarine.

Overall, the results suggest that consumers generally do not think about diseases that might possibly occur in their life, when deciding whether to consume functional food. Instead, they are giving priority to their current health individually, which is assumed to be in a good state, and the health values of the products which being promoted currently in the market (Vassallo et al., 2009). Specifically, the significant result applied for Yoghurt with Live Cultures in this study signifies that consumers are concerned about the potential general health benefit offered by the product rather than thinking about Perceived Susceptibility and Perceived Severity of the risks associated.

9.2.4 The effect of Perceived Barriers on Behavioural Intention

H4: Perceived Barriers have a negative effect on Behavioural Intention (intention to purchase and consume functional foods).

<u>Results: Yoghurt with Live Cultures (User Group vs Non-User Group)</u>

The result of Hypothesis 4 is in line with expectations, as the results indicate a significant and negative effect for both groups, i.e. the User Group and the Non-User Group of Yoghurt with Live Cultures. Hence Hypothesis 4 is fully supported that the negative effect of Perceived Barriers on Behavioural Intention is stronger for the Non-User Group of respondents.

Among the barriers identified in this study, which are captured by scale items in the construct, include: the product is not convenient, the consumers have to give up some of their favourite snacks, unappealing taste, too much effort to change diet, the interference with daily routine, risky for those who have food allergies, higher product price, and uncertainty regarding benefits. The taste element is well known as an important barrier identified in previous research, limiting the purchase of functional foods **(**Marina et al., 2014; Gajdos et al., 2015; Yu and Bogue 2013).

Higher Perceived Barriers reduce the consumption of healthy foods such as fruit, vegetables and fish, whilst making individuals more likely to switch to alternatives such as sugar-sweetened beverages and fast food. Generally, identified barriers have negatively impacted on customers' healthier food purchases (Kim et al., 2017). In addition, Deshpande et al., (2009) also corroborates the finding of significant impact of Perceived Barriers in the context of healthy eating behaviour.

The result in this study provides a signal for the industry players to improve the taste elements as to overcome the identified barriers. The results are also consistent with the study by Menozzi et al., (2017) where the impact of Barriers on Intention is significant in the context of eating novel foods. Identified barriers, including a sense of disgust, cultural differences and lack of product accessibility in the shops.

Overall, based on the significant impact of Perceived Barriers in both groups (the User Group and the Non-User Group) of Yoghurt with Live Cultures towards the Behavioural Intention, thus it is suggested the identified barriers should be given a high priority by all stakeholders to find possible ways to reduce the barriers as to enhance functional food product growth in the market.

Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)

In relation to Cholesterol Lowering Margarine, the results partially support hypothesis H4. Perceived Barriers significantly affect the Behavioural Intentions of the User Group only. Technically, the structural model results indicate that the negative impact is relatively higher for Cholesterol Lowering Margarine compared to Yoghurt with Live Cultures.

Comparison of results between the two products

The results are varied between the two products, i.e. Yoghurt with Live Cultures and Cholesterol Lowering Margarine. Precisely, the hypotheses of the effect of Perceived Barriers to Behavioural Intention are fully supported for Yoghurt with Live Cultures, whilst it is partially supported for the Cholesterol Lowering Margarine.

9.2.5 The effect of Cues to Action on Behavioural Intention

H5: Cues to Action has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

Results: Yoghurt with Live Cultures (User Group vs Non-User Group)

The results fully support the H5 regarding the positive effect of Cues to Action on Behavioural Intention to purchase and consume Yoghurt with Live Cultures in both the User Group and the Non-User Group. The positive effect of Cues to Action on Behavioural Intention is stronger in the case of the Non-User Group.

This result is reasonable as the Non-User group is assumed to have no prior experience in the consumption of Yoghurt with Live Cultures. In this case the reliance on testimonials from other individuals and authority figures would likely to have a greater impact than for individuals already buying the product.

The Cues to Action captured in the scale items in the construct include advice and suggestions from medical doctors, family members, mass media and friends. The results indicate that a higher level of Cues to Action positively impacts on intention to consume and purchase (Behavioural Intention) functional foods. Such individuals exhibit a high level of confidence in the information supplied by others, believing it to be reliable, whether from a doctor, family members, mass media and / or friends and colleagues (available in the research questionnaire Section VII, 12.1, 12.2, 12.3 and 12.4 respectively). This indicates the importance of the influence by other parties for individual (Burnkrant and Cousineau, 1975).

The results of this study suggest that Cues to Action positively affect Behavioural Intentions. This result indicates that consumers are motivated to acquire the same products that have been acknowledged by their social reference group members (Leigh and Gabel, 1992). In this study, the social reference groups referred to are doctors, family, friends and colleagues. Consequently, it appeared that consumption of such products can be stimulated by the recommendations of others. Wong and Ahuvia, (1998) suggested that a consumer's willingness to consume functional foods is partially affected by social networks and reference groups. A recent study by Broers et al., (2018) in the food context, corroborates the findings of this study, by confirming the significant impact of Cues to Action in stimulating vegetable choice. Whilst, Penafiel (2016) confirms the role of Cues to Action in the consumption of traditional foods. Finally, in this regard, Sekhon and Szmigin (2009) find that reference groups such as family members and ethnic community significantly influence purchase decision making. The significant positive impacts of the influence of family members and friends in this study confirms the findings of previous studies by Schnettler et al., (2015) and Patch et al., (2005). Thus, marketers should emphasize to this factor, especially by obtaining more positive testimonials related to the functional food products.

Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)

The result is fully supported for both groups i.e. the User Group and the Non-User Group, as Cues to Action positively affect Behavioural Intention to purchase and consume Cholesterol Lowering Margarine.

In comparing the impact between the two groups i.e. the User Group and the Non-User Group, the pattern is similar to the case of Yoghurt with Live Cultures. Specifically, the finding suggests that the impact of Cues to Action is greater for the Non-User Group compared to the User Group of Cholesterol Lowering Margarine. Similar to the case of Yoghurt with Live Cultures, such a finding is logical as the Non-User Group is more likely to be swayed by recommendations from others, such as family members, mass media and friend and colleagues than those who already consume the product and have "internalised" the advice.

This finding mirrors those of Deshpande et al., (2009), which indicated that Cues to Action significantly influence consumers' Behavioural Intention for a healthy diet. Given the significance of Cues to Action, a good marketing strategy for a specific type of functional food product should include testimonials from the identified reference groups (i.e. doctors, family, friends and colleagues) to convince potential consumers.

Comparison of results between the two products

The results fully support the positive effect of Cues to Action on Behavioural Intention for Yoghurt with Live Cultures as well as Cholesterol Lowering Margarine. The findings suggest that Cues to Action have a stronger effect in the case of Cholesterol Lowering Margarine rather than Yoghurt with Live Cultures. This may due to the focus of Cholesterol Lowering Margarine in reducing the risk of specific health problem (i.e. coronary heart disease) that requires reliable references for potential consumers prior to deciding. This is due to the disease prevention properties and its mechanism in reducing the risk of a specific disease such as coronary heart disease, which may be more complicated to understand than Yoghurt with Live Cultures. Hence, input from others are essential and crucial, i.e. doctor, family members, mass media and friend and colleagues.

9.2.6 The effect of Self-Identity on Behavioural Intention

H6: Self-Identity has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).

<u>Results: Yoghurt with Live Cultures (User Group vs Non-User Group)</u>

The final model results offer partial supported for H6. There is a significant positive relationship in the case of the User Group of Yoghurt with Live Cultures, but the relationship is not significant in the case of the Non-User Group.

The elements of Self-Identity that able to influence consumers' intention are reflected by scale items in the construct which include, "I am a person that concerned about the long-term health effects on my food choice", "I am a person generally thinks carefully about the health consequence of my food choice", "I think myself as a health-conscious person". In respect to this study, a healthy food consciousness of Self-Identity is emphasised which is described by three items in the construct. In reflection, Self-identity carries individual identity of "the salient part of the actor's self which relates to a particular behaviour" (Armitage and Conner, 1999, p. 73).

The significant result in the User Group indicates the ability of Self-Identity to influence consumer' intention to purchase and consume Yoghurt with Live Cultures, a general type of functional food. A parallel can be drawn with organic food, for which studies suggest that a 'green self-identity' positively fosters trust in organic food retailers (Khare and Pandey, 2017). In another related study self-identity also affects purchase behaviour for organic vegetables (Sparks and Shepherd, 1992). In a related context, Loebnitz et al. (2015), indicates that individuals with strong pro-environmental self-identities have stronger intentions to purchase fruits and vegetables.

Meanwhile, in understanding the insignificant of Self-Identity to effect Behavioural Intention among the Non-User group of Yoghurt with Live Cultures, the results indicate that there is no relationship between Self-Identity and Behavioural Intentions for the Non-User Group. It is indicated that the Self-Identity is yet to be effective to influence the non-user. This might due to the dimensions of Self-Identity investigated in this study are not relevant to the interest of the Non-User Group. The fact that the scale measurement of items in the construct of Self-Identity explores dimensions of individual acknowledgement about their health consciousness, i.e. "I am a person that concerned about the long-term health effects on my food choice", "I am a person generally thinks carefully about the health consequence of my food choice", "I think myself as a health-conscious person". Hence it is suggested that currently, this factor does not significantly affect the non-consumer Behavioural Intention. It is a signal that the current marketing approach is yet to be effective to stimulate health awareness among the non-user group, in particular.

<u>Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)</u>

The result indicates Self-Identity significantly affects Behavioural Intentions for the User Group of Cholesterol Lowering Margarine, a functional food that offer specific health properties for reducing the risk of getting coronary heart disease. In contrast, no such relationship is established for the Non-User Group. Hence, the hypothesis is partially supported.

<u>Comparison of results between the two products</u>

There is a positive effect of Self-Identity on Behavioural Intention, which applies to the User Group of both products in this study. The results also indicate that the effect is greater in the case of Yoghurt with Live Cultures than Cholesterol Lowering Margarine. This finding suggests that healthy food consciousness of Self-Identity is more effective for functional food types that promote health-promoting behaviour rather than illness-avoiding behaviour.

Meanwhile, the results for the Non-User Group are not significant for both products considered. Such results indicate that there could be some barriers that make it difficult for the non-user to translate a health-conscious Self-Identity into Behavioural Intentions for functional foods. These obstacles could have come in various forms such as a lack of nutrition knowledge, lack of confidence on the products' health properties, or facing financial difficulties in getting access to healthy food products.

9.3 The Effect of Control Variables on Behavioural Intention

The analysis of demographic factors is important as to better understand the background of who consumes functional foods, and why, particularly in the UK. Socio-demographic factors such as Gender, Age and Education were considered as control variables in the model.

9.3.1 Gender

H7: Females have a higher Behavioural Intention (intention to purchase and consume functional foods) compared to males.

Results: Yoghurt with Live Cultures (User Group vs Non-User Group)

The control variable of Gender was included in the model of Yoghurt with Live Cultures for the User Group, but was not included in the Non-User Group, following the result obtained from the preliminary MANOVA analysis. Nevertheless, further assessment in the SEM analysis indicates an insignificant result. Hence the hypothesis H7 is not supported.

Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)

The control variable of Gender was not included in either of the two models of the User Group and the Non-User Group on the basis of the preliminary MANOVA analysis. Hence the hypothesis H7 is not supported by default.

The finding in the study contradicts with selected past study. Precisely, Vecchione et al., (2015) found that females possess the intention towards consuming healthy food, i.e. products that not contain genetically modified substances. The insignificant result in this study indicates that females are yet to get adequate knowledge about the health properties of functional foods. Such problem could due to confusion among consumers to comprehend the differences between functional food products and ordinary foods, as none of the producers highlighted their products using the specific term of 'functional food' in the label. Hence, the marketers should improve their effort to penetrate the market by targeting females as it is proven that they are the most potential segment of consumers of healthy foods. The finding of this study also contradicts with previous study, which suggest a significant difference among gender towards the acceptance of functional foods. Particularly, females have higher positive intention (Vecchio et al., 2016; Kraus 2015a; Kraus 2015b; Hur and Jang, 2015;

Salleh et al., 2015; Brecic et al., 2014; Bechtold and Abdulai, 2014; Irene and Spiller, 2014; Ong et al., 2014; Loizou et al., 2013; Yu and Bogue, 2013; Krystallis and Chrysochou, 2012; Lalor et al., 2011a; Cranfield et al., 2011; Annunziata and Vecchio, 2010; and O'Connor and White, 2010).

9.3.2 Age

H8: Older people have a higher Behavioural Intention (intention to purchase and consume functional foods).

Results: Yoghurt with Live Cultures (User Group vs Non-User Group)

The control variable of Age was not included in either of the two models of the User Group and the Non-User Group of Yoghurt with Live Cultures, on the basis of the preliminary MANOVA analysis. Hence the hypothesis H8 is not supported by default.

Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)

The study classifies the respondent's age into 6 categories (i.e. 18-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years and 65 plus years). The control variable of Age was not included in the model of the User Group. However, it was included in the model for the non-user based on the outcome of the preliminary MANOVA analysis. Nevertheless, further assessment in the structural model of the Non-User Group, found the path Age→BI is not statistically significant and has a contradictory negative sign. Hence, the hypothesis is not supported. Therefore, the conclusion based on both models is that the Hypothesis H8 are not supported. This result contradicts with previous studies discussed, that suggests a significant difference between Age group on consumer behaviour, i.e. Vecchio et al., (2016); Stratton et al., (2015); Kraus (2015a); Kraus (2015b); Hur and Jang (2015); Collins and Bogue (2015); Salleh et al., (2015); Irene and Spiller (2014); Senadisai et al., (2014); Tobin et al., (2014); Büyükkaragoz et al., (2014); Bechtold and Abdulai (2014); Marina et al., (2014); Ong et al., (2014); Yu and Bogue (2013); Loizou et al., (2013); and Krystallis and Chrysochou (2012).

9.3.3 Education

H9: Higher educated people have a higher Behavioural Intention (intention to purchase and consume functional foods).

Results: Yoghurt with Live Cultures (User Group vs Non-User Group)

The study classifies respondents' education into six categories (i.e. no formal qualification, O Level/GCSE, Vocational qualification NVQ, A-Level, Bachelor degree and Masters/PhD). In the Yoghurt with Live Cultures model, the control variable of Education is not included following the preliminary MANOVA test. Hence, the hypothesis H9 is not supported by default.

Results: Cholesterol Lowering Margarine (User Group vs Non-User Group)

The result of preliminary MANOVA analysis justifies the inclusion of the control variable of Education in the Non-User Group model only, and not in the User Group model. The further SEM analysis found that the Cholesterol Lowering Margarine model of the Non-User Group, the path Education (BI is not statistically significant and has a contradictory negative sign. Hence the hypothesis is not supported. Therefore, the conclusion, from both models, i.e. the User Group and the Non-User Group, is that the Hypothesis H9 is not supported.

The insignificant result of the Cholesterol Lowering Margarine model (the Non-User Group) signifies higher levels of education are not associated with strong intentions to purchase and consume functional foods. The result in this study contradicts with previous studies discussed, which suggested a significant different between different level of Education towards the consumption of functional foods, i.e. Hung et al., (2016), Schnettler et al., (2015), Jezewska and Krolak (2015), Hur and Jang (2015), Kraus (2015b), Salleh et al., (2015), Irene and Spiller (2014), Bornkessel, Broring, Omta, and van Trijp (2014), Brecic et al., (2014), Büyükkaragoz et al., (2014), Bechtold and Abdulai (2014), Ong et al., (2014), Yu and Bogue (2013), Loizou et al., (2013), Krystallis and Chrysochou (2012).

In relation to this, the result of this study contrary to the study by La Barbera et al., (2016) that found the significant impact of the Education to functionalised product, i.e. tomatoes with lycopene. Nevertheless, the insignificant result of Education is in line with the study by Chambers and Lobb (2007) in the context of functional food products of soft fruit and lamb.

In a related development, the assessment of impact of Education towards functional foods in past studies provides mixed results. The findings related to education are mixed, for example, De Jong et al., (2003) suggested that higher educated consumers would more likely to consume functional foods. Nevertheless, Niva and Makela (2007) suggested that consumers with lower levels of education are more concerned and requested firmer rules on functional foods than those with higher levels.

In summary, the result of demographic factors in this study indicates that there are no significant impacts of Gender, Age and Education levels towards consumers' intention to purchase and consume functional foods. These findings concur with the previous study by Urala and Lahteenmaki (2003) found that socio-demographics such as Age, Gender and Education did not significantly influence the frequency of use of functional food products by Finnish consumers. Other previous findings by Verbeke (2005) also identified an insignificant impact of Age, Gender and Education on confidence and attitudes towards functional foods.

Verbeke (2005) found that psychological factors (i.e. Belief, knowledge and presence of an ill family member) outweighed socio-demographics (Gender, Age and Education) as potential determinants for consuming functional foods. Psychological factors seem to be more important than socio-demographic factors, which are captured in the EHBM. Segmenting the functional food market based on demographics is therefore likely to lead to a misleading picture.

9.4 Chapter Summary

This chapter discusses the hypotheses concerning the causal relationships between the constructs within the Extended Health Belief Model (EHBM). The assessment is divided into two groups, i.e. User Group and Non-User Group for each of the functional food products in this study.

With regard to the comparison between the User Group and the Non-User Group in the model of Yoghurt with Live Culture, the result shows of the nine hypotheses tested three were fully supported (H3, H4, and H5), two achieved partial support (H1, H6) and four were not supported (H2, H7, H8, H9). Two of the three control variables i.e. H8 and H9, were not applicable because the control variables were not specified in the original conceptual model.

In the case of Cholesterol Lowering Margarine, there was only one hypothesis fully supported (H5), and three were partially supported (H3, H4 and H6), and four were not supported (H1, H2, H8, H9). Hypothesis H7 (Gender) was not applicable or not supported because either control variable Gender was not specified in the conceptual model of both groups (the User Group and the Non-User Group). Generally, the model fits better for the User Group than the Non-User Group.

The results of the hypothesis tests were discussed in relation to the literature. The results vary according to the different group i.e. User Group vs Non-User Group in different types of functional food. The result of the final structural model of Yoghurt with Live Cultures (the User Group) reveals that the significant factors that influence intentions in the EHBM applied to functional foods that promote general health (Yoghurt with Live Cultures) consists of five factors i.e. Perceived Susceptibility, Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity. Meanwhile, in the case of Yoghurt with Live Cultures (the Non-User Group) only three factors i.e. Perceived Benefits, Perceived Barriers and Cues to Action appear to influence Behavioural Intentions.

With respect to the case of existing users of Cholesterol Lowering Margarine, four factors were identified to have a significant effect on Behavioural Intentions. The four significant factors are: Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity. Meanwhile, in the assessment of the Non-User Group of Cholesterol Lowering Margarine, it indicates a significant effect only on one factor which is Cues to Action. The insignificant results of Perceived Susceptibility and Perceived Severity echoes another study, which concluded that "framing messages and marketing efforts from a prevention perspective, encouraging people to avoid unhealthy foods to prevent future health problems may not result in the consumption of healthy alternatives. However, using creative marketing practices to promote the selection of healthy foods may increase consumption" (Bublitz and Peracchio, 2015, p. 2486)

The findings reveal that at present, EHBM constructs are more effective for understanding the User Group rather than the Non-User Group. This is as expected. From a marketing point of view, switching consumers from non-user to becoming users is an important objective. The study progresses to the presentation of conclusions in Chapter 10.

Chapter 10. Conclusions

10.1 Introduction

The aim of this chapter is to present the conclusions of the study. The chapter begins by providing a summary of findings in Section 10.2. Section 10.3 presents a summary of the tests of hypotheses. Next, the contributions of the study are presented in Section 10.4. Section 10.5 presents the key empirical and practical contributions for marketers. This is followed by Section 10.6 which provides recommendations for the improvement in marketing strategies by utilising the EHBM. Section 10.7 contains a discussion of the research gaps and contributions to the academic literature. Section 10.8 provides an explanation of the research limitations, whilst Section 10.9 describes the avenues for future research. Section 10.10 concludes the thesis.

10.2 Summary of Findings

While the market for functional foods has grown, many firms still struggle to formulate effective marketing strategies and tactics for these products, particularly to understand consumer behaviour, to influence and build relationships with customers (Heasman and Mellentin, 2001). The theme of this research is to understand consumer behaviour toward purchasing and consuming functional food products. The research formulates a structural equation model of the determinants of consumers' intentions to purchase and consume functional foods. The model is applied to the context of the UK and to two functional food categories. These are Yoghurt with Live Cultures for general health benefits and Cholesterol Lowering Margarine for specific health benefits to reduce the risk of getting cardiovascular disease. In the realisation of the research aim, the Health Belief Model (HBM) was chosen as the main framework to study consumers' behaviour towards functional foods. The selection of the HBM is justified as it proposes that an individual's motivation towards healthy behaviour i.e. consuming healthy foods will be stimulated by their perceptions of several factors such as, higher potential susceptibility to disease or illness, when a behavioural change (to purchase and consume functional foods) would reduce the potential risk associated to certain diseases. The five original constructs of the HBM were included as factors to determine consumers' behaviour towards purchasing and consuming functional foods. In this study, the original HBM was then enhanced by adding the construct of Self-Identity as an independent variable. Meanwhile, the original dependent variable of 'Action' was replaced by 'Behavioural Intention'. The enhancement of the HBM has created an Extended Health Belief Model (EHBM).

In this thesis, the empirical research thus examined the causal relationships between seven EHBM constructs: Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, Self-Identity and Behavioural Intention. Furthermore, the research involves the development of scales for each construct, adapted from previously verified studies. Each of these constructs was evaluated for desired measurement properties of internal consistency and measurement models were evaluated for convergent validity.

There are two research questions investigated in this study. The first question is associated with the determinants of consumers' acceptance/rejection of functional foods. The second research question is to investigate whether different types of functional foods with different population interest (User Group vs Non-User Group) provide equivalent results. Table 10.1 summarises the results of hypotheses testing.

Table 10-1 Results of the Test Hypotheses

Underpinning Theories	Variable		Hypotheses	Result
Independent variable	Perceived Susceptibility	H1	*Perceived Susceptibility has a positive effect on Behavioural Intentions (intention to purchase and consume functional foods).*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Partially supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Not supported**
The Health Belief Model (HBM)	Perceived Severity	H2	*Perceived Severity has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Not supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Not supported**
	Perceived Benefits	H3	*Perceived Benefits has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Fully supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Partially supported**
	Perceived Barriers	H4	*Perceived Barriers has a negative effect on Behavioural Intention (intention to purchase and consume functional foods).*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Fully supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Partially supported**
	Cues to Actions	H5	*Cues to Action has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Fully supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Fully supported**
Identity Theory	Self-Identity	H6	*Self-Identity has a positive effect on Behavioural Intention (intention to purchase and consume functional foods).*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Partially supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Partially supported**
Control variables	Gender	H7	*Females have a higher Behavioural Intention (intention to purchase and consume functional foods) compared to males.*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Not supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Not supported**
	Age	H8	*Older people have a higher Behavioural Intention (intention to purchase and consume functional foods).*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Not supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Not supported**
	Education	H9	*Higher educated people have a higher Behavioural Intention (intention to purchase and consume functional foods).*	Models of Yoghurt with Live Cultures (User Group vs Non-User Group) - **Not supported** Models of Cholesterol Lowering Margarine (User Group vs Non-User Group) - **Not supported**
Dependent variable **The Theory of Planned Behaviour (TPB)** **The Theory of Reasoned Action (TRA)**	Behavioural Intention			

The results indicate that Perceived Susceptibility has a significant impact for the Yoghurt (User Group) only, whilst not significant for the Yoghurt (Non-User Group), hence the hypothesis is partially supported. In contrast, in the case of Margarine models, the result implies there is no significant impact, in the case of both groups, i.e. User Group and Non-User Group, hence, the hypothesis is not supported. The second construct of the EHBM, which is Perceived Severity has no significant impact in both groups, i.e. User Group and Non-User Group, for both functional food products in this study, hence the hypothesis is not supported. Perceived Benefits has a significant impact on the case of both groups i.e. User Group and Non-User Group in the Yoghurt model, hence the hypothesis is fully supported. In the assessment of the Margarine model, there is a significant impact for the User Group only, but not in the Non-User Group, hence the hypothesis is partially supported. Meanwhile, Perceived Barriers has a significant impact for both groups in the Yoghurt model, hence the hypothesis is fully supported for this product category. However, margarine model results indicate that Perceived Barriers is only significant for the User Group, hence the hypothesis is partially supported. Interestingly, Cues to Action is the only construct that has a significant impact, in the case of all groups for both functional food products. Hence the hypothesis is fully supported for both products. The assessment of Self-Identity produces a similar result to both functional food products. Particularly, it has a significant impact for the User Group only, but not significant for the Non-User Group, hence the hypothesis is partially supported for both functional food products in the study.

