

FOOD CHOICE: MOTIVATIONAL FACTORS AMONG MALAYSIAN HIGHER EDUCATION STUDENTS

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Abstract: *Food consumption can have both positive and negative effects on ones' health. As food consumption is closely related to health, the alarming statistics of the NCDs' prevalence and its consequences in this country warrant an understanding of the population's motivation of food choices. Therefore, this study aims to identify the importance of food choice motives and to determine the underlying factors of food choice motives among Malaysian higher education students. Data were gathered from a sample of 526 students via a non-probability sampling method. The respondents rated religion (4.38 ± 1.04), sensory appeal ($4.26 \pm .98$), and price (4.25 ± 1.00) as the top three important food choice factors whereas ethical concern (3.76 ± 1.20), familiarity (3.77 ± 1.13), and weight control (3.78 ± 1.11) as the bottom three. The exploratory factor analysis of 38 items in the food choice questionnaire suggested four factors that accounted for 70.51% of the variance in the food choice motives, labelled as balanced diet, convenience and price, comfort food, and religion. The findings of the present study are helpful in understanding the higher education students' motivation on food choice and important to the relevant agencies in improving healthy eating campaign intervention as well as to the food industry players and marketers in offering food products that can satisfy the young adults' food choices.*

Keywords: *Factor Analysis, Food Choice Motives, Higher Education Students*

Introduction

In general, food provides the nutrients needed for growth, development, and the maintenance of bodily processes. These nutrients include carbs, protein, fat, vitamins, minerals, fiber, and water. According to Trivedi and Mehta (2019), food is considered as the physiological necessity for human life. It is ranked lowest on Maslow's hierarchy of needs, and it transcends all other desires, including those for shelter, water, sex, sleep, excretion, breathing, and homeostasis. Additionally, individuals eat to preserve their physical health, socialize with others, plan their days, adjust to environmental stimuli, and control their emotions (Caso et al., 2022).

Food affects physical and mental health, energy sources, lifestyle, and cultural and social aspects, all of which have a substantial influence on an individual's way of life. The benefits of a balanced diet and a healthy lifestyle can assist in improving a person's general standard of life. On the other hand, food can also be detrimental to human health. Prolonged consumption of high calorie or low nutrient meals can lead to an increase in body weight, which raises the chance of acquiring a variety of non-communicable diseases (NCDs) such as cardiovascular disease, obesity, kidney failure and various types of cancer. Over one in two adults and almost one in six children worldwide suffer from obesity, making it a global problem that affects every nation (Unusan, 2020). As a matter of fact, NCDs has recorded 71% of all loss of life which kills approximately 41 million people worldwide annually (Plasek et al., 2019).

In Malaysia, the health state of the population seems to be poorer than any other countries in the region. According to the National Health and Morbidity Survey (NHMS 2019), slightly over half (50.1%) of Malaysian adults were overweight or obese, which shown 30.4% becoming overweight and 19.7% getting obese (Ministry of Health Malaysia, 2019). Furthermore, a study by Chong et al. (2022) found that respondents between the ages of 18 and 29 had a higher likelihood of being obese than respondents between the ages of 50 and 59. In terms of the association between NCDs and years of life loss in this country, a study by Khaw et al. (2023) found that, out of 3.5 million years of life lost in 2018, 72.2% were attributed to NCDs. The study also deduced that the major causes of premature deaths among Malaysians were ischemic heart disease (17.7%), lower respiratory illnesses (9.7%), traffic accidents (8.7%), stroke (8.0%), and diabetes mellitus (3.9%).

Lifestyle choices including food consumption are closely linked to NCDs. Therefore, it is important to start developing healthy eating habits in early adulthood as at this stage, individuals are able to make their own choices. The amount of authority or autonomy a youth has over food choices could be resulted to other health consequences such as eating disorders or obesity (Ziegler et al., 2021). To minimize the risk of contracting NCDs that are closely related to unhealthy lifestyles, young adults need to eat healthily given the fact that this stage of life establishes the groundwork for long-term health and wellbeing. Young people' present and future health can be significantly improved by supporting