The study attempts to find whether different types of functional foods have a common set of determinants of prediction intention to purchase and consume. This research assessed the application of EHBM in the context of two different categories of functional foods, i.e. a functional food product that promotes general health benefits and a functional food product that promotes specific health benefits. The results provide empirical evidence that different determinants are significant across functional food products.

The results are mixed across two different types of functional foods. In particular, for the general type of functional foods (Yoghurt with Live Cultures) the significant constructs in the User Group are Perceived Susceptibility, Perceived Benefits, Perceived Barriers, Cues to Action and Self-identity whilst Perceived Severity is not significant. The significant constructs in the Non-User Group are Perceived Benefits, Perceived Barriers, and Cues to Action only.

Meanwhile, for a specific type of functional foods that promotes specific health benefits (Cholesterol Lowering Margarine), the significant constructs in the User Group are Perceived Benefits, Perceived Barriers and Cues to Action and Self-Identity whilst Perceived Susceptibility and Perceived Severity, are not significant. In the Non-User Group analysis, the significant construct is Cues to Action only whilst other constructs i.e. Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers and Self-Identity are not significant.

10.3 Contributions of the Study

The study contributes on a number of grounds. Firstly, it develops a model for understanding consumer behaviour related to functional foods (EHBM). Secondly, this research empirically identified the antecedents of consumers' Behavioural Intention to purchase and consume functional foods. Finally, the research assesses the validity of the EHBM model in the context of two different types of functional foods. These contributions are further discussed below. Table 10.2 summarises the contributions of the study.

Food marketers face huge competitive challenges (Siro et al., 2008). Companies' competitiveness depends on an understanding of consumer behaviour that has changed rapidly in favour of healthier diets and lifestyles (Menrad, 2003). In this context, functional foods play a specific role to fulfil contemporary market demand.

In the context of food and health, since no previous consumer behaviour studies in the context of functional foods has utilised the perspective of the Health Belief Model, this research contributes by extending the initial model to be an Extended Health Belief Model (EHBM). In addition, the EHBM in this research has explored consumers' predictive behaviour into two different categories of functional foods.

Table 10-2 Contributions of the Study

I. Theoretical contributions to theories	Use of variables	Comments
Socio-Psychological Theories		
1. The Health Belief Model (HBM)	Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action	Extending the HBM model with the creation of an Extended Health Belief Model (EHBM). The EHBM integrates five independent variables of HBM with one independent construct of Self-Identity and one dependent variable of Behavioural Intention. The EHBM model assesses individual Behavioural Intention towards the purchase and consumption of two different types of functional foods. According to the knowledge of the researcher, this is the first comparative study undertaken in the context of two different types of functional foods utilising such model.
2. The Theory of Planned Behaviour (TPB) 3. The Theory of Reasoned Action (TRA)	Behavioural Intention (Attitudes towards the purchase and consumption of A. Functional food that offers general health properties-Yoghurt with Live Cultures B. Functional food that offers specific health properties-Cholesterol Lowering Margarine	
4. Identity Theory	Self-Identity	
II. Contribution to the Body of Knowledge (Quantitative)		
Relationships between six independent variables, i.e. Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity to effect Behavioural Intention		This validates the extant findings from Behavioural Intention experience in the UK functional foods context. Additional insights: There are significant findings for both different types of functional food products. A. Functional foods with general health properties i. Yoghurt with Live Cultures (User Group): 5 constructs significantly affected Behavioural Intention. The constructs are Perceived Susceptibility, Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity. ii. Yoghurt with Live Cultures (Non-User Group): 3 constructs significantly affected Behavioural Intention. The constructs are Perceived Benefits, Perceived Barriers, and Cues to Action. B. Functional foods with specific health properties i. Cholesterol Lowering Margarine (User Group): 4 constructs significantly affected Behavioural Intention. The constructs are Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity. ii. Cholesterol Lowering Margarine (Non-User Group): 1 construct significantly affected Behavioural Intention. The construct is Cues to Action.
III. Methodological Contributions		
Construct Measures Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action and Self-Identity to effect Behavioural Intention		New dimensions of measurement models were developed for these variables which are reliable and valid for two different types of functional foods.
III. Practical Contributions to Marketers		
Predictors to understand consumer behaviour		The significant predictors in the study to affect the Behavioural Intention of consumers can inform marketing strategy.

This research has successfully developed the measurement models for all seven constructs in the EHBM with significant results. For example, in this research, Perceived Susceptibility, adapted from Erkin and Ozsoy (2012) by modifying it according to the aspects of digestive systems health and cardiovascular health, new measurement items have been empirically established in this research. The items represent each EHBM construct in the measurement models provides a better understanding of the reasons for consumers' acceptance or rejection of functional foods.

10.4 The Key Empirical and Practical Contributions for Marketers

Since the EHBM models developed in this study have produced acceptable significant results (i.e. the measurement models and the structural models), these models are a good predictor in understanding consumers' behaviour, in relation to functional foods.

10.4.1 Marketing implications

The study identifies several constructs that significantly influence consumers' Behavioural Intention. For example, testing of hypotheses resulted in full support the proposed relationships between Perceived Barriers, Cues to Action and Behavioural Intention. Such findings indicate that marketers should give more attention to those significant constructs in their marketing communication activities involving functional food products.

In relation to this study, greater emphasis should be given to understand the current feedback of the Non-User Group as they are the potential consumers that would foster the growth of the functional foods market. The results of this study indicate that the number of significant constructs of EHBM among Non-User Groups in both functional food products is less than the User Group. For example, in the case of Cholesterol Lowering Margarine, only one construct of EHBM, i.e. Cues to Action has a significant effect to Behavioural Intention, whilst other constructs are not significant. Higher emphasis to Cues to Action would acknowledge the health properties contained in functional food products, thus might shift Non-User into User category.

The success of innovative products in the market such as functional foods need extensive research to understand consumers' behaviour (Schmalen, 2005). Hence, this study has explored current consumers' Behavioural Intentions as consumers think and act differently among different types of functional food products and their health claims. In addition, demographic factors do not play a significant role in affecting consumers' intentions.

Since the results of Perceived Susceptibility in this study partially supported the hypothesis for the Yoghurt User Group, while is not supported for both groups in the Cholesterol Lowering Margarine model, the results do not corroborate some previous related research. This suggests that marketers would have to consider improving the awareness through communication about the associated risks of related diseases. Cho et al., (2012) which applied the HBM to food safety beliefs found that when an individual had acquired higher knowledge of food safety, the Perceived Susceptibility and Perceived Severity towards foodborne illness are also higher. A similar approach by Cao et al., (2014) found that Perceived Susceptibility has a greater impact on health beliefs after students participated in a school health education programme. Based on these facts, marketers should extensively address health risk exposures in their marketing campaigns. To be more effective, it is proposed that marketers should focus on educating consumers through the communication of their susceptibility to certain health problems and consumption of a particular functional food can reduce the associated risks. For instance, for cholesterol lowering margarines this could be done by involving experts in cardiovascular disease to explain and verify about related susceptibility to the disease. In addition to that, the identified Non-User Group should be given more chances to experience the products as greater familiarity stimulates purchase intention (Song et al., 2018). Subsequently, a better consumption experience would make individuals more likely to be frequent customers.

Nevertheless, this research has successfully developed the measurement scales in the context of two different types of functional foods for the construct of Perceived Susceptibility adapted from Erkin and Ozsoy (2012). Since the HBM initial items were adapted from research in a different context which was on influenza, therefore by modifying it according to the contexts of digestive systems health and cardiovascular health, new measurements have been empirically tested.

In this study, Perceived Benefits has a significant impact on Behavioural Intention for Yoghurt with Live Cultures but does not have a significant effect in the case of the Cholesterol Lowering Margarine Non-User Group. In the case of Yoghurt with Live Cultures, Perceived Benefits has a high impact on Behavioural Intention for User Group. The significant result of Perceived Benefits in this study is keeping with previous research by Azpiazu et al., (1999) which “prevent disease” was the most frequently selected Perceived Benefits to healthy eating. In relation to this result, ethical considerations in accordance with the current regulations should be considered by marketers when communicating to consumers about the health benefits of consuming functional foods. In the UK, at the time of writing, marketers can deploy health claims approved by EFSA.

Consequently, the present study also makes a contribution, in identifying the ability of Perceived Benefits to influence consumers’ intention to purchase and consume the general type of functional foods (i.e. Yoghurt with Live Cultures), as it is significant for both groups i.e. User Group and Non-User Group. The newly developed measurement models of Perceived Benefits for both types of products in the present study also indicate the scales are reliable for further research in the similar context.

The study reveals that Perceived Barriers has a significant negative effect on Behavioural Intention for both types of functional foods. The significant negative impact is higher for Cholesterol Lowering Margarine than Yoghurt with Live Cultures. Therefore, in developing a marketing strategy, it would be useful to counter possible Perceived Barriers elements. The Perceived Barriers elements include taste, convenience, need to give up my favourite snacks, too much effort to change my diet, consumption would interfere with my daily routine, risky for those who are intolerant to dairy products/ having certain food allergies, the price is higher than alternative food products and uncertainty of the benefits. Effective means are needed to overcome identified Perceived Barriers. In this context, effective marketing communication tools should be employed for the success of such foods (Verschuren, 2002).

To solve these issues on consumers’ Perceived Barriers, it is suggested that a marketing campaign would be useful to educate the potential consumers to a better understanding on how to overcome these barriers by having a good knowledge on the health benefits provide by both types of functional foods, hence, would offset the negative notion on Perceived Barriers. For example, an effort to acknowledge scientifically the health claim of functional foods should be given utmost priority by producers. A robust understanding and confidence among consumer about the potential health benefits of the ingredients in functional foods would help to eliminate the Perceived Barriers, hence, would be the key to escalate the demand of these healthy foods.

In relation to the result in this study, the significant negative relationship between Perceived Barriers and Behavioural Intention adds novelty to the creation of a model of EHBM in this study. This includes the measurement models for both types of functional food products that proven as able to gain consumers' behaviour insight perspectives.

The results reveal that Cues to Action has a significant positive effect on the Behavioural Intention for both types of functional foods. In particular, the consumers' intention to purchase and consume functional foods is influenced by family, mass media and friends. Therefore, the marketer should focus on these platforms to deliver a comprehensive message.

It suggests the use of product referral schemes using conventional and social media, to stimulate consumers' intention. This finding indicates an endorsement of the importance of marketing communication.

A novel element of the Extended Health Belief Model (EHBM) is the inclusion of the construct Self-Identity. This newly integrated construct originates from the Identity Theory of Stryker and Burke (2000) and the role identity theory of McCall and Simmons (1978). This construct has also been used by Sparks and Guthrie (1998) which studied healthy behaviour (diets low in animal fats). The scale for Self-Identity used in this study was adapted from Sparks and Guthrie (1998).

The results for Self- Identity in this study indicate that it has a significant positive effect on Behavioural Intention for Yoghurt with Live Cultures but not for Cholesterol Lowering Margarine. This discrepancy might due to lower confidence among consumers on the health properties offered by specific types of functional foods. It also to signal for marketers to invite the experts to deliver messages about healthier diet such as functional foods.

Choosing a right theme to create promotional campaign is crucial. Marketers should creatively utilise messages that consist of identified elements that portray good health identity in their communications. In order to make it more effective, a message should be conveyed by a high credibility source i.e. health expert opinions and endorsement. Lascu and Zinkhan (1999) suggested that messages should be delivered through effective way of communication that would create a passion to the consumers. In relation to this, in order to make the message communication impactful, the execution on healthy lifestyles by consumers of functional foods in advertisements would be beneficial.

10.5 Research Gaps and Contributions to the Academic literature

The testing of the EHBM in the context of two different types of functional foods in this study contributes to the methodology and knowledge, particularly. It extends the knowledge by filling the gaps in this field as the theoretical foundation of this study, which derives from HBM which has yet to be used to explore consumer behaviour in the context of two different types of functional foods, before. The justification of modifying the HBM to EHBM is to highlight important, relevant elements, particularly in understanding the consumers' intention to purchase and consume functional foods. This is due to the original HBM constructs have been used by many previous researchers mostly in a clinical context such as breast cancer, diabetes etc. but not in a healthy food context, particularly functional foods. Therefore, a gap existed to further explore and modify HBM in a context of consumer behaviour towards functional foods.

The implication to theoretical advancement by the development of EHBM in the study as well as the implication to the practicality of the theory in the real market is very useful. Precisely, they provide guidelines to better understand the relationship between consumers' behaviour and healthy food products, i.e. the likelihood of purchasing and consuming two different types of functional foods (Yoghurt with Live Cultures and Cholesterol Lowering Margarine) based on the constructs of original Health Belief Model (HBM) and another two additional constructs. The additional new independent construct is Self-Identity which taken from Identity Theory. Whilst the new dependent variable is Behavioural Intention, which adapted from the Theory of Planned Behaviour (TPB). The knowledge acquired from the findings of this study would be useful to be further explored.

10.6 Research Limitations

The empirical work in this study provides interesting results. Nevertheless, the interpretation of the outcome of the research should consider some limitations.

10.6.1 Data

This study was conducted in the UK. The representative sample was collected online through an online survey platform (Qualtrics). In relation to that, collecting data from one country offers rich internal validity, but the generalisability of the results may be limited (Bryman and Bell, 2015). However, the sample size of this thesis was greater than most of the survey research in consumer behaviour in general. The initial sample was 700 respondents. After data screening, the sample size used for the final analysis was divided into two groups that consisted of 345 respondents for each type of two sets of questionnaires (total 690) which is considered adequate for data analysis (Hair et al., 2010). However, after splitting the data between User Group and Non-User Group for each sample, the number of samples becomes smaller, which resulted in some issue with model fit indices. In particular, there is an issue with incremental fit indices (e.g. NFI) as it requires a larger sample of more than 200 to obtain a good fit. Nevertheless, other incremental fit indices such as TLI and CFI indicate an acceptable level of fit.

10.6.2 Methodology

This research employs a quantitative approach with non-probability sampling. Non-probability samples are appropriate to a study to assess new dimension or new extended items in a model (Kinnear, 1991). Precisely, data collection applies quota sampling technique. Data were collected through a web-based questionnaire on the reliable panel survey platform Qualtrics.com. The respondents were willingly answered the structured questionnaire without any forces. Such method has been performed to reduce error in the coding of answers, however, there are some tendency that the respondent act arbitrarily when answering the questionnaire (Bryman and Bell, 2015). Nevertheless, to reduce arbitrary responses, ‘filters’ were employed in the data collection platform. One of the limitations of an online web-based questionnaire is the respondent unable to rectify any issue related to the questionnaire as they are not able to directly ask the researcher while answering the questionnaire.

10.6.3 Products

The research focuses on two types of functional foods and each category was represented by only one product (i.e. Yoghurt with Live Culture for general health benefits and Cholesterol Lowering Margarine for specific health benefits), thus, the generalisability of the result of other products in a similar category respectively, requires further testing. Therefore, it is suggested that future research should select different products that offering similar functional claims. For example, in the context of cholesterol lowering margarine vs cholesterol lowering soy milk.

10.6.4 Other Potential Influential Factors

The research focuses on the psychological factor as to understand the consumer preventative behaviour towards the possible health issue and the consumption of functional foods could possibly reduce the associated risks. In a broader context, other psychological factors could also be interesting to assess its influence. For example, Perceived Healthiness, Perceived Safety, and Perceived Pleasantness which scale measurements already tested in other context of studies.

10.7 Avenues for Future Research

The results of this thesis lead to several future research avenues that could be explored to gain greater insight into how the mechanisms of the EHBM in predicting consumers' intentions work. The methodology employed, and the substantive findings of this research provide foundations for future research. The suggestions are as follows:

10.7.1 Model replication

The EHBM model developed in this study is useful to assess the consumers' intention to purchase and consume functional foods, particularly from the point of view of health. The model should be replicated with other functional foods and look at its applicability by different types of health claim and link to base products. Certain health claims associate suitably with certain products (Ares and Gambaro, 2007). Previous studies proved that the base product significantly influence the perception of products' healthiness (Roe et al., 1999). Thus, the model can be replicated in other similar product in this study. For example, cholesterol lowering margarine vs cholesterol lowering soy milk.

10.7.2 Longitudinal examination

This research was designed and tested in a cross-sectional approach. It is, therefore, important for future research to examine the long-term applicability of the EHBM. Since consumer behaviour is dynamic in nature, the effects of particular constructs on consumer behaviour may vary over time. It is not clear how stable is consumer perceptions, for instance, of perceived severity over time and what may cause these to shift. For example, after a heart attack, consumers' attitudes to health and health related foods may change considerably, even in the cases of products unrelated to the heart attack. A longitudinal study would better able understand the stability of attitudes over time and what may cause attitudinal change.

10.7.3 Different cultural and social settings

The research could be extended to other cultural settings. According to van Trijp and van der Lans (2007), there is evidence that there are some differences in the factors to determine the acceptance of functional foods among EU countries. One of the differences was identified as cultural heritage. As this research is limited to UK consumers, the study could be replicated to obtain a comparison of its findings with different countries, especially developing countries that have huge numbers of potential consumers. For example, users in European vs Asian might produce different results. Beside that, it would be good to assess the role of social status in the application of EHBM as perceptions of functional foods vary according to the social status of individuals (Hassan, 2011).

10.7.4 Additional variables / factors to consider in future

The EHBM developed in this study may be further enhanced by adding new independent variables to see the impact towards consumers' Behavioural Intention. It is proposed to fully combine the EHBM with other relevant constructs to widen the perspectives of consumers' behaviour. For example, the inclusion of the construct of Perceived Quality would be good to consider, as the measurement scales have established by other studies.

10.8 Conclusion

The objectives of this study were threefold. Firstly, to examine consumers' intention towards functional foods; Secondly, to model the determinants of consumers' intention to purchase and consume functional foods, thus identifying factors underpinning the acceptance/rejection of functional foods. Finally, the finding from this study offer insight for marketing scholars and practitioners to understand consumers' behaviour and enable them to formulate effective marketing strategies for functional foods. In realising these objectives, the Extended Health Belief Model (EHBM) has been established. The EHBM employed in this research has extended the existing models of consumer food choice and it has been tested to gather information on consumers' intention to purchase and consume in the context of two different types of functional foods.

The EHBM reveals the determinants of consumers' intention towards the consumption of functional foods and this information are useful to the relevant stakeholders. Studying consumers' behaviour in relation to functional foods from the perspective of EHBM aids the understanding of both academics and practitioners.

REFERENCES

Aaker, D. A., Kumar, V., and Day, G. S. (2004) *Marketing research*. 8th edition. New York: John Wiley and Sons.

Abdel Salam, A.M. (2010) ‘Functional Foods: Hopefulness to Good Health’, *American Journal of Food Technology*, 5(2), pp. 86-99.

Abood, D. A., Black, D. R., and Feral, D. (2003) ‘Nutrition education worksite intervention for university staff: application of the Health Belief Model’, *Journal of Nutrition Education and Behavior*, *35*(5), pp. 260-267.

Abumweis, S. S., Barake, R., and Jones, P. (2008) ‘Plant sterols/stanols as cholesterol lowering agents: a meta-analysis of randomized controlled trials’, *Food* and *Nutrition Research*, p.52.

Agri-Food Trade Service (2009) *Consumer Trends: Functional Foods*. Agriculture and Agri-Food Canada.

Ajzen, I. (1985) ‘From intentions to actions: A Theory of Planned Behavior’, in Kuhl, J., and Beckmann, J. (Eds.), *Action-control: From cognition to behavior.* Berlin, Heidelber, New York: Springer-Verlag, pp.11-39.

Ajzen and Fishbein, (1980) *Understanding Attitudes and Predicting Social Behaviour*. Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I. (1991) ‘The Theory of Planned Behavior’, *Organizational Behavior and Human Decision Processes*, 50(2), pp. 179-211.

Ajzen, I. (1996) ‘The Directive Influence of Attitudes on Behavior’, in Gollwitzer, P., and Bargh, J.A. (eds.), *Psychology Faction*. New York, NY: Guilford pp. 385-403.

Ajzen, I. and Fishbein, M. (2000) ‘Attitudes and the attitude-behavior relation: reasoned and automatic processes’, *European Review of Social Psychology,* 11, pp.1-33.

Allen, S., and Goddard, E. (2012) ‘Consumer preferences for milk and yogurt attributes: How health beliefs and attitudes affect choices’, in *2012 Annual Meeting, August 12-14, 2012, Seattle, Washington* (No. 125012). Agricultural and Applied Economics Association.

Alreck, P. L., and Settle, R. B. (2004) *The Survey Research Handbook.* 3rd edition. New York: McGraw-Hill Irwin.

American Dietetic Association, (1995) ‘Position of the American dietetic association: phytochemicals and functional foods’, *Journal of the American Dietetic Association*, 95(4), pp. 493-496.

Anderson, J. C., and Gerbing, D. W. (1988) ‘Structural equation modelling in practice: A review and recommended two-step approach’, *Psychological bulletin*, *103*(3), pp. 411-423.

Anderson, P. F. (1986) ‘On method in consumer research: A critical relativist perspective’, *Journal of Consumer Research, 13*(2), pp. 155-173.

Anderson, A.S., Cox, D.N., McKellar, S., Reynolds, J., Lean, M.E., and Mela, D.J. (1998) ‘Take Five, a nutrition education intervention to increase fruit and vegetable intakes: impact on attitudes towards dietary change’, *British Journal of Nutrition*, 80, pp. 133-140.

Anttolainen, M., R. Luoto, A. Uutela, J. D. Boice, W. J. Blot, J. K. and McLaughlin (2001) ‘Characteristics of users and nonusers of plant stanol ester margarine in Finland: An approach to study functional foods’, *Journal of the American Dietetic Association*, 101, pp. 1365-1368.

Annunziata, A., and Vecchio, R. (2010) ‘Italian consumer attitudes toward products for well-being: The functional foods market’, *International Food and Agribusiness Management Review*, 13(2), pp. 19-50.

Annunziata, A., and Vecchio, R. (2011) ‘Functional foods development in the European market: A consumer perspective’, *Journal of Functional Foods*, 3(3), pp. 223-228.

Annunziata, A., and Vecchio, R. (2013) ‘Consumer perception of functional foods: A conjoint analysis with probiotics’, *Food Quality and Preference*, 28(1), pp. 348-355.

Annunziata, A., Vecchio, R., and Kraus, A. (2016) ‘Factors affecting parents' choices of functional foods targeted for children’, *International Journal of Consumer Studies*, 40(5), pp. 527-535.

Arbuckle, J. L. (2013) IBM® SPSS® Amos TM 22 User's Guide. *Crawfordville: Amos Development Corporation*.

Ares, G., Gimenez, A., and Deliza, R. (2010) ‘Influence of three non-sensory factors on consumer choice of functional yogurts over regular ones’, *Food Quality and Preference*, 21, pp. 361-367.

Ares and Gambaro, (2007) ‘Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods’, *Appetite*, 49, pp. 148-158.

Armitage, C. J. and Conner, M. (2001) ‘Efficacy of the Theory of Planned Behaviour: A meta-analytic review’, *British Journal of Social Psychology’*, 40, pp.471-499.

Armitage, C. J., and Conner, M. (1999) ‘The Theory of Planned Behavior: Assessment of predictive validity and perceived control’, *British Journal of Social Psychology*, 38, pp. 35-54.

Arvanitoyannis, I. S., and Van Houwelingen-Koukaliaroglou, M. (2005) ‘Functional foods: a survey of health claims, pros and cons, and current legislation’, *Critical Reviews in Food Science and Nutrition, 45*(5), pp. 385-404.

Arvola, A., Vassallo, M., Dean, M., Lampila, P., Saba, A., Lahteenmaki, L., and Shepherd, R. (2008) ‘Predicting intentions to purchase organic food: the role of affective and moral attitudes in the theory of planned behaviour’, *Appetite*, 50(2-3), pp. 443-454.

Aschemann, J., and Hamm, U. (2008) Determinants of choice regarding food with nutrition and health claims. In *12th Congress of the European Association of Agricultural Economists-EAAE*.

Aschemann-Witzel, J., and Hamm, U. (2010) 'Do consumers prefer foods with nutrition and health claims? Results of a purchase simulation', *Journal of Marketing Communications*, 16(1-2), pp. 47-58.

Asci, O.S., and Sahin, N.H. (2011) 'Effect of the breast health program based on Health Belief Model on breast health perception and screening behaviors', *The Breast Journal*, 17(6), pp. 680-682.

Ashwell, M. (2004) 'Concepts of functional food', *Nutrition and Food Science*, *34*(1), p. 47.

Azpiazu, I.L., Gonzalez, M., Gibney, K.J., and Martinez, J.A. (1999) 'Perceived barriers of, and benefits to, healthy eating reported by a Spanish national sample', *Public Health Nutrition*, 2(2), pp. 209-215.

Babbie, E. R. (2013) *The basics of social research*. Cengage Learning.

Bacon, D.R., Sauer, P.L. and Young, M. (1995) 'Composite reliability in structural equation modelling', *Educational and Psychological Measurement*, 55 (June), pp. 394-406.

Baglin, J. (2014) 'Improving your exploratory factor analysis for ordinal data: a demonstration using FACTOR', *Practical Assessment, Research* and *Evaluation*, *19*(5), p. 2.

Bagozzi, R.P. and Philips, L.W. (1982) 'Representing and testing organisational theories: a holistic construal', *Administrative Science Quarterly*, 27(3), pp. 459-489.

Bagozzi, R. P., Yi, Y., and Phillips, L. W. (1991) 'Assessing construct validity in organizational research', *Administrative science quarterly*, pp. 421-458.

Bagozzi, R. P. (1980) *Causal Models in Marketing*. New York: John Wiley & Sons, Inc.

Bahari, S. F. (2010) 'Qualitative versus quantitative research strategies: contrasting epistemological and ontological assumptions', *Jurnal Teknologi*, 52, pp. 17-28.

Balasubramanian S.K, Cole. C, (2002) 'Consumers' search and use of nutrition information: The challenge and promise of the nutrition labelling and education act', *Journal of Marketing*, 66 (3), pp. 112-127.

Bandura (1977) 'Self-efficacy: Towards unifying theory of behavioural change', *Psychological review*, 84(2), pp. 191-295.

Bandura, A. (1997) 'Self-Efficacy and Health Behaviour', in A. Baum, S. Newman, J. Wienman, R. West, and C. McManus (eds.), *Cambridge Handbook of Psychology, Health and Medicine*, Cambridge: Cambridge University Press, pp. 160-162.

Barbarossaa, C., De Pelsmacker, P., and Moons, I., (2017) 'Personal Values, Green Self-identity and Electric Car Adoption', *Ecological Economics*, 140, pp.190-200.

Barrena, R., and Sanchez, M. (2010) ‘The link between household structure and the level of abstraction in the purchase decision process: An analysis using a functional food’, *Agribusiness*, 26(2), pp. 243-264.

Bearden, W. O., Sharma, S., and Teel, J. E. (1982) ‘Sample size effects on chi-square and other statistics used in evaluating causal models’, *Journal of Marketing Research*, pp. 425-430.

Bearden, W. O., Netemeyer, R. G., and Teel, J. E. (1989) ‘Measurement of consumer susceptibility to interpersonal influence’, *The Journal of Consumer Research*, 15, pp. 473-481.

Bearden, W. O., and Netemeyer, R. G. (1999) *Handbook of marketing scales: Multi-item measures for marketing and consumer behaviour research*. Sage.

Bechtold, K.B., and Abdulai, A. (2014) ‘Combining attitudinal statements with choice experiments to analyze preference heterogeneity for functional dairy products’, *Food Policy*, 47, pp. 97-106.

Bech-Larsen, T., Grunert, K. G., and Poulsen, J. B. (2001) *The acceptance of functional foods in Denmark, Finland and the United States. A study of consumers’ conjoint evaluations of the qualities of functional food and perceptions of general health factors and cultural values*. Working Paper No. 73. Aarhus, Denmark: MAPP.

Bech-Larsen, T. and Grunert, K. G. (2003) ‘The perceived healthiness of functional foods. A conjoint study of Danish, Finnish and American consumers’ perception of functional foods’, *Appetite*, 40, pp. 9-14.

Bech-Larsen, T. and Scholderer, J. (2007) ‘Functional Foods in Europe: Consumer research, market experiences and regulatory aspects’, *Trends in Food Science and Technology*, 18, pp. 231-234.

Becker (1974) *A Theory of Social Interactions* Working Paper No. 42 Center for Economic Analysis of Human Behavior and Social Institutions National Bureau of Economic Research. Inc. 261 Madison Avenue, New York, N.Y.

Becker, Haefner, and Maiman (1977) ‘The Health Belief Model and Prediction of Dietary Compliance: A Field Experiment’, *Journal of Health and Social Behavior*, 18(4), pp. 348-366.

Becker M, (1974) ‘The Health Belief Model and Personal Health Behavior’, *Health Education Monograph*, 2(4), p. 236.

Bentler, P. M. and Bonett D. G. (1980) ‘Significance tests and goodness of fit in the analysis of covariance structures’, *Psychological Bulletin*, 88, pp. 588-606.

Bentler, P.M. (1990), ‘Comparative Fit Indexes in Structural Models,’ *Psychological Bulletin*, 107 (2), pp. 238-46.

Berger, A., Jones, P. J., and Abumweis, S. S. (2004) 'Plant sterols: factors affecting their efficacy and safety as functional food ingredients', *Lipids in Health and Disease, 3*(1), p.1.

Berkman, L. F. (1995) 'The role of social relations in health promotion', *Psychosomatic medicine, 57*(3), pp. 245-254.

Bigliardi, B., and Galati, F. (2013) 'Innovation trends in the food industry: the case of functional foods', *Trends in Food Science* and *Technology, 31*(2), pp. 118-129.

Bitzios, M., Fraser, I., and Haddock-Fraser, J. (2011) 'Functional ingredients and food choice: Results from a dual-mode study employing means-end-chain analysis and a choice experiment', *Food Policy*, 36(5), pp. 715-725.

Bogue, J., and Ryan, M. (2000) *Market-oriented New Product Development: Functional Foods and the Irish Consumer,* Agribusiness Discussion Paper No. 27, Department of Food Economics, University College, Cork, Ireland.

Bollen, K. A. (1989a) 'A new incremental fit index for general structural models', *Sociological Methods and Research,* 17(3), pp. 303-316.

Bollen, K. A. (1989) *Structural equations with latent variables*. New York, Wiley.

Boluda, K., Capilla, I.V. (2017) 'Consumer attitudes in the election of functional foods', *Spanish Journal of Marketing* - ESIC; 21(S1), pp. 65-79.

Bornkessel, S., Broring, S., Omta, S. O., and van Trijp, H. (2014) 'What determines ingredient awareness of consumers? A study on ten functional food ingredients', *Food Quality and Preference*, 32, pp. 330-339.

Boss, S.R., Galletta, D. F., Benjamin, L.P., Moody, G.D., and Polak, P., (2015). 'What do users have to fear? Using fear appeals to engender threats and fear that motivate protective behaviors in users', *MIS Quarterly,* 39 (4), pp. 837–864.

Brannback, M., de Heer, A. J., and Wiklund, P. (2002) 'The convergence of the pharmaceutical and the food industry through functional food: strategic change and business opportunity or an illusion?', *Pharmaceuticals Policy and Law*, *5(0),* pp. 63-78.

Bredahl, L. (2001) 'Determinants of consumer attitudes and purchase intentions with regard to genetically modified foods - Results of a cross-national survey', *Journal of Consumer Policy,* 24, pp. 23–61.

Brecic, R., Gorton, M., and Barjolle, D. (2014) 'Understanding variations in the consumption of functional foods evidence from Croatia', *British Food Journal*, 116(4), pp. 662-675.

Brewer, N.T., Chapman, G.B., Gibbons, F.X, Gerrard, M., McCaul, K.D., and Weinstein, N.D. (2007) 'Meta-analysis of the relationship between risk perception and health behavior: the example of vaccination', *Health Psychology*, 26(2), pp. 136-145.

Brewer, N., and Rimer, B. (2008) 'Perspectives on health behaviour theories that focus on individuals' in Glanz, K., Rimer, B.K., and Viswanath, K. (ed.) *Health Behaviour and Health*

Education: Theory, Research, and Practice (4th Edition). University of North Carolina at Chapel Hill, pp. 1-13.

Browne M.W, Cudeck R. (1993) *Alternative Ways of Assessing Model Fit*. In: Bollen K, Long J, editors. *Testing Structural Equation Models*. Sage; Newbury Park, CA. pp. 136–162.

Bryman, A. (2004) *Social research methods*. New York, Oxford University Press Inc.

Bryman, A., and Bell, E. (2015) *Business research methods*. Oxford University Press, USA.

Bryman, A., and Cramer, D. (2011) *Quantitative data analysis with IBM SPSS 17, 18 and 19*. Routledge.

Broers, V.J.V., Brouckea, S. Van den., Taverne, C., and Luminet, O., (2019) 'Investigating the conditions for the effectiveness of nudging: Cue-to-action nudging increases familiar vegetable choice', *Food Quality and Preference*, 71, pp. 366-374.

Brouwer, A.M., and Mosack, K.E. (2015) 'Motivating healthy diet behaviors: The self-as-doer identity,' *Self and Identity*, 14(6), pp. 638-653.

Bruschi, V., Teuber, R., and Dolgopolova, I. (2015) 'Acceptance and willingness to pay for health-enhancing bakery products Empirical evidence for young urban Russian consumers', *Food Quality and Preference,* 46, pp. 79-91.

Bryła, P. (2016) 'Organic food consumption in Poland: Motives and barriers', *Appetite*, 105, pp. 737-746.

Bublitz, M.G., Peracchio, L.A. (2015) 'Applying industry practices to promote healthy foods: An exploration of positive marketing outcomes', *Journal of Business Research*, 68, pp. 2484-2493.

Buckley, J. W., Buckley, M. H., and Chiang, H-F. (1976) *Research Methodology and Business Decisions*. New York: National Association of Accountants and the Society of Industrial Accountants of Canada.

Buglar, M.E., White K.M., and Robinson, N.G. (2010) 'The role of self-efficacy in dental patients' brushing and flossing: testing an extended Health Belief Model', *Patient Education Counselling*, 78(2), pp. 269-272.

Burnkrant, R. E., and Cousineau, A. (1975) Informational and normative social influence in buyer behavior. *Journal of Consumer Research*, 2(3), pp. 206-215.

Burns, R. (2000) *Introduction to research methods*. 4th edition. Melbourne: Longman.

Burns, A. C., and Bush, R. F. (2004) *Marketing research: Online research applications*. Prentice Hall.

Burton, M., Rigby, D., Young, T., and James, S. (2001) 'Consumer attitudes to genetically modified organisms in food in the UK', *European Review of Agricultural Economics,* 28, pp. 479-498.

Buscher, L. A., Martin, K. A., and Crocker, S. (2001) ‘Point-of-purchase messages framed in terms of cost, convenience, taste, and energy improve healthful snack selection in a college foodservice setting’, *Journal of the American Dietetic Association*, 101, pp. 909-913.

Büyükkaragoz, A., Bas, M., Saglam, D., and Cengiz, S.E. (2014) ‘Consumers' awareness, acceptance and attitudes towards functional foods in Turkey’, *International Journal of Consumer Studies*, 38(6), pp. 628-635.

Byrne, B. M. (2001) *Structural Equation Modelling with AMOS, Basics Concepts, Applications, and Programming*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, pp. 79-88.

Cao, Z.J., Chen, Y., and Wang S.M. (2014) ‘Health belief model-based evaluation of school health education programme for injury prevention among high school students in the community context’, *BMC Public Health*, 14, p. 26.

Carpenter, C. J. (2010) ‘A meta-analysis of the effectiveness of health belief model variables in predicting behavior’, *Health communication*, *25*(8), pp. 661-669.

Carfora, V., Caso, D., Sparks, P., and Conner, M. (2017) ‘Moderating effects of pro-environmental self-identity on pro-environmental intentions and behaviour: A multi-behaviour study.’ *Journal of Environmental Psychology,* 53, pp. 92-99.

Carfora, V., Caso, D., and Conner, M. (2016) ‘The role of self-identity in predicting fruit and vegetable intake’ *Appetite,* 106, pp. 23-29.

Carrillo, E., Prado-Gasco, V., Fiszman, S., and Varela, P. (2013) ‘Why buying functional foods? Understanding spending behaviour through structural equation modelling’, *Food Research International*, 50(1), pp. 361-368.

Cavaliere, A., Marchi, E.D., and Alessandro Banterle (2016) ‘Does consumer health-orientation affect the use of nutrition facts panel and claims? An empirical analysis in Italy’, *Food Quality and Preference*, 54, pp. 110-116.

Cazacu, S., Rotsios, K., and Moshonas, G. (2014) ‘Consumers' purchase intentions towards water buffalo milk products (WBMPs) in the greater area of thessaloniki, Greece’, *Procedia Economics and Finance*, 9, pp. 407-416.

Chambers, S. and Lobb, A.E. (2007) *Consumer acceptance of functional foods: soft fruit and lamb*. Poster Presentation: International Symposium on "Developments in Functional Foods in Europe - International Impact and Significance", 9-11 May 2007, Malta.

Chambers, S.A., Lobb, A.E. and Mortimer, D.T. (2006) *Attitudes and Behaviour towards Functional Foods*: Focus Groups, Work package No. 2 Report No. 3. The University of Reading.

Champion, V. L. (1984) ‘Instrument development for health belief model constructs’, *Advances in Nursing Science*, pp. 73-87.

Champion, V. L., and Scott, C. R. (1997) ‘Reliability and validity of breast cancer screening belief scales in African American women’, *Nursing research*, *46*(6), pp. 331-337.

Chandon and Wansink (2011) ‘Is food marketing making us fat? A multi-disciplinary review’, *Foundations and Trends in Marketing,* Now Publisher, pp. 2-74.

Chandon, P., and Wansink, B. (2007) ‘The biasing health halos offast-food restaurant health claims: Lower calorie estimates andhigher side-dish consumption intentions’, *Journal of Consumer Research*, *34*(3), pp. 301-314.

Charng, H.W., Piliavin, J.A., and Callero, P.L. (1988) ‘Role Identity and Reasoned Action in the Prediction of Repeated Behavior’, *Social Psychology Quarterly*, 51, pp. 303-317.

Chen, M. F. (2011) ‘The joint moderating effect of health consciousness and healthy lifestyle on consumers' willingness to use functional foods in Taiwan’, *Appetite*, 57(1), pp. 253-262.

Childs, N. M. (1997) ‘Functional foods and the food industry: consumer, economic and product development issues’, *Journal of Nutraceuticals, Functional and Medical Foods*, 1(2), pp. 25-43.

Childs, N. M., and Poryzees, G. H. (1997) ‘Foods that help prevent disease: Consumer attitudes and public policy implications’, *Journal of Consumer Marketing*, 14 (6), pp. 433-447.

Chisholm, M.A., Lance, C.E., Williamson, G.M., and Mulloy, L.L. (2005) ‘Development and validation of an immunosuppressant therapy adherence barrier instrument’, *Nephrol Dial Transplant*, 20(1), pp. 181-188.

Cho, S., Hertzman, J., Erdem, M., and Garriott, P. O. (2012) ‘A food safety belief model for Latino (a) employees in foodservice’, *Journal of Hospitality* and *Tourism Research*, 37(3), pp. 330-348.

Choi, J., Lee, A., and Ok, C. (2013) ‘The effects of consumers' perceived risk and benefit on attitude and behavioral intention: a study of street food’, *Journal of Travel and Tourism Marketing*, 30(3), pp. 222-237.

Chung, H. S., Hong, H., Kim, K., Cho, C. W., Moskowitz, H. R., and Lee, S. Y. (2011) ‘Consumer attitudes and expectations of ginseng food products assessed by focus groups and conjoint analysis’, *Journal of Sensory Studies*, 26(5), pp. 346-357.

Chung, E., and Alagaratnam, S. (2001) ‘Teach ten thousand stars how not to dance’: a survey of alternative ontologies in marketing research,’ *Qualitative Market Research: An International Journal*, *4*(4), pp. 224-234.

Churchill Jr, G. A. (1979) ‘A paradigm for developing better measures of marketing constructs’, *Journal of Marketing Research*, pp. 64-73.

Churchill, G. A. and Iacobucci, D. (2002) *Marketing research: Methodological foundations*. Ohio, South-Western Thomson Learning.

Churchill, G. A., Jr., and Iacobucci, D. (2005) *Marketing research: Methodological foundations*. 9th edition. Sydney: South-Western College.

Churchill Jr, G. A. and Iacobucci, D. (2009) *Marketing research: methodological foundations*. Cengage Learning.

Churchill, G. A., Jr., and Peter, J. P. (1984) ‘Research design effects on the reliability of rating scales: A meta-analysis*,’ Journal of Marketing Research*, 21(4), pp. 360-375.

Clark, L. A., and Watson, D. (1995) ‘Constructing validity: Basic issues in objective scale development’, *Psychological assessment, 7*(3), p. 309.

Clydesdale, F. M. (1997) ‘A proposal for the establishment of scientific criteria for health claims for functional foods’, *Nutrition Reviews, 55*(12), pp. 413-422.

Cohen, N. L., Stoddard, A. M., Sarouhkhanians, S., and Sorensen, G. (1998) ‘Barriers toward fruit and vegetable consumption in a multi-ethnic worksite population’, *Journal of Nutrition Education, 30*(6), pp. 381-386.

Colavito, E. A., Guthrie, J. F., Hertzler, A. A. and Webb, R. E. (1996) ‘Relationship of diet health attitudes and nutrition knowledge of household meal planners to the fat and fibre intakes of meal planners and pre-schoolers’, *Journal of Nutrition Education*, 28(6), pp. 321-328.

Colby, S. E., Johnson, L., Scheett, A., and Hoverson, B. (2010) ‘Nutrition marketing on food labels’, *Journal of Nutrition Education and Behavior,* 42(2), pp. 92-98.

Collins, O., and Bogue, J. (2015) ‘Designing health promoting foods for the ageing population: A qualitative approach’, *British Food Journal*, 117(12), pp. 3003-3023.

Colleen, A.R, Joseph, S.R, Susan, R.R, Wayne, F. V., and James, O.P. (2000) ‘Health Behavior Models’, *The International Electronic Journal of Health Education*, 3 (Special Issue), pp. 180-193.

Conner, M., and Norman, P. (2005) *Predicting Health Behaviour*, McGraw-Hill International.

Conner, M., and Armitage, C. J. (1998) ‘Extending the Theory of Planned Behavior: A review and avenues for further research’, *Journal of Applied Social Psychology,* 28, pp. 1429-1464.

Cornish, L. S. (2012) ‘It's good for me: It has added fibre! An exploration of the role of different categories of functional foods in consumer diets’, *Journal of Consumer Behaviour*, 11(4), pp. 292-302.

Cox, D., Koster, A., and Russell, C. (2004) ‘Predicting intentions to consume functional foods and supplements to offset memory loss using an adaptation of protection motivation theory’, *Appetite,* 43(1), pp. 55-64.

Cox III, E. P. (1980) ‘The optimal number of response alternatives for a scale: A review’, *Journal of Marketing Research*, 17(4), pp. 407-422.

Cozby, P. C. and Bates, S.C (2015) *Methods in Behavioral Research*. 12th Edition. McGraw-Hill Education.

Cranfield, J., Henson, S., and Masakure, O. (2011) ‘Factors affecting the extent to which consumers incorporate functional ingredients into their diets’, *Journal of Agricultural Economics*, 62(2), pp. 375-392.

Creswell, J. W. (2013) *Research design: Qualitative, quantitative, and mixed method approaches.* Sage publications.

Cronbach, L.J (1951) ‘Coefficient Alpha and the Internal Structure of Tests’, *Psychometrika* 16(3), pp. 297-334.

Cronbach, L.J. and Meehl, P.E. (1955) ‘Construct validity in psychological tests’, *Psychological Bulletin,* 52, pp. 281-302.

Crotty, M. (1998) *The foundation of social research*. NSW Australia: Allen and Unwin.

Cruwys, T., Bevelander. K.E., and Hermans, R.C. (2015) ‘Social modeling of eating: A review of when and why social influence affects food intake and choice’, *Appetite*, 86, pp. 3-18.

Cummings, K.M., Becker, M.H., and Kirscht, J.P. (1982) ‘Psychosocial factors affecting adherence to medical regimens in a group of haemodialysis patients’, *Med Care,* 20, pp. 567-579.

Curator, J. E (2013) ‘Self-Identity and Consumer Behavior’, *Journal of Consumer Research,* 39 (5), pp. xv–xviii.

Dagevos, H. (2005) ‘Consumers as four-faced creatures. Looking at food consumption from the perspective of contemporary consumers’, *Appetite,* 45, pp. 32-39.

Damrosch, S. (1991) ‘General strategies for motivating people to change their behavior’, *The Nursing clinics of North America, 26*(4), pp. 833-843.

Daniel, A.D., Irene, K.P., and Keith, J.P. (2007) ‘You eat what you are: Modern health worries and the acceptance of natural and synthetic additives in functional foods’, *Appetite,* 48(3), pp. 333-337.

Darrington, H. (1999) *The claims and the evidence*. Food Manufacturer, June.

Davaadorj, N., and Kim, M. (2014) ‘Behavioral Adoption of Smart Healthcare System Using Health Belief Model’, *Academic Journal of Science,* 3(1), pp. 203-209.

Dave, J.M., Thompson, D.I, Sanchez, A.S and Cullen, K.W (2017) ‘Perspectives on Barriers to Eating Healthy Among Food Pantry Clients’, *Health Equity*, 1(1), pp. 28-34.

Davidhizar, R. (1983) ‘Critique of the health belief model’, *Journal of Advanced Nursing*, 8, pp. 467-472.

Dean, M., Shepherd, R., Arvola, A., Vassallo, M., Winkelmann, M., Claupein, E., and Saba, A. (2007) ‘Consumer perceptions of healthy cereal products and production methods’, *Journal of Cereal Science*, *46*(3), pp. 188-196.

DeCarlo, L. T. (1997) ‘On the meaning and use of kurtosis’ *Psychological Methods* 2(3), p. 292.

Denzin, N. K., and Lincoln, Y. S. (2011) *The SAGE handbook of qualitative research*. Sage.

Department of Health (2000) *National service framework for coronary heart disease*. London: The Stationary Office.

Department of Health (2000a) *The NHS Plan. A plan for investment. A plan for reform.* London: The Stationery Office.

Department of Health, Human Services (HHS) Staff, and Office of the Federal Register (2004) *Code of Federal Regulations: Title 45: Public Welfare*. National Archives and Records Administration.

Department of Health (1992) *The Health of the Nation: A Strategy for Health in England.* HMSO, London.

Deshpande, S., Basil, M.D., and Basil, D.Z. (2009) ‘Factors influencing healthy eating habits among college students: An application of the Health Belief Model’, *Health Marketing Quarterly,* 26, pp. 145-164.

De Jong, N., Ocke, M.C., Branderhorst, H.A.C. and Friele, R. (2003) ‘Demographic and lifestyle characteristics of functional food consumers and dietary supplement users’, *British Journal of Nutrition*, 89, pp. 273-281.

De Vellis, R. F. (2003) *Scale development: Theory and applications.* 2nd edition. Newbury Park, CA: Sage.

Devcich, D. A., Pedersen, I. K., and Petrie, K. J. (2007) ‘You eat what you are: Modern health worries and the acceptance of natural and synthetic additives in functional foods’, *Appetite*, *48*(3), pp. 333-337.

Devine, C. M., Connors, M. M., Sobal, J., and Bisogni, C. A. (2003) ‘Sandwiching it in: spill over of work onto food choices and family roles in low-and-moderate-income urban households’, *Social Science* and *Medicine*, *56*(3), pp. 617-630.

Diamantopoulos, A. (2005) ‘The C-OAR-SE procedure for scale development in marketing: a comment’, *International Journal of Research in Marketing*, *22*(1), pp. 1-9.

Dillman, D. A. (2000) *Mail and internet surveys: The tailored design method*. 2nd edition. New York: John Wiley & Sons.

Dillman, D. A. (1998) *Mail and other self-administered surveys in the 21st century: The beginning of a new era* (p. 24). Pullman, WA: Washington State University.

Ding, Y., Veeman, M. M., and Adamowicz, W. L. (2015) 'Functional food choices: Impacts of trust and health control beliefs on Canadian consumers' choices of canola oil', *Food Policy*, 52, pp. 92-98.

Diplock, A. T., Aggett, P. J., Ashwell, M., Bornet, F., Fern, E. B., and Roberfroid, M. B. (1999) 'Scientific concepts of functional foods in Europe: consensus document,' *British Journal of Nutrition*, 81(suppl. 1), pp.1-27.

Dobrenova, F. V., Grabner-Krauter, S., and Terlutter, R. (2015) 'Country-of-origin (COO) effects in the promotion of functional ingredients and functional foods', *European Management Journal*, 33(5), pp. 314-321.

Dolgopolova, I., Teuber, R., and Bruschi, V. (2015) 'Consumers' perceptions of functional foods: Trust and food-neophobia in a cross-cultural context', *International Journal of Consumer Studies*, 39(6), pp. 708-715.

Douglas, P., and Craig, C.S., (1997) 'The changing dynamic of consumer behavior: implications for cross-cultural research', *International Journal of Research in Marketing*, 14(4), pp. 379-395.

Dovey, T.M., Staples, P.A., Gibson, E.L., and Halford, J.C. (2008) 'Food neophobia and 'picky/fussy' eating in children: a review', *Appetite,* 50(2-3), pp. 181-193.

Drewnowski, A. and Shultz, JM. (2001) 'Impact of aging on eating behaviors, food choices, nutrition, and health status', *Journal Nutrition Health Aging*, 5(2), pp.75-79.

Eagly, A.H. and Chaiken, S. (1993) *The psychology of attitudes*. Fort Worth, Harcourt, Brace Jovanovich.

Ericksen, M. K. (1997) 'Using self-congruity and ideal congruity to predict purchase intention: a European perspective', *Journal of Euro marketing*, *6*(1), pp. 41-56.

Erkin, O., and Ozsoy, S. (2012) 'Validity and reliability of Health Belief Model applied to influenza', *Academic Research International, 2*(3), pp. 31-40.

Eslami, M., Heidarnia, A., Heidarzadeh, A., Shokravi, F., and Motlag, M. (2011) 'Designed to determine the effect of questionnaire validity and reliability of Health Belief Model in two ways users of family planning pills and condoms', *Urmia Medical Journal*, 21(5), pp. 382-390.

ESRC. (2010) ESRC Framework for Research Ethics.

Euromonitor International (2018) Fortified/Functional Packaged Food in the United Kingdom – Available at: https://www.euromonitor.com/fortified-functional-packaged-food,   July 2018.

Euromonitor International (2011) *Health and Wellness in the United Kingdom*.

Euromonitor International (September 2011) *Fortified/Functional Packaged Food in the United Kingdom.*

Euromonitor (2013) http://www.portal.euromonitor.com/portal/default.aspx.

European Consumer Organisation (2015) *Informed food choices for healthier consumers-* BEUC position on nutrition. Available at: http://www.beuc.eu/publications/beuc-x-2015-008_pca_beuc_position_paper_on_nutrition.pdf

FAO (2007) *Report on Functional Foods*. Food and Agriculture Organization of the United Nations (FAO), November.

Farrell, A. M., and Rudd, J. M. (2009) *Factor analysis and discriminant validity: A brief review of some practical issues*. Anzmac.

Fathi, A., Sharifirad, G., and Mohebi, S., (2017) 'Evaluating the performance of unhealthy junk food consumption based on health belief model in elementary school girls', *Journal of Health Literacy*, 2 (1). pp. 45-53.

Federal Register (2006) Conventional Foods Being Marketed as 'Functional Foods'; Public Hearing, Request for Comments, 71 (206), 62400-62407.

Fekadu, Z., and Kraft, P. (2001) 'Self-identity in planned behavior perspective: Past behaviour and its moderating effects on self-identity intention relations', *Social Behavior and Personality*, 29, pp. 671-686.

Feunekes, G. I., de Graaf, C., Meyboom, S., and van Staveren, W.A. (1998) 'Food choice and fat intake of adolescents and adults: associations of intakes within social networks', *Preventive medicine*, *27*(5), pp. 645-656.

Field, A., (2005) *Discovering statistics using SPSS*. 2nd edition. London: Sage.

Field, A., Miles, J., and Field, Z. (2005) *Discovering statistics using R*. 1st edition. London: Sage.

Fishbach, A., and Zhang, Y. (2008) 'Together or apart: When goals and temptations complement versus compete', *Journal of Personality and Social Psychology*, 94(4), pp. 547-559.

Fishbein, M. (1967) A behavior theory approach to the relations between beliefs about an object and the attitude toward the object. In: Fishbein, M. (ed.) *Readings in Attitude Theory and Measurement*. Wiley, New York, pp. 389–400.

Fishbein, M. and Ajzen, I. (1975) *Belief, Attitude, Intention, and Behavior*.Wiley, New York.

Fiszman, S., Carrillo, E., and Varela, P. (2015) 'Consumer perception of carriers of a satiating compound. Influence of front-of-package images and weight loss related information', *Food Research International*, 78, pp. 88-95.

Flores, Belinda Bustos. Clark, Ellen Riojas., Guerra, Norma S., Casebeer, Cindy M., Sanchez, Serafin V., and Mayal, Hayley J. (2010) 'Measuring the psychosocial characteristics of teacher candidates through the academic Self-Identity: Self-observation yearly (ASI SOY) inventory', *Hispanic Journal of Behavioral Sciences*, 32(1), pp. 136-163.

Floyd, D. L., Prentice-Dunn, S., and Rogers, R. W. (2000) 'A meta- analysis of research on protection motivation theory', *Journal of Applied Social Psychology*, 30(2), pp. 407-429.

Fornell, C. and Larcker, D.F. (1981) 'Evaluating structural equation models with unobservable variables and measurement error', *Journal of Marketing Research*, 18(1), pp. 39-50.

Francis, J., Eccles, M.P., Johnston, M., Walker, A.E., Grimshaw, J.M., Foy, R., Kaner, E.F.S., Smith, L., and Bonetti, D. (2004) *Constructing questionnaires based on the Theory of Planned Behaviour: A manual for health services researchers*. Newcastle upon Tyne, UK: Centre for Health Services Research, University of Newcastle upon Tyne.

Frewer, L., Scholderer, J., and Lambert, N. (2003) 'Consumer acceptance of functional foods: issues for the future', *British Food Journal*, 105, pp. 714-731.

Frewer, L. J., Howard, C., Heddeley, D., and Shepherd, R. (1996) 'What determines trust in information about food - related risks? Understanding psychological constructs', *Risk Analysis*, 16(4), pp. 473-486.

Frishammar, J., and Ake Horte, S. (2007) 'The role of market orientation and entrepreneurial orientation for new product development performance in manufacturing firms', *Technology Analysis* and *Strategic Management*, *19*(6), pp. 765-788.

Gajdos, K. J., Cacic, J., Misir, A., and Cacic, D. (2015) 'Geographical region as a factor influencing consumers' perception of functional food ecase of Croatia', *British Food Journal*, 117(3), pp. 1017-1031.

Gaskin, J. (2012) *Testing validity and reliability in a CFA.* Available at: http://youtube.com/Gaskination (Accessed December 2014).

Gaskin, J. (2012) *Structural equation modelling. Gaskination's StatWiki*. Available at: http://statwiki. kolobkreations. com.

Gerbing, D. W., and Anderson, J. C. (1985) 'The effects of sampling error and model characteristics on parameter estimation for maximum likelihood confirmatory factor analysis', *Multivariate Behavioral Research*, *20*(3), pp. 255-271.

Ghanbari, M. K., Farazi, A. A., Shamsi, M., Khorsandi, M., and Esharti, B. (2014) 'Measurement of the Health Belief Model (HBM) in nurses hand hygiene among the hospitals', *World Applied Sciences Journal*, 31 (5), pp. 811-818.

Gilbert, L. (2000) 'The functional food trend: What's next and what Americans think about eggs', *Journal of the American College of Nutrition*, 19, pp. 507-512.

Gilbert, L. (2000) 'Marketing functional foods: how to reach you target audience', *AgBioForum*, 3, pp. 20-38.

Gliem, J.A., and Gliem, R.R. (2003) Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. In: Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, Columbus, The Ohio State University, pp. 82-88.

Global Industry Analysts (2010) *Global Functional Foods and Drinks Market to Exceed $130 Billion by 2015.* Available at: http://www.prweb.com/pdfdownload/4688424.pdf (Assessed: 30 September 2015).

Global Industry Analysts (2013) *The Business of Functional Food Products: Get Industry Insights*. Available at: http://www.reportlinker.com/ci02036/Functional-Food.html (Assessed: 15 October 2015).

Goldman D.P., and Smith JP. (2002) 'Can patient self-management help explain the SES health gradient?' *Proceedings of the National Academy of Sciences*, 99(16), pp. 10929-10934.

Granberg, D. and Holmberg, S. (1990) 'The Intention-Behavior relationship among U.S. and Swedish voters', *Social Psychology Quarterly,* 53(1), pp. 44-54.

Granqvist, N., and Ritvala, T. (2016) 'Beyond prototypes: Drivers ofmarket categorization in functional foods and nanotechnology', *Journal of Management Studies*, 53(2), pp. 210-237.

Gravetter, F., and Wallnau, L. (2014) *Essentials of statistics for the behavioral sciences* (8th ed.). Belmont, CA: Wadsworth.

Grawitch, M. J., Maloney, P., Barber, L. K., and Moosheqian, S. E. (2013) 'Examining the nomological network of satisfaction with work-life balance', *Journal of Occupational Health Psychology*, 18(3), pp. 276-284.

Gray, J., Armstrong, G., and Farley, H. (2003) 'Opportunities and constraints in the functional food market', *Nutrition and Food Science*, 33(5), pp. 213-218.

Green, P. E., and Rao, V. R. (1970) 'Rating scales and information recovery. How many scales and response categories to use?', *The Journal of Marketing*, pp. 33-39.

Grubic, T., and Fan, I. S. (2010) 'Supply chain ontology: Review, analysis and synthesis', *Computers in Industry*, *61*(8), pp. 776-786.

Grunert, K. G., Bech-Larsen, T., and Bredahl, L. (2000) 'Three issues in consumer quality perception and acceptance of dairy products', *International Dairy Journal*, 10(8), pp. 575-584.

Grunert, K. G., Larsen, H. H., Madsen, T. K., and Baadsgaard, A. (1995) *Market orientation in food and agriculture*. Springer Science and Business Media.

Guba, E. G., and Lincoln, Y. S. (2005) *Paradigmatic controversies, contradictions, and emerging confluences.*

Gummesson, Evert. (1999) *Qualitative Method in Management Research.* Second edition. SAGE Publications, Inc.

Gunn, H. (2009) *Web-based surveys [Online]*. Available at: http://www.accesswave.ca/~hgunn/snecial/naDers/websurv/index.html (Assessed: 10 April 2015).

Gutierrez, J., and Long J.A. (2011) 'Reliability and validity of diabetes-specific health beliefs model scales in patients with diabetes and serious mental illness', *Diabetes Research and Clinical Practice*, 92(3), pp. 342-347.

Hagger, M.S., and Chatzisarantis, N.L.D. (2006) 'Self-Identity and the Theory of Planned Behaviour: Between and within participants analyses', *British Journal of Social Psychology*, 45(4), pp. 731-757.

Hailu, G., A. Boecker, S. Henson and J. Cranfield. (2009) 'Consumer valuation of functional foods and nutraceuticals in Canada. A conjoint study using probiotics', *Appetite*, 52, pp. 257-265.

Hair, J.F., Sarstedt, M., Ringle, C.M. and Mena, J.A., (2012) 'An assessment of the use of partial least squares structural equation modelling in marketing research', *Journal of the Academy of Marketing Science* 40(3), pp. 414-433.

Hair, J.F., Black, W.C., Babin, B.J., and Anderson, R.E. (2010) *Multivariate data analysis: a global perspective.* 7th edition. Prentice Hall, Upper Saddle River, New Jersey, USA: Pearson Education Inc. Chapter 3.

Hair, Joseph F., William C. Black, Barry J. Babin, and Rolph E. Anderson (2009) *Multivariate data analysis*. Global Edition, Pearson.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., and Tatham, R. L. (2006) *Multivariate data analysis*. Vol. 6. Pearson Prentice Hall, New Jersey.

Hair, J. F., and Robert, P. (2003) Bush a David J. Ortinau. *Marketing research: within a changing information environment*.

Hair, J. F., Anderson, R. E., Tatham, R. L. and Black, W. C. (1998) *Multivariate data analysis*, NJ: Prentice Hall.

Hamid, N.R (2006) *An Assessment of the Internet's Potential in Enhancing Consumer Relationships.* PhD thesis. Victoria University of Technology. Available at: www.vuir.vu.edu.au

Hanson, J.A., Benedict, J.A (2002) 'Use of the Health Belief Model to Examine Older Adults' Food-Handling Behaviors' *Journal of Nutrition Education and Behavior*, 34(1), pp. 25-30.

Hanson, J. A., Hughes, S.M., and Liu, P. (2015) ‘Use of Health Belief Model variables to examine self-reported food handling behaviors in a sample of U.S adults attending a tailgate event’, *Journal of Food Protection,* 78(12), pp. 2177-2183.

Harrison, J. A., Mullen, P. D., and Green, L. W. (1992) ‘A meta-analysis of studies of the Health Belief Model with adults’, *Health Education Research*, 7(1), pp. 107-116.

Hasler, C. M. (2002) ‘Functional Foods: benefits, concerns and challenges- a position paper from the American Council on Science and Health’, *The Journal of Nutrition*, 132(12), pp. 3772-3781.

Hassan, H. S. (2011a) ‘Managing conflicting values in functional food consumption: the Malaysian experience’, *British Food Journal,* 113(8), pp. 1045-1059.

Hassan, H. S. (2011b) ‘Consumption of functional food model for Malay Muslims in Malaysia’, *Journal of Islamic Marketing*, 2(2), pp. 104-124.

Head, R. J., Record, I. R., and King, R. A. (1996) ‘Functional foods: approaches to definition and substantiation’, *Nutrition reviews*, *54*(11), p.17.

Health Canada. (1998) *Policy paper on Nutraceuticals /functional foods and health claims on food*. Available at: http: //www. hc-sc. gc. ca/food-aliment/ns-sc/ne-en/ health claims-allegations sante/e health Canada policy. html. (Assessed: 5 June 2015).

Heasman, M., and Mellentin, J. (2001) *The Functional Foods Revolution: Healthy People, Healthy Profits?* Earthscan Publication Ltd.

Hellyer, N. E., Fraser, I., and Haddock-Fraser, J. (2012) ‘Food choice, health information and functional ingredients: An experimental auction employing bread’, *Food Policy,* 37(3), pp. 232-245.

Herath, D., J. Cranfield, and S. Henson, (2008) ‘Who consumes functional foods and nutraceuticals in Canada? Results of cluster analysis of the 2006 survey of Canadians’ demand for food products supporting health and wellness’, *Appetite,* 51, pp. 256-265.

Hiekea, S., Pieniaka, Z., and Verbekeb, W. (2018) ‘European consumers’ interest in nutrition information on (sugar-free) chewing gum’, *Food Quality and Preference,* 64, pp. 172-180.

Higgs, S. (2015) ‘Social norms and their influence on eating behaviours’, *Appetite*, 86, pp.38-44.

High, R. (2013) *Dealing with ‘outliers’: How to maintain your data’s integrity [Online]. Research Development Services*. Available at: http://rfd.uoregon.edu/files/rfd/StatisticalResources/outl.txt (Assessed: 15 January 2016).

Hilliam, M. (1996) ‘Functional foods: The Western consumer view- point.’, *Nutrition Reviews*, 54(11), pp. 189-194.

Hirogaki, M. (2013) ‘Estimating consumers' willingness to pay for health food claims: a conjoint analysis’, *International Journal of Innovation, Management and Technology,* 4(6), p. 541.

Hobbs, J. E. (2002) ‘Evolving supply chains in the nutraceuticals and functional foods industry’, *Canadian Journal of Agricultural Economics,* 50(4), pp. 559-568.

Hoch, S.J., and Loewenstein, G.F. (1991) ‘Time-inconsistent preferences and consumer selfcontrol’, *Journal of Consumer Research*, 17(4), pp. 492-507.

Hogg, M. A., and Terry, D. I. (2000) ‘Social identity and self-categorization processes in organizational contexts’, *Academy of management review*, *25*(1), pp. 121-140.

Honkanen, P., Verplanken, B., and Olsen, S. O. (2006) ‘Ethical values and motives driving organic food choice’, *Journal of Consumer Behaviour*, 5(5), pp. 420-430.

Hooper, D., Coughlan, J., and Mullen, M. (2008) ‘Structural equation modelling: Guidelines for determining model fit’, *Electronic Journal of Business Research Methods*, 6(1), pp. 53-60.

Hosseini, Z., Gharlipour, Z., Mohebi, S., Sharifirad, G., Mohammadbeigi, A., and Kazazloo, Z. (2017) ‘Associated Factors of Milk Consumption among Students: Using Health Belief Model (HBM)’, *International Journal of Pediatric,* 5(2), pp. 4439-4448.

Hox, J. and Bechger, T. (1998) ‘An introduction to structural equation modelling’, *Family Science Review,* 11, pp. 354-373.

Hoyle, R. H. (Ed.). (1995) *Structural equation modelling: Concepts, issues, and applications*. Sage Publications.

Hsieh, H., and Tsai, C. H. (2013) ‘An empirical study to explore the adoption of telehealth: Health Belief Model perspective’, *Journal of Engineering Science and Technology Review, 6*(2), pp. 1-5.

Hu, L.T. and Bentler, P.M. (1999) ‘Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives,’ *Structural Equation Modelling: A Multidisciplinary Journal,* 6 (1), pp. 1-55.

Huang, Jui-Chen and Lee, Yii-Ching (2013) ‘Model construction for the intention to use telecare in patients with chronic diseases’, *International Journal of Telemedicine and Applications*, pp. 1-6.

Huang, H.T., Kuo, Y.M., Wang, S.R., Wang, C.F., and Tsai, C.H. (2016) ‘Structural factors affecting health examination Behavioral Intention’, *International Journal of Environmental Research and Public Health*, 13(395), pp. 1-15.

Hudson, L. A. and Ozanne, J. L. (1988) ‘Alternative ways of seeking knowledge in consumer research’, *Journal of Consumer Research*, 14, pp. 508-521.

Humaidi, N., and Balakrishnan, V. (2015) ‘Leadership styles and information security compliance behavior: The mediator effect of information security awareness’, *International Journal of Information and Education Technology*, 5(4), pp. 311-318.

Hung, Y., de Kok, T. M., and Verbeke, W. (2016) ‘Consumer attitude and purchase intention towards processed meat products with natural compounds and a reduced level of nitrite’, *Meat Science,* 121, pp. 119-126.

Hung, Y., Grunert, K.G., Hoefkens, C., Hieke, S., and Verbeke, W. (2017) ‘Motivation outweighs ability in explaining European consumers’ use of health claims’, *Food Quality and Preference,* 58, pp.34-44.

Hunt, S. D., Sparkman Jr, R. D., Humaidi Wilcox, J. B. (1982) ‘The pre-test in survey research: Issues and preliminary findings’, *Journal of Marketing Research*, pp. 269-273.

Hur, J., and Jang, S. S. (2015) ‘Anticipated guilt and pleasure in a healthy food consumption context’, *International Journal of Hospitality Management*, 48, pp. 113-123.

IBM Corp (2013) IBM SPSS for Windows (Version 22.0), Armonk, NY: IBM Corp.

IFIC. (2007) *Consumer Attitudes toward Functional Foods/Foods for Health.*

IFIC. (1998) *International Food Information Council*, http://ificinfo.health.org

International Market Bureau (2012) *Functional Foods in the United Kingdom*. Market Indicator Report, Minister of Agriculture and Agri-Food Canada. April. pp. 1-11.

Irene, G. B., and Spiller, A. (2014) ‘Health-improving lifestyles of organic and functional food consumers’, *British Food Journal,* 116(3), pp. 510-526.

Jack, M. Wall. (2009) *Development of a Health-Belief-Model-based instrument to assess worker beliefs about using personal protective equipment*. Department of Health Promotion and Education, University of Utah.

Jalilian, F., Motlagh, F. Z., Solhi, M. and Gharibnavaz, H. (2014) ‘Effectiveness of selfmanagement promotion educational program among diabetic patients based on health belief model’, *Journal of Educational Health Promotion*, 3(14), pp. 14-18.

Jamal, A., and Goode, M. M. (2001) ‘Consumers and brands: a study of the impact of self-image congruence on brand preference and satisfaction’, *Marketing Intelligence* and *Planning*, *19*(7), pp. 482-492.

Janz, N. K., and Becker, M. H. (1984) ‘The Health Belief Model: A decade later’, *Journal of Health Education* and *Behaviour,* 11(1), pp. 1-47.

Janz, K.F. (2002) ‘Use of heart rate monitors to assess physical activity’, in; Welk, G.J. (ed.), *Physical Activity Assessments for Health-Related Research.* Human Kinetics, Champaign, IL, pp. 143-161.

Jew, S., Vanstone, C. A., Antoine, J. M., and Jones, P. J. (2008) ‘Generic and product-specific health claim processes for functional foods across global jurisdictions’, *The Journal of Nutrition*, *138*(6), pp. 1228-1236.

Jezewska, Z. M., and Krolak, M. (2015) ‘Do consumers' attitudes towards food technologies and motives of food choice influence willingness to eat cereal products fortified with fibre?’, *Polish Journal of Food and Nutrition Sciences*, 65(4), pp. 281-292.

Jonas, M. S. and S.C. Beckmann. (1998) *Functional foods: Consumer perceptions in Denmark and England*. MAPP Working Paper No. 55.

Jones, P. J., and Jew, S. (2007) ‘Functional food development: Concept to reality’, *Trends in Food Science and Technology*, 18, pp. 387-390.

Joreskog, K. G. (1993) *Testing structural equation models*. Sage focus editions, *154*, pp. 294-294.

Jung, S.E., and Bice, C., (2018) ‘The role of Self-Identity in predicting college students’ intention to consume fruits and vegetables’ *Journal of Nutrition Education and Behavior*, pp. 1-9.

Kaiser, H. F. (1974) ‘An index of factorial simplicity’, *Psychometrika,* 39, pp. 31-36.

Kartal, A., and Ozsoy, S. A. (2007) ‘Validity and reliability study of the Turkish version of Health Belief Model scale in diabetic patients’, *International Journal of Nursing Studies*, *44*(8), pp. 1447-1458.

Kasl, S.V., Cobb, S. (1966) ‘Health behavior, illness behavior and sick-role behaviour: I. Health and Illness Behavior’, *Archieves of Environmental Health International Journal,* 12(2), pp. 246-266.

Katz, P.P. (1997) ‘Education and self-care activities among persons with rheumatoid arthritis’, *Social Science and Medicine*, 46(8), pp. 1057-1066.

Kaur, N. and Singh, D.P (2017) ‘Deciphering the consumer behaviour facets of functional foods: A literature review’, *Appetite*, 112, pp. 167-187.

Kayman, S. (1989) ‘Applying theory from social psychology and cognitive behavioral psychology to dietary behavior change and assessment’, *Journal of the American Dietetic Association*, 89, pp. 191-193.

Kearney, M., Kearney, J. M., Dunne, A., and Gibney, M. J. (2000) ‘Socio-demographic determinants of perceived influences on food choice in a nationally representative sample of Irish adults’, *Public Health Nutrition*, *3*(2), pp. 219-226.

Khare, A., and Pandey, S., (2017) ‘Role of green self-identity and peer influence in fostering trust towards organic food retailers’, *International Journal of Retail and Distribution Management*, 45(9), pp. 969-990.

Kim, K.K., Horan, M.L., Gendler, P., and Patel, M.K. (1991) 'Development and evaluation of the osteoporosis health belief scale', *Research in Nursing* and *Health,* 14, pp. 55-163.

Kim, H.S., Joo, A., and Jae-Kyung, (2012) 'Applying the Health Belief Model to college students' health behaviour', *Nutrition Research and Practice*, 6(6), pp. 551-558.

Kim, M., Budd, N., Batorsky, B., Krubiner, C., Manchikanti, S., Waldrop, G., Trude, A., and Gittelsohn, J. (2017) 'Barriers to and facilitators of stocking healthy food options: Viewpoints of Baltimore city small storeowners', *Ecology of Food and Nutrition*, 56(1), pp. 17-30.

Kinnear and Taylor, (1991) *Marketing research: an applied approach*, New York; London: McGraw-Hill.

Kline, R. B. (1998) *Principles and practice of structural equation modelling*. New York: The Guilford Press.

Kline, R. B. (2005) *Principles and practice of structural equation modelling*, New York: The Guilford Press.

Kloeblen, A. S. and Batish, S. S. (1999) 'Understanding the intention to permanently follow a high folate diet among a sample of low-income pregnant women according to the Health Belief Model', *Health Education Research*, 14(3), pp. 327-338.

Korzen-Bohr, S., and Jensen, K. O. D. (2006) 'Heart disease among post-menopausal women: Acceptability of functional foods as a preventive measure', *Appetite*, *46*(2), pp. 152-163.

Koteyko, N. (2010) 'Balancing the good, the bad and the better: A discursive perspective on probiotics and healthy eating', *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine*, 14(6), pp. 585-602. London: SAGE Publications.

Kotler, P., Armstrong, G., Saunders, J., and Wong, V. (1996) *Marketing*. The European Edition.

Kozup, J. C., Creyer, E.H., and Burton, S. (2003) 'Making healthful food choices: The influence of health claims and nutrition information on consumers' evaluations of packaged food products and restaurant menu items', *Journal of Marketing*, 67, pp. 19–34.

Kraus, A. (2015a) 'Factors influencing the decisions to buy and consume functional food', *British Food Journal*, 117(6), pp. 1622-1636.

Kraus, A. (2015b) 'Development of functional food with the participation of the consumer. Motivators for consumption of functional products', *International Journal of Consumer Studies*, 39(1), pp. 2-11.

Kris-Etherton, P. M. (2009) 'Adherence to dietary guidelines: benefits on atherosclerosis progression', *The American Journal of Clinical Nutrition*, 90(1), pp. 13-14.

Krystallis, A., Maglaras, G., and Mamalis, S. (2008) 'Motivations and cognitive structures of consumers in their purchasing of functional foods', *Food Quality and Preference*, *19*(6), pp. 525-538.

Krystallis, A., and Chrysochou, P. (2011) 'Health claims as communication tools that enhance brand loyalty: The case of low-fat claims within the dairy food category', *Journal of Marketing Communications*, 17(3), pp. 213-228.

Krystallis, A., and Chrysochou, P. (2012) 'Do health claims and prior awareness influence consumers' preferences for unhealthy foods? The case of functional children's snacks', *Agribusiness*, 28(1), pp. 86-102.

Kuhn, T. S., (1970) *The structure of scientific revolutions*. Vol.2 of International Encyclopedia of United Science. Second edition. The University of Chicago.

La Barbera, F., Amato, M., and Sannino, G. (2016) 'Understanding consumers' intention and behaviour towards functionalised food: The role of knowledge and food technology neophobia', *British Food Journal*, 118(4), pp. 885-895.

Labrecque, J., Doyon, M., Bellavance, F., and Kolodinsky, J. (2006) 'Acceptance of functional foods: A comparison of French, American, and French Canadian consumers', *Canadian Journal of Agricultural Economics/Revue Canadienne d'agroeconomie*, 54(4), pp. 647-661.

Lahteenmaki, L. (2013) 'Claiming health in food products', *Food Quality and Preference*, 27 (2), pp. 196-201.

Lahteenmaki, L., Urala, N., Lyly, S., and Rauramo. (2004) 'Attitudes behind consumers' willingness to use functional foods', *Food Quality and Preference*, 15(7-8), pp. 793-803.

Lalor, F., Kennedy, J., and Wall, P. G. (2011a) 'Impact of nutrition knowledge on behaviour towards health claims on foodstuffs', *British Food Journal*, 113(6), pp.753-765.

Lalor, F., Madden, C., McKenzie, K., and Wall, P. G. (2011b) 'Health claims on foodstuffs: A focus group study of consumer attitudes', *Journal of Functional Foods*, 3(1), pp. 56-59.

Landstrom, E., Hursti, U. K. K., and Magnusson, M. (2009) 'Functional foods compensate for an unhealthy lifestyle. Some Swedish consumers' impressions and perceived need of functional foods', *Appetite*, *53*(1), pp. 34-43.

Landstrom, E., Hursti, U. K. K., Becker, W., and Magnusson, M. (2007) 'Use of functional foods among Swedish consumers is related to health-consciousness and perceived effect', *British Journal of Nutrition*, *98*(05), pp. 1058-1069.

Larue, B., West, G. E., Gendron, C., and Lambert, R. (2004) 'Consumer response to functional foods produced by conventional, organic, or genetic manipulation', *Agribusiness*, 20(2), pp. 155-166.

Larwin, K. and Harvey, M. (2012) ‘A Demonstration of a Systematic Item-Reduction Approach Using Structural Equation Modelling’, *Practical Assessment, Research and Evaluation*, 17(8), pp. 1-19.

Lascu, D. N., and Zinkhan, G. (1999) ‘Consumer conformity: review and applications for marketing theory and practice’, *Journal of Marketing Theory and Practice*, *7*(3), pp. 1-12.

Lau, T.C., Chan, M.W., Tan, H.P., and Kwek, C.L. (2012) ‘Functional food: A growing trend among the health conscious’, *Asian Social Science*, 9(1), p. 198.

Lawless, L. J., Nayga, R. M., Akaichi, F., Meullenet, J. F., Threlfall, R. T., and Howard, L. R. (2012) ‘Willingness-to-Pay for a nutraceutical-rich juice blend’, *Journal of Sensory Studies*, 27(5), pp. 375-383.

Layte, R., Mc Gee, H., Quail, A., Rundle, K., Cousins, G., and Donnelly, C. (2006) *The Irish study of sexual health and relationships (ISSHR)*. Dublin: Crisis Pregnancy Agency and Department of Health and Children.

Lazarus, R., and Folkman, S. (1984) Stress, apprasisal, and coping. New York: Springer Publishing Company, Inc.

Leathwood, P., MacFie, H., and van Trijp, H. (2007) *Consumer understanding of health claims*. Summary report of a workshop held in May 2006 in Florence, Italy organised by International Life Sciences Institute, Europe.

Lee, E., Hu, M. Y., and Toh, R. S. (2004) ‘Respondent non-cooperation in surveys and diaries: an analysis of item non-response and panel attrition’, *International Journal of Market Research*, *46*(3), pp. 311-327.

Leigh, J. H. and Gabel, T. G. (1992) ‘Symbolic interactionism: its effects on consumer behavior and implications for marketing strategy’, *The Journal of Consumer Marketing*, 9, pp. 27-38.

Lennemas, M., Fjellstrom, C., Becker, W., Giachetti, L Schimitt A., Remaut de Winter AM, Kearney, M. (1997) ‘Influences on food choice perceived to be important by nationally representative samples of adults in the European Union’, *European Journal of Clinical Nutrition*, 51(2), pp. 8-15.

Levitt, J.A., Meng, F., Zhang, P., and DiPietro, R.B. (2017) ‘Examining factors influencing food tourist intentions to consume local cuisine’, *Tourism and Hospitality Research*, 0(0) pp. 1–14. (First published).

Levy, P. S., and Lemeshow, S. (2008) *Sampling of populations: Methods and applications*. New York: Wiley & Sons.

Levy, S. J. (1959) “Symbols for Sale,” *Harvard Business Review*, 37 (July–August), pp. 117-124.

Lewin, K. (1939) ‘Field theory and experiment in social psychology: Concepts and methods’, *American Journal of Sociology*, 44(6), pp. 868-896.

Lissitz, R. W., and Green, S. B. (1975) 'Effect of the number of scale points on reliability: A Monte Carlo approach', *Journal of Applied Psychology*, *60*(1), p. 10.

Loewenstein, G.F., Weber, E.U., Hsee, C., and Welch, K. (2001) 'Risk as feelings', *Psychological Bulletin*, 127(2), pp. 267-286.

Lu, J. (2015) 'The effect of perceived carrier-ingredient fit on purchase intention of functional food moderated by nutrition knowledge and health claim', *British Food Journal*, 117(7), pp. 1872-1885.

Lubran, M. B. (2010) 'Factors Influencing Maryland Farmers' on Farm Processing License Application Behavior', *Nutrition & Food Science Theses and Dissertations University of Maryland U.S.*, pp. 1-219.

Lum, A. (2011) 'Using the Health Belief Model to examine food handling beliefs, knowledge, and practices among families with young children', *Journal of Nutrition Education*, 43(4), p. S9.

Lyly, M., Roininen, K., Honkapaa, K., Poutanen, K., and Lahteenmaki, L. (2007) 'Factors influencing consumers' willingness to use beverages and ready-to-eat frozen soups containing oat b-glucan in Finland, France and Sweden', *Food Quality and Preference*, 18(2), pp. 242-255.

Loebnitz, N., Schuitema, G., Grunert, K.G. (2015) 'Who buys oddly shaped food and why? Impacts of food shape abnormality and organic labeling on purchase intentions', *Psychology and Marketing*, 32(4), pp. 408-421.

Loizou, E., Michailidis, A., and Chatzitheodoridis, F. (2013) 'Investigating the drivers that influence the adoption of differentiated food products: The case of a Greek urban area', *British Food Journal*, 115(7), pp. 917-935.

Ma, G.X., Gao, W., Fang, C.Y., Tan, Y., Feng, Z., Ge, S., and Nguyen, J.A. (2013) 'Health beliefs associated with cervical cancer screening among Vietnamese Americans', *Journal of Women's Health*, 22(3), pp. 276–288.

MacCallum, R. C., and Austin, J. T. (2000) 'Applications of structural equation modelling in psychological research', *Annual Review of Psychology*, *51*(1), pp. 201-226.

MacCallum, R.C., Browne, M.W., and Sugawara, H., M. (1996) 'Power analysis and determination of sample size for covariance structure modeling', *Psychological Methods*, 1(2), pp. 130-49.

MacKenzie, Scott B. (2001) 'Opportunities for improving consumer research through latent variable structural equation modelling', *Journal of Consumer Research*, 28 (June), pp. 159-166.

Maddock, S., Leek, S., and Foxall, G. (1999) 'Healthy eating or chips with everything?', *Nutrition* and *Food Science*, *99*(6), pp. 270-277.

Mai, R. and Hoffmann, S. (2012) ‘Taste lovers vs. nutrition fact seekers: How health consciousness and self-efficacy determine the way consumers choose food products’, *Journal of Consumer Behaviour*, 11 (4), pp. 316-328.

Mai R. and Hoffmann, S. (2017) ‘Indirect ways to foster healthier food consumption patterns: Health-supportive side effects of health-unrelated motives’, *Food Quality and Preference*, 57, pp. 54-68.

Malhotra, N. K. (1999) *Marketing research: An applied orientation*. 3rd edition. Upper Saddle River, NJ: Prentice Hall.

Mangan, J., Chandra, L., and Bernard, G., (2004) ‘Combining quantitative and qualitative methodologies in logistics research’, *International Journal of Physical Distribution & Logistics Management*, 34(7), pp. 565-578.

Marette, S., Roosen, J., Blanchemanche, S., and Feinblatt-Meleze, E. (2010) ‘Functional food, uncertainty and consumers' choices: A lab experiment with enriched yoghurts for lowering cholesterol’, *Food Policy*, 35(5), pp. 419-428.

Margetts, B.M., Martinez, J.A., Saba, A., Holm, L., and Kearney, M. (1997) ‘Definitions of 'healthy' eating: A Pan-EU survey of consumer attitudes to food, nutrition and health’, *European Journal of Clinical Nutrition*, 51(2), pp. 223-277.

Marina, T., Marija, C., and Ida, R. (2014) ‘Functional foods and the young’, *Journal of Food Products Marketing*, 20(5), pp. 441-451.

Market Research Society’s Code of Conduct Guidelines (2014) Available at: www.mrs.org.uk

Markosyan, A., McCluskey, J. J., and Wahl, T. I. (2009) ‘Consumer response to information about a functional food product: Apples enriched with antioxidants’, *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, 57(3), pp. 325-341.

Markovina, J., Cacic, J., Kljusuric, J. G., and Kovacic, D. (2011) ‘Young consumers' perception of functional foods in Croatia’, *British Food Journal*, 113(1), pp. 7-16.

Marsh, H., Hau, K.T., and Wen, Z. (2004) ‘In search of golden rules: Comment on hypothesis-testing approaches to setting cut-off values for fit indexes and dangers on overgeneralizing Hu and Bentler's (1999) findings’, *Structural Equation Modelling*, 11(3), pp. 320-341.

Masson, E., Debucquet, G., Fischler, C., and Merdji, M. (2016) ‘French consumers' perceptions of nutrition and health claims: A psychosocial-anthropological approach’, *Appetite*, 105, pp. 618-629.

McCall, George J. and Simmons, J.L. (1978) *Identities and Interactions*. New York: Free Press.

McDaniel, C., and Gates, R. (2015) *Marketing* research. 10th Edition. Wiley.

McDonald, R.P. (1985) *Factor Analysis and Related Methods*. Hillsdale NJ: Erlbaum.

McKinsey (2012) *IFAMA Agribusiness and Food Survey, Ag2020: Growth Opportunities and Investment Themes*. The discussion document, April.

Mellentin, J. (2014) *Failures in functional foods and beverages*. London, UK: New Nutrition Business.

Menezes, E., Deliza, R., Chan, H. L., and Guinard, J.X. (2011) 'Preferences and attitudes towards açaí-based products among North American consumers', *Food Research International*, 44(7), pp. 1997-2008.

Menozzia, D., Sogaria G., Veneziani, M., Simonia, E., and Moraa, C., (2017) 'Eating novel foods: An application of the Theory of Planned Behaviour to predict the consumption of an insect-based product' *Food Quality and Preference*, 59, pp. 27-34.

Menrad, K. (2003) 'Market and marketing of functional food in Europe', *Journal of Food Engineering*, 56(2), pp. 181-188.

Messina, F., Saba, A., Turrini, A., Raats, M., and Lumbers, M. (2008) 'Older people's perceptions towards conventional and functional yoghurts through the repertory grid method: A cross-country study', *British Food Journal*, 110(8), pp. 790-804.

Mikhail, B.I., and Petro-Nustas, W. (2001) 'Transcultural Adaptation of Champion's Health Belief Model Scales', *Journal of Nursing Scholarship*, 33(2), pp. 173-179.

Mintel Report (2008) *Functional Foods - UK*. Available at: http://academic.mintel.com (Accessed: 3 March 2014).

Mintel Report (2013) Consumer Attitudes towards Functional Food and Drink – UK. Available at http://academic.mintel.com

Mintel Report (2015, July) *Yogurt and Yogurt Drinks - UK*. Available at: http://academic.mintel.com/ (Assessed: 18 April 2016).

Mooney, K. M., and Walbourn, L. (2001) 'When college students reject food: Not just a matter of taste', *Appetite*, 36, pp. 41–50.

Moorman, C., and Matulich, E. (1993) 'A model of consumers' preventive health motivation and health ability', *Journal of Consumer Research*, 20(September), pp. 208-228.

Morowatisharifabad, M. A., Karimi, M., and Jannati, M. (2014) 'Utility of the health belief model to assess predictors of rabies preventive measures', *Journal of Education and Health Promotion*, *3*, p. 62.

Mosley, Michael. (2013) *Five-a-day campaign: A partial success*. Available at: http://www.bbc.com/news/health-20858809. (Assessed: 28 January 2016).

Mowen, J.C. (2000) ‘From health motivation to healthy diet lifestyle in the 3M model of motivation and personality’, *Springer Science Business Media New York* 1/2000, pp. 127-141.

Mulaik, S.A., James, L.R., Van Alstine, J., Bennet, N., Lind, S., and Stilwell, C.D. (1989) ‘Evaluation of goodness-of-fit indices for structural equation models,’ *Psychological Bulletin,* 105 (3), pp. 430-445.

Mullen, P. D., Hersey, J. C. and Iverson, D. C. (1987) ‘Health Behaviour Models compared’, *Social Science and Medicine*, 24 (11), pp. 973-981.

Naslund, D. (2002) ‘Logistics needs qualitative research-especially action research’, *International Journal of Physical Distribution* and *Logistics Management*, *32*(5), pp. 321-338.

Nau, D.P., Ellis, J.J., Kline, R., Eva M., Mallya, U., Eagle, K.A., and Erickson, S.R. (2005) ‘Gender and perceived severity of cardiac disease: Evidence that women are tougher’, *The American Journal of Medicine*, 118 (11), pp. 1256-1261.

Naylor, R. W., Droms, C. M., and Haws, K. L. (2009) ‘Eating with a purpose: Consumer response to functional food health claims in conflicting versus complementary information environments’, *Journal of Public Policy and Marketing*, 28(2), pp. 221-233.

Netemeyer, R. G., Bearden, W. O., and Sharma, S. (2003) *Scaling procedures: Issues and applications*. Sage Publications.

Neuman, W. (2000) *Social research methods: qualitative and quantitative approaches*. 4th edition. Boston: Allyn and Bacon.

Ng, B.Y., and Xu, Y. (2007) ‘Studying users’ computer security behaviour using the Health Belief Model’, *PACIS 2007 Proceedings.* Paper 45.

Nielsen, A.C. (2007) *What's hot around the globe – Insights on growth in food & beverage products*. Available at: http://pt.nielsen.com/documents/tr_08_08_WhatsHotAroundtheGlobeBeverages.pdf (Assessed: 22 May 2014).

Nisbet, E. K., and Gick, M. L. (2008) ‘Can health psychology help the planet? Applying theory and models of health behaviour to environmental actions’, *Canadian Psychology/Psychologie Canadienne*, *49*(4), p. 296.

Niva, M., and Makela, J. (2007) ‘Finns and functional foods: socio- demographics, health efforts, notions of technology and the acceptability of health- promoting foods’, *International Journal of Consumer Studies*, *31*(1), pp. 34-45.

Niva, M. (2007) ‘All foods affect health: Understandings of functional foods and healthy eating among health-oriented Finns’, *Appetite*, 48, pp. 384-393.

Niva, M. (2006) ‘Can we predict who adopts health-promoting foods? Users of functional foods in Finland’, *Scandinavian Journal of Food and Nutrition and Supplement*, *50*(1), p. 13.

Nolan-Clark, D. J., Neale, E. P., Probst, Y. C., Charlton, K. E., and Tapsell, L. C. (2011) ‘Consumers' salient beliefs regarding dairy products in the functional food era: A qualitative study using concepts from the theory of planned behaviour’, *BMC Public Health*, 11(1), p. 843.

Norman, P., and Brain, K. (2005) ‘An application of an extended Health Belief Model to the prediction of breast self-examination among women with a family history of breast cancer’, *British Journal of Health Psychology*, 10(1), pp. 1-16.

Noroozi, A., Jomand, T., and Tahmasebi, R. (2011) ‘Determinants of breast self-examination performance among Iranian women: an application of the Health Belief Model’, *Journal of Cancer Education*, *26*(2), pp. 365-374.

Nunnally, J. C. (1978) *Psychometric Theory.* 2nd Edition. New York: Mc Graw-Hill.

Nunnally, J. C. (1959) *Tests and measurements: Assessment and prediction*. McGraw-Hill.

Nunnally, J. C., and Bernstein, I. H. (1994) ‘The assessment of reliability’, *Psychometric Theory*, *3*(1), pp. 248-292.

Obbagy, J.E., and Essery, E.V. (2012) *The food environment, eating out, and body weight: a review of the evidence*. Arnhem: Nutrition Insight.

Office for National Statistics, (2015) Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates

Office for National Statistics, (2016) Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates

Oh, H., Jeong, H., and Seo, W. (2013) ‘Integrative smoking cessation stage model for Chinese students studying in Korea’, *Asian Nursing Research*, 7, pp. 182-190.

Oliveira, D., Machín, L., Deliza, R., Rosenthal, A., Walter, E. H., Gimenez, A., and Ares, G. (2016) ‘Consumers' attention to functional food labels: Insights from eyetracking and change detection in a case study with probiotic milk’, *LWT-Food Science and Technology*, 68, pp. 160-167.

Ong, F. S., Kassim, N. M., Peng, O. S., and Singh, T. (2014) ‘Purchase behaviour of consumers of functional foods in Malaysia: An analysis of selected demographic variables, attitude and health status’, *Asia Pacific Management Review*, 19(1), pp. 85-104.

O'Connor, E. L., and White, K. M. (2010) ‘Willingness to trial functional foods and vitamin supplements: The role of attitudes, subjective norms, and dread of risks’, *Food Quality and Preference*, 21(1), pp. 75-81.

Organic Monitor (2009) *Market survey UK - Health Foods.* The Ministry of Economic Affairs, EVD, London, pp. 1-89.

Orji, R., Vassileva, J., and Mandryk, R. (2012) ‘Towards an effective health interventions design: An extension of the Health Belief Model’, *Online Journal of Public Health Informatics*. ISSN 1947-2579, 4(3): e9.

Ozen, A.E., Bibiloni, M.M., Pons, A., and Tur, J.A. (2014) ‘Consumption of functional foods in Europe; a systematic review’. *Nutricion hospitalaria*. 29. pp. 470-478.

Ozen, A. E., Pons, A., and Tur, J. A. (2012) ‘Worldwide consumption of functional foods: A systematic review’, *Nutrition Reviews*, *70*(8), pp. 472-481.

Pallant, J. (2005) *SPSS Survival Manual: A step by step guide to data analysis using SPSS version 12*. 2nd Edition. Buckingham: Open University Press.

Pappalardo, G. and, Lusk, J.L (2016) ‘The role of beliefs in purchasing process of functional foods’, *Food Quality and Preference* 53, pp. 151-158.

Park, J., Clement, R., Hooyman, N., Cavalie, K., and Ouslander, J. (2015) ‘Factor structure of the arthritis-related health belief instrument in ethnically diverse community-dwelling older adults with chronic pain’, *Journal of Community Health*, *40*(1), pp. 73-81.

Parvez, S., Malik, K.A., Ah Kang, S., and Kim, H.Y. (2006) ‘Probiotics and their fermented food products are beneficial for health’, *Journal of Applied Microbiology*, 100, pp. 1171-1185.

Patch, C. S., Tapsell, L. C., and Williams, P. G. (2005) ‘Overweight consumers' salient beliefs on omega-3-enriched functional foods in Australia's Illawarra region’, *Journal of Nutrition Education and Behavior*, 37(2), pp. 83-89.

Patch, C.S., Tapsell, C.L., and Williams G.P. (2005) ‘Attitudes and Intentions toward purchasing novel foods enriched with omega-3 fatty acids,’ *Journal of Nutritional Education and Behaviour*, 37, pp. 235-241.

Paul, J., and Rana, J. (2012) ‘Consumer behavior and purchase intention for organic food’, *The Journal of Consumer Marketing*, 29(6), pp. 412–422.

Peak, H. (1955) Attitude and motivation. In: Jones, M.R. (ed.) *Nebraska Symposium on Motivation*, Vol. 3. University of Nebraska Press, Lincoln, Nebraska, pp. 149–188.

Penafiel, D., Termote, C., Lachat, C., Espinel, R., Kolsteren, P., Van Damme, P. (2016) ‘Barriers to eating traditional foods vary by age group in Ecuador with biodiversity loss as a key issue’ *Journal of Nutrition Education and Behavior*, 48(4), pp. 258-268.

Peter, J. P. (1979) ‘Reliability: A review of psychometric basics and recent marketing practices’, *Journal of Marketing Research*, 16, pp. 6-17.

Peter, J. P. (1981) ‘Construct validity: a review of basic issues and marketing practices’, *Journal of Marketing Research*, 18, pp. 133-145.

Petrovici, D.A., Ritson, C., and Ness, M. (2004) ‘The Theory of Reasoned Action and food choice’, *Journal of International Food and Agribusiness Marketing*, 16(1), pp. 59-87.

Pinho, M.G.M., Mackenbach, J.D., Charreire. H., Oppert, J.M., Bárdos, H., Glonti, K., Rutter, H., Compernolle, S., De Bourdeaudhuij, I., Beulens, J.W.J., Brug, J., and Lakerveld, J. (2018) ‘Exploring the relationship between perceived barriers to healthy eating and dietary behaviours in European adults’, *European Journal of Nutrition*, 57, pp. 1761-1770.

Poppe, C., and Kjærnes, U. (2003) *Trust in Food in Europe. A Comparative Analysis*. Oslo: National Institute for Consumer Research. pp. 1–162. Oslo.

Pothoulaki, M., and Chryssochoidis, G. (2009) ‘Health claims: Consumers' matters’, *Journal of Functional Foods,* 1(2), pp. 222-228.

Poulsen, J. (1999) *Danish consumers’ attitudes towards functional foods*, Aarhus (Denmark): MAPP working paper no. 62, Centre for Market Surveillance, research and strategy for the food sector.

Polit, D., and Hungler, B. (1995) *Nursing research: Principles and methods.* 5th edition. Philadelphia: Lippincott.

Preston, C. C., and Colman, A. M. (2000) ‘Optimal number of response categories in rating scales: reliability, validity, discriminating power, and respondent preferences’, *Acta Psychologica*, *104*(1), pp. 1-15.

Prochaska, J. O., DiClemente, C. C., and Norcross, J. C. (1992) ‘In search of how people change: applications to addictive behaviors’, *American Psychologist, 47*(9), p. 1102.

Ras, R., Geleijnse, J.M., and Trautwein, E.A. (2014) ‘LDL-cholesterol-lowering effect of plant sterols and stanols across different dose ranges: a meta-analysis of randomised controlled studies’, *British Journal of Nutrition*, 112(2), pp. 214-219.

Rensvold, R. B., and Cheung, G. W. (1999) ‘Identification of influential cases in structural equation models using the jack-knife method’, *Organization Research Methods*, 2, pp. 293-303.

Rezai, G., Kit Teng, P., Mohamed, Z., and Shamsudin, M. N. (2014) ‘Structural equation modeling of consumer purchase intention toward synthetic functional foods’, *Journal of Food Products Marketing*, 20(sup1), pp. 13-34.

Roberfroid, M. B. (1996) ‘Functional effects of food components and the gastrointestinal system: chicory fructooligosaccharides’, *Nutrition Reviews*, *54*(11), p. 38.

Roberfroid, M. B. (2000) ‘Prebiotics and Probiotics: Are they functional foods?’, *American Journal of Clinical Nutrition*, 71(6), pp. 1682-1687.

Roberfroid, M. B. (2002) ‘Global view on functional foods: European perspectives’, *British Journal of Nutrition,* 88, pp. 133-138.

Roe, B., Levy, A. S., and Derby, B. M. (1999) ‘The impact of health claims on consumer search and product evaluation outcomes: Results from FDA experimental data’, *Journal of Public Policy and Marketing*, 18, pp. 89-105.

Rogers, R. W. (1975) ‘A protection motivation theory of fear appeals and attitude change’, *Journal of Psychology*. 91, pp. 93-114.

Rogers, R. W. (1983) ‘Cognitive and physiological processes in attitude change: a revised theory of protection motivation’. In: Cacioppo, J. and Petty, R. (Eds), *Social Psycho-physiology.* Guilford Press, New York, pp. 153-176.

Roininen, K., and Tuorila, H. (1999) ‘Health and taste attitudes in the prediction of use frequency and choice between less healthy and more healthy snacks’, *Food Quality and Preference*, 10(4), pp. 357-365.

Rose, T. A. (2012) *Using the health belief model to understand cholesterol and blood pressure screenings in rural populations in central Texas* (Doctoral dissertation), Baylor University Waco, Texas.

Rosenstock, I.M. (1990) ‘The Health Belief Model: Explaining health behaviour through expectancies’, in: Glanz, K., Lewis, F.M., and Rimer, B.K. (eds.) *Health Behaviour and Health Education: Theory, Research, and Practice,* San Francisco, CA: Jossey-Bass, pp. 39-62.

Rosenstock, I.M. (1966) *Why people use health services,* Milbank Memorial Fund Quarterly, 44, pp. 94–127.

Rosenstock, I. M. (1974a) ‘Historical origins of the Health Belief Model’, *Health Education Monographs*, 2, pp. 1-8.

Rosenstock, I.M. (1974 b) ‘The Health Belief Model and Preventative Health Behavior’, in: Becker, M. (ed) *The Health Belief Model and Personal Health Behavior*, Thorofare, NJ: Charles B. Slack, Inc., pp. 27-59.

Rosenstock I. M., Victor, S.J., and Becker, M. (1988) ‘Social Learning Theory and the Health Belief Model’, *Health Education Quarterly*, 15(2), pp. 175-183.

Rosenstock, I.M., Cummings, M.K., and Jette, A.M. (1978) ‘Construct validation of the Health Belief Model’, *Health Education Behaviour*, 6(4), pp. 394-405.

Rosenstock, I.M, Strecher, V., and Becker, M. (1994) ‘The Health Belief Model and HIV risk behavior change’, in: R. J. DiClemente and J. L. Peterson (eds.), *Preventing AIDS: Theories and Methods of Behavioral Interventions,* New York: Plenum, pp. 5-24.

Rosenstock, I.M, Becker, M.H and Radius, S.M., (1978) ‘Compliance with a medical regimen for asthma: A test of the Health Belief Model’, *Public Health Reports,* 93, pp. 268-277.

Saaksjarvi, M., Holmlund, M., and Tanskanen, N. (2009) 'Consumer knowledge of functional foods', *The International Review of Retail, Distribution and Consumer Research,* 19(2), pp. 135-156.

Saba, A., Vassallo, M., Shepherd, R., Lampila, P., Arvola, A., Dean, M., and Lahteenmaki, L. (2010) 'Country-wise differences in perception of health-related messages in cereal-based food products', *Food Quality and Preference,* 21(4), pp. 385-393.

Salleh, H. S., Noor, A. M., Mat, N. H. N., Yusof, Y., and Mohamed, W. N. (2015) 'Consumer behavioural intention towards the consumption of functional food in Malaysia: Their profiles and behaviours', *The International Business and Economics Research Journal,* 14(4), p. 727.

Sánchez, M., and Barrena, R. (2004) 'El consumidor ante losalimentos de nueva generación: Alimentos funcionales y alimen-tos transgénicos', *Revista Espa˜nola de Estudios Agrosociales y Pesqueros*, (204), pp. 95-128.

Sanders, M. (1993) 'Healthful attributes of bacteria in yogurt', *Contemporary Nutrition, 18*(5).

Sandmann, A., Brown, J., Mau, G., Saur, M., Amling, M., and Barvencik, F. (2015) 'Acceptance of vitamin D-fortified products in Germany. A representative consumer survey'. *Food Quality and Preference,* 43, pp. 53-62.

Sarkar, S., and Costa, A. (2008) 'Dynamics of open innovation in the food industry', *Trends in Food Science and Technology,* 19 (11), pp. 574-580.

Saunders, M. N. (2011) *Research methods for business students.* 5th edition. Pearson Education, India.

Scalvedi, M.L., and Saba, A. (2018) 'Exploring local and organic food consumption in a holistic sustainability view, *British Food Journal*, 120(4), pp.749-762.

Schafer, R.B, Schafer, E., Bultena, G.L., and Hoiberg, E.O. (1993) 'Food safety: An application of the health belief model', *Journal of Nutrition Education*, 25(1), pp. 17-24.

Schafer, R. B., Keith, P.M., and Schafer, E. (1995) 'Predicting fat in diets of marital partners using the health belief model', *Journal of Behavioral Medicine*, 18(5), pp. 419-433.

Schnettler, B., Adasme-Berríos, C., Grunert, K.G., Márquez, M.P., Lobos, G., Oñate, N.S., Orellana, L., and Sepúlveda, J. (2016) 'The relation between attitudes toward functional foods and satisfaction with food-related life', *British Food Journal*, 118(9), pp. 2234-2250.

Schnettler, B., Miranda, H., Lobos, G., Sepulveda, J., Orellana, L., Mora, M., et al. (2015). 'Willingness to purchase functional foods according to their benefits: Consumer profiles in Southern Chile'. *British Food Journal,* 117(5), pp. 1453-1473.

Schmalen, C. (2005) Einflussfaktoren der Markteinführung von Produktinnovationen klein- und mittelständischer Unternehmen der Ernährungsindustrie (Factors Influencing Market

Entry of Product Innovations of Small and Medium- sized Food Industry Enterprises), Utz, München.

Schumacker, R. E., and Lomax, R. G. (2010) *A beginner's guide to structural equation modelling* (3rd ed.). New York: Routledge.

Scotland, J. (2012) 'Exploring the philosophical underpinnings of research: Relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms', *English Language Teaching*, *5*(9), p. 9.

Scott, M. (2012) 'Customer research easier in digital era'. *USA Today*. (Assessed: 15 March 2015).

Sechrest, L. (2005) 'Validity of measures is no simple matter'. *Health Services Research*, 40(5 Pt 2), pp. 1584-1604. http://doi.org/10.1111/j.1475-6773.2005.00443.x

Sekhon, Y. K. and Szmigin, I. (2009) 'The bicultural value system: undertaking research among ethnic audiences', *International Journal of Market Research*, 51, pp. 751-771.

Senadisai, P., Trimetsoontorn, J., and Fongsuwan, W. (2014) 'Model of factors influencing the intention to purchase lactose-free milk for the population of Bangkok', *Research Journal of Business Management*, 8(8), pp. 284-298.

Serwinek, P.J. (1992) 'Demographic and related differences in ethical views among small businesses', *Journal of Business Ethics*, 11, pp. 555-566.

Shepherd, R. (1990) Attitudes and beliefs as determinants of food choice. In: *Psychological basis of sensory evaluation*. London: Elsevier Applied Science.

Shepherd, R., and Raats, M. (2006) *The Psychology of Food Choice*. Frontiers in Nutritional Science. No. 3. The Nutrition Society.

Shepherd, R., and Stockley, L. (1985) 'Fat consumption and attitudes towards food with a high fat content', *Human Nutrition: Applied Nutrition*, 39(A), pp. 431-442.

Shepherd, R., and Stockley, L. (1987) 'Nutrition knowledge, attitudes, and fat consumption', *Journal of the American Dietetic Association*, 87(5), pp. 615-619.

Shepherd, R. (1988) 'Belief structure in relation to low-fat milk consumption', *Journal of Human Nutrition and Dietetics,* 1, pp. 421-428.

Shepherd, R. (1989) Factors influencing food preferences and choice. In: *Handbook of the Psychophysiology of Human Eating*. Chichester, West Sussex: Wiley, pp. 3-24.

Shepherd, R., Sparks, P., and Guthrie, C.A. (1995) 'The application of the Theory of Planned Behaviour to consumer food choice', in: *E - European Advances in Consumer Research* Volume 2, eds. Flemming Hansen, Provo, UT: Association for Consumer Research, pp.360-365.

Sheil, B., Shanahan, F., and O'Mahony, L. (2007) ‘Probiotic effects on inflammatory bowel disease’, *The Journal of Nutrition*, *137*(3), pp. 819-824.

Sheeran, P., and Orbell, S. (1999) ‘Augmenting the Theory of Planned Behavior: Roles for anticipated regret and descriptive norms’, *Journal of Applied Social Psychology*, *29*(10), pp. 2107-2142.

Sheeran, P., and Abraham, C. (1995) The Health Belief Model, in: *Predicting Health Behaviour*, Conner, M. and Norman, P. (eds.). Buckingham: Open University Press.

Shepherd, R., and Dennison, C.M. (1996) ‘Influences on adolescent food choice’ *Proceedings of the Nutrition Society*, 55, pp. 345-357.

Siegrist, M., Shi, J., Giusto, A., Hartmann, C. (2015) ‘Worlds apart. Consumer acceptance of functional foods and beverages in Germany and China’, *Appetite*, 92 (1), pp. 87-93.

Siegrist, M., Stampfli, N., and Kastenholz, H. (2008) ‘Consumers' willingness to buy functional foods. The influence of carrier, benefit and trust’, *Appetite*, 51(3), pp.526-529.

Sinhaa, M. and Sheth, J. (2018) ‘Growing the pie in emerging markets: Marketing strategies for increasing the ratio of non-users to users’, *Journal of Business Research*, 86, pp. 217-224.

Simon, R. W. (1992) ‘Parental role strains, the salience of parental identity, and gender differences in psychological distress’, *Journal of Health and Social Behaviour*, 33, pp. 25-35.

Simons, Laura E. (2006*) Identifying Barriers to Adherence in Pediatric Transplantation*, PhD thesis, University of Georgia.

Singh, K. (2007) *Quantitative social research methods: Methods and issues*. India: Sage Publication Pte. Ltd.

Sirgy, M. J., Grewal, D., Mangleburg, T. F., Park, J. O., Chon, K. S., Claiborne, C. B., and Berkman, H. (1997) ‘Assessing the predictive validity of two methods of measuring self-image congruence’, *Journal of the Academy of Marketing Science*, *25*(3), pp. 229-241.

Sirgy, J.M. (1982) ‘Self-concept in consumer behavior: A critical review’, *Journal of Consumer Research*, 9 (December), pp. 287-300.

Siro, I., Kapolna, E., Kapolna, B., and Lugasi, A. (2008) ‘Functional food. Product development, marketing and consumer acceptance- A review’, *Appetite*, 51(3), pp. 456-467.

Sluis, S., Dolan, C., and Stoel, R. (2005) ‘A note on testing perfect correlations in SEM’, *Structural Equation Modelling*, 12(4), pp.551-557.

Snedecor, G. W., and Cochran, W. G. (1989) *Statistical methods*. 8th Edition. Ames: Iowa State Univ. Press Iowa.

Solomon, D. J. (2001) *Conducting Web-Based Surveys*. ERIC Digest.

Song, L. W, Cheng, C. H and Han, S.C. (2018) ‘To buy or not to buy? Consumer attitudes and purchase intentions for suboptimal food’ *International Journal of Environmental Research and Public Health*, 15, pp. 1-13.

Sparks, P., Conner, M., James, R., Shepherd, R., and Povey, R. (2001) ‘Ambivalence about health-related behaviours: An exploration in the domain of food choice’, *British Journal of Health Psychology,* 6, pp. 53-68.

Sparks, P. and Shepherd, R. (1992) ‘Self-Identity and the Theory of Planned Behavior: Assessing the role of identification with green consumerism,’ *Social Psychology Quarterly,* 55(4), pp. 388-399.

Sparks, P., Shepherd, R., and Frewer, L.J. (1995) ‘Assessing and structuring attitudes toward the use of gene technology in food production: the role of perceived ethical obligation,’ *Basic and Applied Social Psychology,* 16, pp. 267-285.

Sparks, P., and Guthrie, C.A. (1998) ‘Self-identity and the Theory of Planned Behavior: A useful addition or an unhelpful artifice?’ *Journal of Applied Social Psychology,* 28, pp. 1393-1410.

Sparke, K., and Menrad, K. (2009) ‘Cross-European and functional food-related consumer segmentation for new product development’, *Journal of Food Products Marketing*, 15(3), pp. 213-230.

Spiroski, I., Gjorgjev, D., Milosevic, J., Kendrovski, V., Naunova-Spiroska, D., and Barjolle, D. (2013) ‘Functional foods in Macedonia: Consumers' perspective and public health policy’, *Macedonian Journal of Medical Sciences,* 6(4), pp. 440-445.

Stake, R. E. (1995) *The art of case study research*. Sage.

Steenkamp, J-B. E. M. (1997) ‘Dynamics in consumer behavior with respect to agricultural and food products’, in: Wierenga et al., (eds) 1997. *Agricultural marketing and consumer behavior in changing world*. Kluwert Academic Publishers. Dordrecht, The Netherlands. pp. 143-188.

Steenkamp, J.B.E.M., and Baumgartner, H. (2000) ‘On the use of structural equation models for marketing modelling’, *International Journal of Research in Marketing*, 17 (2-3), pp. 195-202.

Steptoe, A., Pollard, T. M., and Wardle, J. (1995) ‘Development of a measure of the motives underlying the selection of food: The food choice questionnaire’, *Appetite*, 25(3), pp. 267-284.

Stratton, L. M., Vella, M. N., Sheeshka, J., and Duncan, A. M. (2015) ‘Food neophobia is related to factors associated with functional food consumption in older adults’, *Food Quality and Preference*, 41, pp. 133-140.

Straub, D. W., and Carlson, C.L. (1989) ‘Validating instruments in MIS research’, *MIS Quarterly,* 13(2), pp. 157- 165.

Strecher, V., and Rosenstock, I. (1997) 'The Health Belief Model', In: Andrew, B., Stanton, N., John, W., Robert, W., and Chris, M. (eds) *Cambridge Handbook of Psychology, Health and Medicine.* Cambridge, United Kingdom: Cambridge University Press, pp. 113-117.

Stryker, S. and Burke, P.J. (2000) 'The past, present, and future of an Identity Theory,' *Social Psychology Quarterly,* 63, pp. 284-297.

Soleymanian, A., Niknami, S., Hajizadeh, E., Shojaeizadeh, D., and Montazeri, A. (2014) 'Development and validation of a Health Belief Model-based instrument for measuring factors influencing exercise behaviors to prevent osteoporosis in pre-menopausal women (HOPE)', *BMC Musculoskeletal Disorders,* 15(1), p. 1.

Sullivan, K.A., White, K.M., Young, R.M., and Scott, C.J. (2008) 'Predictors of intention to exercise to reduce stroke risk among people at risk of stroke: an application of an extended Health Belief Model', *Rehabilitation Psychology*, 3(4), pp. 505-512.

Sun, Y.H.C. (2008) 'Health concern, food choice motives, and attitudes toward healthy eating: The mediating role of food choice motives', *Appetite,* 10, pp. 10-16.

Surtees, J.R.L (2014) *Interorganizational Innovation and Collaboration in the UK Medical Device Sector*. Thesis of Doctor of Philosophy, Aston University.

Szalavitz, M. (2012) *How child abuse primes the brain for future mental illness*. Time Health and Family. Available at: http://healthland.time.com/2012/02/15/how-child-abuse-primes-the-brain-for-future-mental-illness/. (Assessed: 25 June 2015).

Tabachnick, B.G. and Fidell, L.S. (2007), *Using Multivariate Statistics* (5th ed.). New York: Allyn and Bacon.

Tarkiainen, A., and Sundqvist, S. (2005) 'Subjective norms, attitudes and intentions of Finnish consumers in buying organic food', *British Food Journal*, 107(11), pp. 808-822.

Taylor, R. (2010) 'Older people and functional foods. The importance of diet in supporting older people's health; what role for functional foods?' Available at: www.ilcuk.org.uk

Terry, D. J., Hogg, M. A., and White, K. M. (1999) 'The Theory of Planned Behaviour: self-identity, social identity and group norms', *British Journal of Social Psychology*, *38*(3), pp. 225-244.

Tesser, A., and Shaffer, D.R., (1990) 'Attitudes and attitude change', *Annual Review of Psychology*, 41, pp. 479-523.

The Nielsen Company (2015) *Global health and wellness survey*. Nielsen. Retrieved from http://www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2015-reports/january-2015-global-health-and-wellness-report.pdf

The World Health Organization (2002) The world health report 2002: *Reducing risks, promoting healthy life*. Geneva.

The World Health Organization (2000) *Obesity: Prevention and man-aging the global epidemic: Report of a WHO consultation*. WHO Technical Report Series, p. 894.

Thoits, P.A., and Virshup, L. (1997) 'Me's and We's: Forms and functions of social identities', in Ashmore, R.D., and Jussim, L. (eds.), *Self and Identity: Fundamental Issues*, Oxford: Oxford University Press, pp. 106-133.

Thompson, A.K., and Moughan, P.J. (2008) 'Innovation in the foods industry: Functional foods. Innovation', *Management, Policy and Practice,* 10, pp. 61-73.

Thompson, N. P. (2010) *The development and maintenance of customer relationships through communication: A consumer perspective*. PhD thesis. Victoria University of Wellington. Available at: www.researcharchive.vuw.ac.nz

Tobin, B. D., O'Sullivan, M. G., Hamill, R., and Kerry, J. P. (2014) 'European consumer attitudes on the associated health benefits of neutraceutical-containing processed meats using Co-enzyme Q10 as a sample functional ingredient', *Meat Science*, 97(2), pp. 207-213.

Tomarken, A. J., and Waller, N. G. (2005) 'Structural equation modelling: Strengths, limitations, and misconceptions', *Annual Review Clinical Psychology,* 1, pp. 31-65.

Tourangeau, R., Rips, L. J., and Rasinski, K. (2000) *The psychology of survey response*. Cambridge University Press.

Tovar, E. G., Rayens, M. K., Clark, M., and Nguyen, H. (2010) 'Development and psychometric testing of the health beliefs related to cardiovascular disease scale: preliminary findings', *Journal of advanced nursing*, *66*(12), pp. 2772-2784.

Townsend, N., Wickramasinghe, K., Bhatnagar, P., Smolina, K., Nichols, M., Leal, J., Luengo-Fernandez, R., and Rayner, M. (2012) *Coronary Heart Disease Statistics 2012 Edition*. British Heart Foundation: London, pp. 1-207.

Towler, G. and Shepherd, R. (1992) 'Application of Fishbein and Ajzen's expectancy-value model to understanding fat intake', *Appetite,* 18, pp.15-27.

Trenkner, L. L., Rooney, B., Viswanath, K., Baxter, J., Elmer, P., Finnegan, J. R., and Pirie, P. (1990) 'Development of a scaleusing nutrition attitudes for audience segmentation', *Health Education Research*, 5(4), pp. 479-487.

Trochim, W. M. K., Donnelly, J. P., and Arora, K. (2016) *Research methods: The essential knowledge base*. Boston, MA: Cengage Learning.

Tu, V. P., Husson, F., Sutan, A., Ha, D. T., and Valentin, D. (2012) 'For me the taste of soy is not a barrier to its consumption. And how about you?', *Appetite*, 58(3), pp. 914-921.

Tuorila, H. (1987) 'Selection of milks with varying fat contents and related overall liking, attitudes, norms and intentions', *Appetite,* 8, pp. 1-14.

Tuorila, H., and Cardello, A. V. (2002) 'Consumer responses to an off-flavour juice in the presence of specific health claims', *Food Quality and Preference*, 13, pp. 561-569.

Tuorila, H., and Pangborn, R.M. (1988) 'Prediction of reported consumption of selected fat-containing foods', *Appetite*, 11, pp. 81-95.

Turner, J. C., and Tajfel, H. (1986) 'The social identity theory of intergroup behavior', *Psychology of intergroup relations*, pp. 7-24.

Urala, N. (2005) *Functional foods in Finland: Consumers' views, attitudes and willingness to use*. Finland: VTT Publications.

Urala, N., and Lahteenmaki, L. (2003) 'Reasons behind consumers' functional food choices', *Nutrition and Food Science*, 33, pp. 148-158.

Urala, N., and Lahteenmaki, L. (2004) 'Attitudes behind consumer's willingness to use functional foods', *Food Quality and Preference,* 15, pp. 793-803.

Urala, N., Arvola, A., and Lahteenmaki, L. (2003) 'Strength of health-related claims and their perceived advantage', *International Journal of Food Science and Technology*, 38, pp. 815-826.

Urala, N., and Lahteenmaki, L. (2006) 'Hedonic ratings and perceived healthiness in experimental functional food choices', *Appetite,* 47, pp. 302-314.

Urala, N., and Lahteenmaki, L. (2007) 'Consumer's changing attitudes towards functional foods', *Food Quality and Preference,* 18, pp. 1-12.

Urala, N., Schutz, H. and Spinks. J. (2011) 'Consumer perceptions of "functional food" in the united states', *Journal of Food Products Marketing*, 17(4), pp. 407-419.

Vakili, M., Hidarnia, A.R., Niknami, S., and Mousavinasab, N. (2012) 'Development and psychometrics of Health Belief Model instrument about HIV/AIDS', *Zahedan Journal of Research in Medical Sciences*, 14(9), pp. 64-71.

Van Buul, V. J., and Brouns, F. J. (2015) 'Nutrition and Health Claims as Marketing Tools', *Critical Reviews in Food Science and Nutrition*, 55(11), pp.1552-1560. DOI: 10.1080/10408398.2012.754738

Van den Putte, B., Yzer, M., Willemsen, M. C., and de Bruijn, G. J. (2009) 'The effects of smoking self-identity and quitting self-identity on attempts to quit smoking', *Health Psychology*, 28(5), pp. 535-544.

Van der Zanden, L. D., van Kleef, E., de Wijk, R. A., and van Trijp, H. C. (2015) 'Examining heterogeneity in elderly consumers' acceptance of carriers for protein-enriched food: A segmentation study', *Food Quality and Preference,* 42, pp. 130-138.

Van Kleef, E., van Trijp, H.C.M., Luning, P., and Jongen, W.M.F. (2002) 'Consumer-oriented functional food development: How well do functional disciplines reflect the 'voice of the consumer?', *Trends in Food Science and Technology*, 13, pp. 93-101.

Van Kleef, E., van Trijp, H.C.M., and Luning, P. (2005) 'Functional foods: Health claim-food product compatibility and the impact of health claim framing on consumer evaluation', *Appetite,* 44, pp. 299-308.

Van Oort, F.V.A., van Lenthe, F.J., and Mackenbach, J.P. (2004) 'Co-occurrence of lifestyle risk factors and the explanation of education inequalities in mortality: Results from the GLOBE study', *Preventive Medicine*, 39, pp. 1126-1134.

Van Trijp, H.C.M., and van der Lans, I.A. (2007) 'Consumer perceptions of nutrition and health claims', *Appetite*, 48, pp. 305-324.

Van Wezemael, L., Caputo, V., Nayga, R. M., Chryssochoidis, G., and Verbeke, W. (2014) 'European consumer preferences for beef with nutrition and health claims: A multi-country investigation using discrete choice experiments', *Food Policy*, 44, pp. 167-176.

Vassallo, M., Saba, A., Arvola, A., Dean. M., Messina, F., Claupein, E., Lahteenmaki, L. and Shepherd, S. (2009) 'Willingness to use functional bread. Applying the Health Belief Model across four European countries', *Appetite*, 52(2), pp. 452-460.

Vecchio, R., Van Loo, E. J., and Annunziata, A. (2016) 'Consumers' willingness to pay for conventional, organic and functional yogurt: Evidence from experimental auctions', *International Journal of Consumer Studies*, 40(3), pp. 368-378.

Vecchione, M., Feldman, C., and Wunderlich, S. (2015) 'Consumer knowledge and attitudes about genetically modified food products and labelling policy', *International Journal of Food Sciences and Nutrition,* 66 (3), pp. 329-335.

Vella, M. N., Stratton, L.M., Sheeshka, J., and Duncan, A.M. (2014) 'Functional food awareness and perceptions in relation to information sources in older adults', *Nutrition Journal*, 13(1), pp. 1-12.

Verbeke, W. (2005) 'Consumer acceptance of functional foods: Socio-demographic, cognitive and attitudinal determinants', *Food Quality and Preference*, 16(1), pp. 45-57.

Verbeke, W. (2006) 'Functional foods: Consumer willingness to compromise on taste for health?' *Food Quality and Preference*, 17(1), pp. 126-131.

Verbeke, W., Moriaux, S., and Viaene, J. (2001) 'Consumer knowledge and attitude towards functional foods in Belgium: Evidence from empirical research.' *Annals of Nutrition and Metabolism,* 45(1), p. 114.

Verbeke, M. (2008) *A Guide to Modern Econometrics.* 3rd edition. John Wiley & Sons, Ltd. England.

Verhagen, H., Vosb, E., Francld, S., Heinonene, M., and van Loverena, H. (2010) 'Status of nutrition and health claims in Europe', *Archives of Biochemistry and Biophysics,* 501(1), pp. 6-15.

Vermeir, I., and Verbeke, W. (2006) 'Sustainable food consumption: Exploring the consumer attitude-behavioral intention gap', *Journal of Agricultural and Environmental Ethic,* 19, p. 175.

Verschuren, P. M. (2002) 'Functional foods: Scientific and global perspectives' *British Journal of Nutrition*, 88 (2), pp. 125-130.

Vicentini, A., Liberatore, L., and Mastrocola, D. (2016) 'Functional Foods: Trends and development of the global market', *Italian Journal of Food Science*, 28, pp. 338-351.

Von Alvensleben, R. (2001) 'Beliefs associated with food production'. In: Frewer, L., Risvik, E., and Schifferstein, H. (eds). *Food, people, and society- a European perspective of consumer's food choices*. Berlin Heidelberg New York: Springer-Verlag, pp. 381-400.

Wansink, B., and Kim, J. (2001) 'The marketing and consumer acceptance of biotechnology,' *Journal of Commercial Biotechnology*, 7 (3), pp. 249-259.

Wass, V.J., and Wells, P. E. (Eds.). (1994) *Principles and practice in business and management research*. Aldershot: Dartmouth.

Weichselbaum, E. (2009) 'Probiotics and health: a review of the evidence', *Nutrition Bulletin*, *34*(4), pp. 340-373.

Weinstein, N. D. (1984) 'Why it won't happen to me: perceptions of risk factors and susceptibility', *Health Psychology,* 3, pp. 431-457.

Weinstein, N.D., Sandman, P.M., and Roberts, N.E. (1991) 'Perceived susceptibility and self-protective behavior: A field experiment to encourage home radon testing', *Health Psychology*, 10(1), pp. 25-33.

Weinstein, N.D. (1993) 'Testing four competing theories of health-protective behaviour', *Health Psycholo*gy, 12, pp. 324-333.

Werf, G.R. van der, Peters, W., Leeuwen, T.T. van and Giglio, L. (2013) 'What could have caused pre-industrial biomass burning emissions to exceed current rates?', *Climate of the Past*, 9, pp. 289-306.

Wilcock, A., Pun, M., Khanona, J., and Aung, M. (2004) 'Consumer attitudes, knowledge and behaviour: A review of food safety issues', *Trends in Food Science and Technology*, 15(2), pp. 56-66.

Wilkinson, S.B.T., Pidgeon, N., Lee, J., Pattison, C., and Lambert, N. (2005) 'Exploring consumer attitudes towards functional foods: a qualitative study', *Journal of Nutraceuticals, Functional and Medical Foods*, 4(3-4), pp. 5-28.

Willingham, D. T. (2007) *Cognition: The thinking animal*. 3rd edition. Upper Saddle River: Pearson/Prentice Hall.

Wilson, P.M., and Muon, S. (2008) 'Psychometric properties of the exercise identity scale in a university sample', *International Journal of Sport and Exercise Psychology*, 6, pp. 115-131.

Witt, A.A., and Lowe, M.R. (2014) ‘Hedonic hunger and binge eating among women with eating disorders’, *International Journal of Eating Disorders*. 47 (3), pp. 273-80.

Wong, N.Y., and Ahuvia, A.C. (1998) ‘Personal taste and family face: Luxury consumption in Confucian and western societies’, *Psychology* and *Marketing*, 15, pp. 423-441.

Worsley, A., and Skrzypiec, G. K. (1998) ‘Personal predictors of consumers' food and health concerns’, *Asia Pacific Journal of Clinical Nutrition*, *7*(1), p. 15.

Wrick, K. L. (1995) ‘Consumer issues and expectations for functional foods.’, *Critical Reviews in Food Science and Nutrition*, 35(1&2), pp. 167-173.

Wulan, I.A (2017) ‘The food label, knowledge, trust and experience on adoption of functional food’, *Review of Integrative Business and Economics Research*, 6 (3), pp. 287-294.

Xiaoli, N., Linda, V., and Jarim, K. (2016) *Mapping Sources of Food Safety Information for U.S. Consumers: Findings from a National Survey*, Health Communication.

Yadav, R., and Pathak, G.S. (2016) ‘Intention to purchase organic food among young consumers: Evidences from a developing nation’, *Appetite*, 96, pp. 122-128.

Yazdanpanah, M., Forouzani, M., and Hojjati, M., (2015) ‘Willingness of Iranian young adults to eat organic foods: Application of the Health Belief Model’, *Food Quality and Preference*, 41, pp. 75-83.

Yu, H., and Bogue, J. (2013) ‘Concept optimisation of fermented functional cereal beverages’, *British Food Journal*, 115(4), pp. 541-563.

Zhao, J., Song, F., Ren, S., Wang, Y., Wang, L., Liu, W., and Bazzano, L. (2012) ‘Predictors of condom use behaviors based on the Health Belief Model (HBM) among female sex workers: a cross-sectional study in Hubei Province, China’, *Plos one*, *7*(11), pp. 1-7.

Zikmund, W. G. (2000) *Business research methods*. Fort Worth, TX: Dryden Press.

APPENDICES

Appendix 1: Survey questionnaire (Yoghurt with Live Cultures)

Screeners

Welcome and thank you for taking part in this survey. This survey is part of a PhD research project at Newcastle University. The theme of the survey is food and health. It focuses on attitudes towards, and consumption of, **yogurt with live cultures**. The completion of the survey should not take more than 10 minutes of your time.

Please read the questions and instructions carefully. The anonymity and confidentiality of answers to this survey are fully guaranteed in accordance with the Data Protection Act 1998 and the Market Research Society Code of Practice 2014.The data collected will be used for academic purposes only. There are no right or wrong answers. I am interested in your opinions.

Your sincere responses are necessary to ensure the success of this research. Please try to answer all questions.

Thank you very much,

Mohammad Tahir Zainuddin, Researcher (email: m.t.b.zainuddin@newcastle.ac.uk) /
Dr Matthew Gorton & Dr Mitchell Ness, Supervisors

Please click the ">>" button below to continue.

Section I

About yourself.

In this section, we would like to ask you questions about yourself.

1. Please indicate your gender.

Please tick one.

- Male
- Female

What country are you based in?

- UK
- Other

2. Please indicate your age group.

Please tick one.

- 18-24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 plus years

3. What is your highest level of education achieved?

Please tick one.

- No formal qualification
- O Level / GCSE
- Vocational qualification (e.g. NVQ)
- A Level
- Bachelor Degree (e.g. BA, Bsc)
- Masters / PhD

4. Which band best describes your total annual household income?

Please tick one.

- <£15,000

- As part of a lunch deal/ or just lunch
- To replace a meal
- To have on the go (eg while travelling)
- Other occasion
- Purely for health reason
- Not applicable- do not consume

7. In typical week, how much do you spend on yogurt with live cultures?

Please tick one.

- Nothing
- Less than £1.00
- £1.00 - £2.00
- £2.01 - £3.00
- More than £3.00

8. Where do you typically buy yogurt with live cultures?

Please tick one.

- In a convenience store (e.g. Tesco Express, Sainsbury's local)
- In a health food shop (e.g. Holland & Barrett)
- In a supermarket (e.g. Asda, Tesco Extra, Sainsbury's)
- Online stores
- Do not buy yogurt

.

Section III

Your feelings about the risk of suffering a problem with your digestive system or your general health.

This section examines your attitudes and feelings about the risk of suffering a problem with your digestive system and general health.

Please score each of the statements below to indicate the extent to which the statement reflects your feelings.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
8.1 If I do not adopt a healthy lifestyle I could suffer from digestive system problems.	○	○	○	○	○	○	○
8.2 Someone of my age is at risk of getting digestive system problems.	○	○	○	○	○	○	○
8.3 It is likely that I could suffer a digestive system problem.	○	○	○	○	○	○	○
8.4 Anyone may suffer from digestive system problems if they do not adopt a healthy diet.	○	○	○	○	○	○	○
8.5 I might develop a digestive system problem in the future.	○	○	○	○	○	○	○
8.6 I am							

concerned about getting digestive system problems.	○	○	○	○	○	○	○
8.7 I could suffer a serious problem with my digestive system in the next year.	○	○	○	○	○	○	○
8.8 The thought of getting digestive system problems worries me.	○	○	○	○	○	○	○

Section IV

Your feelings about the consequences of suffering a problem with your digestive system.

9. This section examines your feelings about the consequences of suffering a problem with your digestive system.

Please score each of the statements below to indicate the extent to which the statement reflects your feelings.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
9.1 A digestive system problem would distract from my daily work activities.	○	○	○	○	○	○	○
9.2 A digestive system problem would have long-lasting	○	○	○	○	○	○	○

effects.							
9.3 A digestive system problem would make me less active if it was very serious.	○	○	○	○	○	○	○
9.4 A digestive system problem would be financially damaging and result in loss of earnings.	○	○	○	○	○	○	○
9.5 A digestive system problem would harm my career.	○	○	○	○	○	○	○
9.6 A digestive system problem would affect my social relationships.	○	○	○	○	○	○	○
9.7 A digestive system problem would affect my family life.	○	○	○	○	○	○	○
9.8 Please select the last option - strongly agree - to continue	○	○	○	○	○	○	○

Section V

Your feelings about the benefits of taking positive action (Perceptions and beliefs about consuming yogurt with live cultures).

10. This section examines your feelings about the potential benefits of consuming yogurt with live cultures.

Please score each of the statements below to indicate the extent to which the statement reflects your feelings.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
10.1 Consuming yogurt with live cultures would protect me from getting digestive system problems.	○	○	○	○	○	○	○
10.2 Consuming yogurt with live cultures would protect others in my household from getting digestive system problems.	○	○	○	○	○	○	○
10.3 The health benefits of consuming yogurt with live cultures would help me avoid being absent from work.	○	○	○	○	○	○	○
10.4 Consuming yogurt with live cultures would be beneficial for my digestive system	○	○	○	○	○	○	○

health.							
10.5 Consuming yogurt with live cultures would give me more confidence that I can avoid digestive system problems.	○	○	○	○	○	○	○
10.6 Consuming yogurt with live cultures would reduce the likelihood of getting other diseases related to an unhealthy digestive system.	○	○	○	○	○	○	○

Section VI

Your feelings about the difficulties that may prevent you taking positive action.

11. This section examines your feelings about difficulties you may face that would prevent your consumption of yogurt with live cultures.

Please score each of the statements below to indicate the extent to which the statement reflects your feelings.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
11.1 Consuming yogurt with live cultures is not convenient for me.	○	○	○	○	○	○	○
11.2 In order							

to obtain the benefits of consuming yogurt with live cultures, I would have to give up some of my favourite snacks/ foods.	○	○	○	○	○	○	○
11.3 I don't like the taste of yogurt with live cultures.	○	○	○	○	○	○	○
11.4 I think it would take too much effort to change my diet to include frequent consumption of yogurt with live cultures.	○	○	○	○	○	○	○
11.5 Consuming yogurt with live cultures would interfere with my daily routine.	○	○	○	○	○	○	○
11.6 Consuming yogurt with live cultures might be risky for those who are intolerant to dairy products.	○	○	○	○	○	○	○
11.7 It is too difficult to frequently consume yogurt with live cultures as the price is higher than	○	○	○	○	○	○	○

alternative food products.							
11.8 I am concerned about the uncertainty of the benefits of consuming yogurt with live cultures.	○	○	○	○	○	○	○
11.9 Please select the first option - strongly disagree - to continue	○	○	○	○	○	○	○

Section VII

Other influences on your consumption.

12. This section examines your feelings about other factors that may influence your decision to consume yogurt with live cultures.

Please score each of the statements below to indicate the extent to which the statement reflects your attitudes.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
12.1 I would more likely consume yogurts with live cultures if recommended by a doctor.	○	○	○	○	○	○	○
12.2 I would more likely consume yogurts with live cultures if recommended by my family.	○	○	○	○	○	○	○
12.3 I would more likely consume							

yogurts with live cultures if its health benefits were advertised on the mass media (press, magazines, newspaper, radio, television, internet).	○	○	○	○	○	○	○
12.4 I would more likely consume yogurts with live cultures if recommended by my friends and colleagues.	○	○	○	○	○	○	○

Section VIII

Your attitudes to health consciousness.

13. This section examines your attitudes toward health.

Please score each of the statements below to indicate the extent to which the statement reflects your attitudes to health.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
13.1 I think of myself as the sort of person who is concerned about the long-term health effects of my food choices.	○	○	○	○	○	○	○
13.2 I think of myself as someone who generally thinks							

carefully about the health consequences of my food choices.	○	○	○	○	○	○	○
13.3 I think of myself as a health-conscious person.	○	○	○	○	○	○	○

Section IX

Your future intentions.

14. This section examines your future purchase intentions toward consumption of yogurt with live cultures.

Please score each of the statements below to indicate the extent to which the statement reflects your intentions.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
14.1 I will make an effort in future to eat yogurt with live cultures.	○	○	○	○	○	○	○
14.2 I would encourage my friends and family to eat yogurt with live cultures in the future.	○	○	○	○	○	○	○
14.3 In the future I intend to eat a diet that includes yogurt with live cultures even if is more	○	○	○	○	○	○	○

expensive.

END OF QUESTIONNAIRE

Appendix 2: Survey questionnaire (Cholesterol Lowering Margarine)

Newcastle University Business School

Screeners

Welcome and thank you for taking part in this survey. This survey is part of a PhD research project at Newcastle University. The theme of the survey is food and health. It focuses on attitudes towards, and consumption of, **cholesterol lowering margarine**. The completion of the survey should not take more than 10 minutes of your time.

Please read the questions and instructions carefully. The anonymity and confidentiality of answers to this survey are fully guaranteed in accordance with the Data Protection Act 1998 and the Market Research Society Code of Practice 2014.The data collected will be used for academic purposes only. There are no right or wrong answers. I am interested in your opinions.

Your sincere responses are necessary to ensure the success of this research. Please try to answer all questions.

Thank you very much,

Mohammad Tahir Zainuddin, Researcher (email: m.t.b.zainuddin@newcastle.ac.uk) /
Dr Matthew Gorton & Dr Mitchell Ness, Supervisors

Please click the “>>” button below to continue.

Section I

About yourself.

In this section, we would like to ask you questions about yourself.

1. Please indicate your gender.

Please tick one.

- ○ Male
- ○ Female

What country are you based in?

- UK
- Other

2. Please indicate your age group.

Please tick one.

- 18-24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 plus years

3. What is your highest level of education achieved?

Please tick one.

- No formal qualification
- O Level / GCSE
- Vocational qualification (e.g. NVQ)
- A Level
- Bachelor Degree (e.g. BA, Bsc)
- Masters / PhD

4. Which band best describes your total annual household income?

Please tick one.

- <£15,000
- £15,000-£19,999
- £20,000-£24,999
- £25,000-£29,999
- £30,000-£39,999
- £40,000-£49,999
- £50,000 or more
- Prefer not to answer

Section II

Purchase of cholesterol lowering margarine.

In this section, we would like to ask some questions about your purchase of cholesterol lowering margarine.

5. Have you consumed cholesterol lowering margarine in the last 6 months and how often? For example brands such as Benecol and Flora *pro. active*.

Please tick one.

- Never
- Once per month or less often
- Two or three times per month
- Once per week
- More often than once per week
- Everyday

6. For which of the following occasion do you most typically consume cholesterol lowering margarine?

Please tick all that apply.

- Spreading
- Cooking (e.g. for frying)
-

Topping (e.g. with steamy vegetables or pasta)

- ☐ Baking
- ☐ Purely for health reason
- ☐ Not applicable - do not consume

7. In typical week, how much do you spend on cholesterol lowering margarine?

Please tick one.

- ○ Nothing
- ○ Less than £1.00
- ○ £1.00 - £2.00
- ○ £2.01 - £3.00
- ○ More than £3.00

8. Where do you typically buy cholesterol lowering margarine?

Please tick one.

- ○ In a convenience store (e.g. Tesco Express, Sainsbury's local)
- ○ In a health food shop (e.g. Holland & Barrett)
- ○ In a supermarket (e.g Asda, Tesco Extra, Sainsbury's)
- ○ Online stores
- ○ Do not buy cholesterol lowering margarine

Section III

Your feelings about the risk of suffering a problem with your cardiovascular system.

This section examines your attitudes and feelings about the risk of suffering a problem with coronary heart disease.

Please score each of the statements below to indicate the extent to which the statement reflects your intentions.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
8.1 If I do not adopt a healthy lifestyle I could suffer from coronary heart disease.	○	○	○	○	○	○	○
8.2 Someone of my age is at the risk of getting coronary heart disease.	○	○	○	○	○	○	○
8.3 It is likely that I could suffer coronary heart disease.	○	○	○	○	○	○	○
8.4 Anyone may suffer from coronary heart disease if they do not adopt a healthy diet.	○	○	○	○	○	○	○
8.5 I might develop coronary heart disease in the future.	○	○	○	○	○	○	○
8.6 I am concerned about getting coronary heart	○	○	○	○	○	○	○

disease.							
8.7 I could suffer from coronary heart disease in the next year.	○	○	○	○	○	○	○
8.8 The thought of getting coronary heart disease worries me.	○	○	○	○	○	○	○

Section IV

Your feelings about the consequences of suffering a problem with your cardiovascular system.

9. This section examines your feelings about consequences of having specified disease associated to a coronary heart disease.

Please score each of the statements below to indicate the extent to which the statement reflects your intentions.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
9.1 Coronary heart disease would distract from my daily work activities.	○	○	○	○	○	○	○
9.2 Coronary heart disease would have long-lasting effects.	○	○	○	○	○	○	○
9.3 Coronary heart disease would make me less active if it was very serious.	○	○	○	○	○	○	○

9.4 Coronary heart disease would be financially damaging and result in loss of earnings.	○	○	○	○	○	○	○
9.5 Coronary heart disease would harm my career.	○	○	○	○	○	○	○
9.6 Coronary heart disease would affect my social relationships.	○	○	○	○	○	○	○
9.7 Coronary heart disease would affect my family life.	○	○	○	○	○	○	○
9.8 Please select the last option - strongly agree - to continue	○	○	○	○	○	○	○

Section V

Your feelings about the benefits of taking positive action. (Perceptions and beliefs about consuming cholesterol lowering margarine).

10. This section examines your feelings about the potential benefits of consuming cholesterol lowering margarine.

Please score each of the statements below to indicate the extent to which the statement reflects your feelings.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
10.1 Consuming cholesterol lowering margarine	○	○	○	○	○	○	○

would protect me from getting coronary heart disease.							
10.2 Consuming cholesterol lowering margarine would protect others in my household from getting coronary heart disease.	○	○	○	○	○	○	○
10.3 The health benefit of consuming cholesterol lowering margarine would help me avoid being absent from work.	○	○	○	○	○	○	○
10.4 Consuming cholesterol lowering margarine would be beneficial for the health of my heart in particular.	○	○	○	○	○	○	○
10.5 Consuming cholesterol lowering margarine would give me more confidence that I can avoid coronary heart disease.	○	○	○	○	○	○	○
10.6 Consuming cholesterol lowering							

margarine would reduce the likelihood of getting other diseases related to an unhealthy cardiovascular system.	○	○	○	○	○	○	○

Section VI

Your feelings about difficulties that may prevent you taking action.

11. This section examines your feelings about difficulties you may face that would prevent your consumption of cholesterol lowering margarine.

Please score each of the statements below to indicate the extent to which the statement reflects your intentions.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
11.1 Consuming cholesterol lowering margarine is not convenient for me.	○	○	○	○	○	○	○
11.2 In order to obtain the benefits of consuming cholesterol lowering margarine, I would have to give up some of my favourite snacks/ foods.	○	○	○	○	○	○	○
11.3 I don’t like the taste of cholesterol	○	○	○	○	○	○	○

lowering margarine.							
11.4 I think it would take too much effort to change my diet to include frequent consumption of cholesterol lowering margarine.	○	○	○	○	○	○	○
11.5 Consuming cholesterol lowering margarine would interfere with my daily routine.	○	○	○	○	○	○	○
11.6 Consuming cholesterol lowering margarine might be risky for those having certain food allergies.	○	○	○	○	○	○	○
11.7 It is too difficult to frequently consume cholesterol lowering margarine as the price is higher than alternative ordinary margarines.	○	○	○	○	○	○	○
11.8 I am concerned about the uncertainty of the benefits of consuming cholesterol	○	○	○	○	○	○	○

lowering margarine.							
11.9 Please select the first option - strongly disagree - to continue	○	○	○	○	○	○	○

Section VII

Other influences on your consumption.

12. This section examines your feelings about other factors that may influence your decision to consume cholesterol lowering margarine.

Please score each of the statements below to indicate the extent to which the statement reflects your attitudes.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
12.1 I would more likely consume cholesterol lowering margarine if recommended by a doctor.	○	○	○	○	○	○	○
12.2 I would more likely consume cholesterol lowering margarine if recommended by my family.	○	○	○	○	○	○	○
12.3 I would more likely consume cholesterol lowering margarine if its health benefits were advertised on the mass	○	○	○	○	○	○	○

media (press, magazines, newspaper, radio, television, internet).							
12.4 I would more likely consume cholesterol lowering margarine if recommended by my friends and colleagues.	○	○	○	○	○	○	○

Section VIII

Your attitude to health consciousness.

13. This section examines your attitudes toward health.

Please score each of the statements below to indicate the extent to which the statement reflects your attitudes to health.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
13.1 I think of myself as the sort of person who is concerned about the long-term health effects of my food choices.	○	○	○	○	○	○	○
13.2 I think of myself as someone who generally thinks carefully about the health consequences of my food	○	○	○	○	○	○	○

choices.							
13.3 I think of myself as a health-conscious person.	○	○	○	○	○	○	○

Section IX

Your future intentions.

14. This section examines your future purchase intentions towards consumption of cholesterol lowering margarine.

Please score each of the statements below to indicate the extent to which the statement reflects your intentions.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
14.1 I will make an effort in future to eat cholesterol lowering margarine.	○	○	○	○	○	○	○
14.2 I would encourage my friends and family to eat cholesterol lowering margarine in the future.	○	○	○	○	○	○	○
14.3 In the future I intend to eat a diet that includes cholesterol lowering margarine even if is more expensive.	○	○	○	○	○	○	○

END OF QUESTIONNAIRE

Appendix 3: EHBM constructs and items (Yoghurt with Live Cultures)

ORIGINAL CONSTRUCTS (Independent Variables)	NO OF ITEMS	ADAPTED SCALES	SOURCES AND SCORE OF CRONBACH'S ALPHA	ORIGINAL SCALES
Perceived Susceptibility	1	"If I do not adopt a healthy lifestyle I could suffer from digestive system problems".	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.98)*	"Working with multiple people each day increases my chances of getting the flu" (Erkin and Ozsoy, 2012: p. 39).
	2	"Someone of my age is at risk of getting digestive system problems".	**Erkin and Ozsoy (2012)**	"Only people over 65 years of age get the flu" (Erkin and Ozsoy, 2012: p. 39).
	3	"It is likely that I could suffer a digestive system problem".	**Erkin and Ozsoy (2012)**	"My chances of getting the flu are good" (Erkin and Ozsoy, 2012: p. 39).
	4	"Anyone may suffer from digestive system problems if they do not adopt a healthy diet".	**Erkin and Ozsoy (2012)**	"Healthy people can get the flu" (Erkin and Ozsoy, 2012: p. 39).
	5	"I might develop a digestive system problem in the future".	**Erkin and Ozsoy (2012)**	"I feel the chances of getting the flu in the future are good" (Erkin and Ozsoy, 2012: p. 39).
	6	"I am concerned about getting digestive system problems".	**Erkin and Ozsoy (2012)**	"I worry a lot about getting the flu" (Erkin and Ozsoy, 2012: p. 39).
	7	"I could suffer a serious problem with my digestive system in the next year".	**Erkin and Ozsoy (2012)**	"I could get the flu next year" (Erkin and Ozsoy, 2012: p. 39).
	8	"The thought of getting digestive system problems worries me".	**Erkin and Ozsoy (2012)**	"The thought of getting the flu scares me" (Erkin and Ozsoy, 2012: p. 39).
Perceived Severity	1	"A digestive system problem would distract from my daily work activities".	**Deshpande et al., (2009)** *(Cronbach alpha 0.86)*	"I will miss more than two months of school or work" (Deshpande et al., 2009: p. 151).
	2	"A digestive system problem would have long-lasting effects".	**Deshpande et al., (2009)**	"I will have long-lasting effects" (Deshpande et al., 2009: p. 151).
	3	"A digestive system problem would make me less active if it was very serious".	**Deshpande et al., (2009)**	"I will be bed-ridden for a long time" (Deshpande et al., 2009: p. 151).
	4	"A digestive system problem would be financially damaging and result in loss of earnings".	**Deshpande et al., (2009)**	"I will have medical expenses" (Deshpande et al., 2009: p. 151).
	5	"A digestive system problem would harm my career".	**Deshpande et al., (2009)**	"I will harm my career" (Deshpande et al., 2009: p. 151).
	6	"A digestive system problem would affect my social relationships".	**Deshpande et al., (2009)**	"My social relationships will suffer" (Deshpande et al., 2009: p. 151).

	7	"A digestive system problem would affect my family life".	**Deshpande et al., (2009)**	"I will hurt my family life" (Deshpande et al., 2009: p. 151).
Perceived Benefits	1	"Consuming yoghurt with live cultures would protect me from getting digestive system problems".	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.99)*	"Getting a flu shot will prevent me from getting the flu" (Erkin and Ozsoy, 2012: p. 40).
	2	"Consuming yoghurt with live cultures would protect others in my household from getting digestive system problems".	**Erkin and Ozsoy (2012)**	"Getting a flu shot will protect others in my household from getting the flu" (Erkin and Ozsoy, 2012: p. 40).
	3	"The health benefits of consuming yoghurt with live cultures would help me avoid being absent from work".	**Erkin and Ozsoy (2012)**	"Getting a flu shot will prevent me from being absent from work" (Erkin and Ozsoy, 2012: p. 40).
	4	"Consuming yoghurt with live cultures would be beneficial for my digestive system health".	**Erkin and Ozsoy (2012)**	"I have a lot to gain by getting a flu shot" (Erkin and Ozsoy, 2012: p. 40).
	5	"Consuming yoghurt with live cultures would give me more confidence that I can avoid digestive system problems".	**Erkin and Ozsoy (2012)**	"I would not be afraid of getting the flu if I got a flu shot" (Erkin and Ozsoy, 2012: p. 40).
	6	"Consuming yoghurt with live cultures would reduce the likelihood of getting other diseases related to an unhealthy digestive system".	**Erkin and Ozsoy (2012)**	"Having a chronic illness (such as diabetes, heart disease, or asthma), is a reason for getting the flu vaccine" (Erkin and Ozsoy, 2012: p. 40).
Perceived Barriers	1	"Consuming yoghurt with live cultures is not convenient for me".	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.99)*	"Getting a flu shot is not convenient for me" (Erkin and Ozsoy, 2012: p. 40).
	2	"In order to obtain the benefits of consuming yoghurt with live cultures, I would have to give up some of my favourite snacks/ foods".	**Erkin and Ozsoy (2012)**	"In order to get a flu shot, I would have to give up quite a bit" (Erkin and Ozsoy, 2012: p. 40).
	3	"I don't like the taste of yoghurt with live cultures".	**Erkin and Ozsoy (2012)**	"Getting a flu shot can be painful" (Erkin and Ozsoy, 2012: p. 40).
	4	"I think it would take too much effort to change my diet to include frequent consumption of yoghurt with live cultures".	**Erkin and Ozsoy (2012)**	"Getting a flu shot is time-consuming" (Erkin and Ozsoy, 2012: p. 40).
	5	"Consuming yoghurt with live cultures would interfere with my daily routine".	**Erkin and Ozsoy (2012)**	"Getting a flu shot interferes with my daily activities" (Erkin and Ozsoy, 2012: p. 40).
	6	"Consuming yoghurt with live cultures might be risky for those who are intolerant to dairy products".	**Erkin and Ozsoy (2012)**	"There are too many risks in getting a flu shot" (Erkin and Ozsoy, 2012: p. 40).
	7	"It is too difficult to frequently consume yoghurt with live cultures as the price is higher than alternative food products".	**Erkin and Ozsoy (2012)**	"It costs too much to get a flu shot" (Erkin and Ozsoy, 2012: p. 40).

	8	"I am concerned about the uncertainty of the benefits of consuming yoghurt with live cultures".	**Erkin and Ozsoy (2012)**	"I am concerned about having a bad reaction to the flu shot" (Erkin and Ozsoy, 2012: p. 40).
ADDITIONAL CONSTRUCTS (Independent Variables)	**NO. OF ITEMS**	**ADAPTED SCALES**	**SOURCES AND SCORE OF CRONBACH'S ALPHA**	**ORIGINAL SCALES**
Cues to Action	1	"I would more likely consume yoghurts with live cultures if recommended by a doctor".	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.97)*	"I got the flu vaccine because my doctor or nurse told me it was good" (Erkin and Ozsoy, 2012: p. 40).
	2	"I would more likely consume yoghurts with live cultures if recommended by my family".	**Erkin and Ozsoy (2012)**	"I got the flu vaccine because my supervisor thought it was a good idea" (Erkin and Ozsoy, 2012: p. 40).
	3	"I would more likely consume yoghurts with live cultures if its health benefits were advertised on the mass media (press, magazines, newspaper, radio, television and internet)".	**Erkin and Ozsoy (2012)**	"I got the flu vaccine after hearing an announcement of benefits on the radio or television" (Erkin and Ozsoy, 2012: p. 40).
	4	"I would more likely consume yoghurts with live cultures if recommended by my friends and colleagues".	**Deshpande et al., (2009)** *(Cronbach alpha 0.66)*	"I would pay more attention to my food choices if friends or family members suggested it" (Deshpande et al., 2009: p. 151).
Self-Identity	1	"I think of myself as the sort of person who is concerned about the long-term health effects of my food choices" (Sparks and Guthrie, 1998: p. 1399).	**Sparks and Guthrie (1998)** *(Cronbach's alpha 0.82)*	"I think of myself as the sort of person who is concerned about the long-term health effects of my food choices" (Sparks and Guthrie, 1998: p. 1399).
	2	"I think of myself as someone who generally thinks carefully about the health consequences of my food choices" (Sparks and Guthrie, 1998: p. 1399).	**Sparks and Guthrie (1998)**	"I think of myself as someone who generally thinks carefully about the health consequences of my food choices" (Sparks and Guthrie, 1998: p. 1399).
	3	"I think of myself as a health-conscious person" (Sparks and Guthrie, 1998: p. 1399).	**Sparks and Guthrie (1998)**	"I think of myself as a health-conscious person" (Sparks and Guthrie, 1998: p. 1399).
DEPENDANT VARIABLE	**NO. OF ITEMS**	**ADAPTED SCALES**	**SOURCE AND SCORE OF CRONBACH'S ALPHA**	**ORIGINAL SCALES**
Behavioural Intention	1	"I will make an effort in future to eat yoghurt with live cultures".	**Sparks and Guthrie (1998)** *(Cronbach's alpha 0.96)*	"I will make an effort to eat a diet that is low in animal fats from now on" (Sparks and Guthrie, 1998: p. 1399).
	2	"I would encourage my friends and family to eat yoghurt with live cultures in the future".	**Sparks and Guthrie (1998)**	"I will try to eat a diet that is low in animal fats from now on" (Sparks and Guthrie, 1998: p. 1399).
	3	"In the future, I intend to eat a diet that includes yoghurt with live cultures even if is more expensive".	**Sparks and Guthrie (1998)**	"I intend to eat a diet that is low in animal fats from now on" (Sparks and Guthrie, 1998: p. 1399).

Appendix 4: EHBM constructs and items (Cholesterol Lowering Margarine)

ORIGINAL CONSTRUCTS (Independent Variables)	NO OF ITEMS	ADAPTED SCALES	SOURCES AND SCORE OF CRONBACH'S ALPHA	ORIGINAL SCALES
Perceived Susceptibility	1	"If I do not adopt a healthy lifestyle I could suffer from coronary heart disease".	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.98)*	"Working with multiple people each day increases my chances of getting the flu" (Erkin and Ozsoy, 2012: p. 39).
	2	"Someone of my age is at the risk of getting coronary heart disease".	**Erkin and Ozsoy (2012)**	"Only people over 65 years of age get the flu" (Erkin and Ozsoy, 2012: p. 39).
	3	"It is likely that I could suffer coronary heart disease".	**Erkin and Ozsoy (2012)**	"My chances of getting the flu are good" (Erkin and Ozsoy, 2012: p. 39).
	4	"Anyone may suffer from coronary heart disease if they do not adopt a healthy diet".	**Erkin and Ozsoy (2012)**	"Healthy people can get the flu" (Erkin and Ozsoy, 2012: p. 39).
	5	"I might develop coronary heart disease in the future".	**Erkin and Ozsoy (2012)**	"I feel the chances of getting the flu in the future are good" (Erkin and Ozsoy, 2012: p. 39).
	6	"I am concerned about getting coronary heart disease".	**Erkin and Ozsoy (2012)**	"I worry a lot about getting the flu" (Erkin and Ozsoy, 2012: p. 39).
	7	"I could suffer from coronary heart disease in the next year".	**Erkin and Ozsoy (2012)**	"I could get the flu next year" (Erkin and Ozsoy, 2012: p. 39).
	8	"The thought of getting coronary heart disease worries me".	**Erkin and Ozsoy (2012)**	"The thought of getting the flu scares me" (Erkin and Ozsoy, 2012: p. 39).
Perceived Severity	1	"Coronary heart disease would distract from my daily work activities".	**Deshpande et al., (2009)** *(Cronbach alpha 0.86)*	"I will miss more than two months of school or work" (Deshpande et al., 2009: p. 151).
	2	"Coronary heart disease would have long-lasting effects".	**Deshpande et al., (2009)**	"I will have long-lasting effects" (Deshpande et al., 2009: p. 151).
	3	"Coronary heart disease would make me less active if it was very serious".	**Deshpande et al., (2009)**	"I will be bed-ridden for a long time" (Deshpande et al., 2009: p. 151).
	4	"Coronary heart disease would be financially damaging and result in loss of earnings".	**Deshpande et al., (2009)**	"I will have medical expenses" (Deshpande et al., 2009: p. 151).
	5	"Coronary heart disease would harm my career".	**Deshpande et al., (2009)**	"I will harm my career" (Deshpande et al., 2009: p. 151).
	6	"Coronary heart disease would affect my social relationships".	**Deshpande et al., (2009)**	"My social relationships will suffer" (Deshpande et al., 2009: p. 151).
	7	"Coronary heart disease would affect my family life".	**Deshpande et al., (2009)**	"I will hurt my family life" (Deshpande et al., 2009: p. 151).
Perceived Benefits	1	"Consuming cholesterol lowering margarine would protect me from getting coronary heart disease".	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.99)*	"Getting a flu shot will prevent me from getting the flu" (Erkin and Ozsoy, 2012: p. 40).

	2	"Consuming cholesterol lowering margarine would protect others in my household from getting coronary heart disease".	**Erkin and Ozsoy (2012)**	"Getting a flu shot will protect others in my household from getting the flu" (Erkin and Ozsoy, 2012: p. 40).
	3	"The health benefit of consuming cholesterol lowering margarine would help me avoid being absent from work".	**Erkin and Ozsoy (2012)**	"Getting a flu shot will prevent me from being absent from work" (Erkin and Ozsoy, 2012: p. 40).
	4	"Consuming cholesterol lowering margarine would be beneficial for the health of my heart in particular".	**Erkin and Ozsoy (2012)**	"I have a lot to gain by getting a flu shot" (Erkin and Ozsoy, 2012: p. 40).
	5	"Consuming cholesterol lowering margarine would give me more confidence that I can avoid coronary heart disease".	**Erkin and Ozsoy (2012)**	"I would not be afraid of getting the flu if I got a flu shot" (Erkin and Ozsoy, 2012: p. 40).
	6	"Consuming cholesterol lowering margarine would reduce the likelihood of getting other diseases related to an unhealthy cardiovascular system".	**Erkin and Ozsoy (2012)**	"Having a chronic illness (such as diabetes, heart disease, or asthma), is a reason for getting the flu vaccine" (Erkin and Ozsoy, 2012: p. 40).
Perceived Barriers	1	"Consuming cholesterol lowering margarine is not convenient for me".	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.99)*	"Getting a flu shot is not convenient for me" (Erkin and Ozsoy, 2012: p. 40).
	2	"In order to obtain the benefits of consuming cholesterol lowering margarine, I would have to give up some of my favourite snacks/ foods".	**Erkin and Ozsoy (2012)**	"In order to get a flu shot, I would have to give up quite a bit" (Erkin and Ozsoy, 2012: p. 40).
	3	"I don't like the taste of cholesterol lowering margarine".	**Erkin and Ozsoy (2012)**	"Getting a flu shot can be painful" (Erkin and Ozsoy, 2012: p. 40).
	4	"I think it would take too much effort to change my diet to include frequent consumption of cholesterol lowering margarine".	**Erkin and Ozsoy (2012)**	"Getting a flu shot is time-consuming" (Erkin and Ozsoy, 2012: p. 40).
	5	"Consuming cholesterol lowering margarine would interfere with my daily routine".	**Erkin and Ozsoy (2012)**	"Getting a flu shot interferes with my daily activities" (Erkin and Ozsoy, 2012: p. 40).
	6	"Consuming cholesterol lowering margarine might be risky for those having certain food allergies".	**Erkin and Ozsoy (2012)**	"There are too many risks in getting a flu shot" (Erkin and Ozsoy, 2012: p. 40).
	7	"It is too difficult to frequently consume cholesterol lowering margarine as the price is higher than alternative ordinary margarine".	**Erkin and Ozsoy (2012)**	"It costs too much to get a flu shot" (Erkin and Ozsoy, 2012: p. 40).
	8	"I am concerned about the uncertainty of the benefits of consuming cholesterol lowering margarine".	**Erkin and Ozsoy (2012)**	"I am concerned about having a bad reaction to the flu shot" (Erkin and Ozsoy, 2012: p. 40).

ADDITIONAL CONSTRUCTS (Independent Variables)	NO. OF ITEMS	ADAPTED SCALES	SOURCES AND SCORE OF CRONBACH'S ALPHA	ORIGINAL SCALES
Cues to Action	1	"I would more likely consume cholesterol lowering margarine if recommended by a doctor".	**Erkin and Ozsoy (2012)** *(Cronbach's alpha 0.97)*	"I got the flu vaccine because my doctor or nurse told me it was good" (Erkin and Ozsoy, 2012: p. 40).
	2	"I would more likely consume cholesterol lowering margarine if recommended by my family".	**Erkin and Ozsoy (2012)**	"I got the flu vaccine because my supervisor thought it was a good idea" (Erkin and Ozsoy, 2012: p. 40).
	3	"I would more likely consume cholesterol lowering margarine if its health benefits were advertised on the mass media (press, magazines, newspaper, radio, television and internet)".	**Erkin and Ozsoy (2012)**	"I got the flu vaccine after hearing an announcement of benefits on the radio or television" (Erkin and Ozsoy, 2012: p. 40).
	4	"I would more likely consume cholesterol lowering margarine if recommended by my friends and colleagues".	**Deshpande et al., (2009)** *(Cronbach alpha 0.66)*	"I would pay more attention to my food choices if friends or family members suggested it" (Erkin and Ozsoy, 2012: p. 40).
Self-Identity	1	"I think of myself as the sort of person who is concerned about the long-term health effects of my food choices" (Sparks and Guthrie, 1998: p. 1399).	**Sparks and Guthrie (1998)** *(Cronbach's alpha 0.82)*	"I think of myself as the sort of person who is concerned about the long-term health effects of my food choices" (Sparks and Guthrie, 1998: p. 1399).
	2	"I think of myself as someone who generally thinks carefully about the health consequences of my food choices" (Sparks and Guthrie, 1998: p. 1399).	**Sparks and Guthrie (1998)**	"I think of myself as someone who generally thinks carefully about the health consequences of my food choices" (Sparks and Guthrie, 1998: p. 1399).
	3	"I think of myself as a health-conscious person" (Sparks and Guthrie, 1998: p. 1399).	**Sparks and Guthrie (1998)**	"I think of myself as a health-conscious person" (Sparks and Guthrie, 1998: p. 1399).
DEPENDANT VARIABLE	**NO. OF ITEMS**	**ADAPTED SCALES**	**SOURCE AND SCORE OF CRONBACH'S ALPHA**	**ORIGINAL SCALES**
Behavioural Intention	1	"I will make an effort in future to eat cholesterol lowering margarine".	**Sparks and Guthrie (1998)** *(Cronbach's alpha 0.96)*	"I will make an effort to eat a diet that is low in animal fats from now on" (Sparks and Guthrie, 1998: p. 1399).
	2	"I would encourage my friends and family to eat cholesterol lowering margarine in the future".	**Sparks and Guthrie (1998)**	"I will try to eat a diet that is low in animal fats from now on" (Sparks and Guthrie, 1998: p. 1399).
	3	"In the future, I intend to eat a diet that includes cholesterol lowering margarine even it is more expensive".	**Sparks and Guthrie (1998)**	"I intend to eat a diet that is low in animal fats from now on" (Sparks and Guthrie, 1998: p. 1399).

Appendix 5: EHBM Control variables

VARIABLES	SCALES
Gender	Male / female
Age	18-24, 25-34, 35-44, 45-54, 55-64, 65 plus
Level of Education	No formal qualification O level/ GCSE Vocational qualification (e.g. NVQ) A Level Bachelor Degree (e.g. BA, BSc) Masters/ PhD
Income	<£15,000 £15,000-£19,999 £20,000-£24,999 £25,000-£29,999 £30,000-£39,999 £40,000-£49,999 £50,000 or more Prefer not to answer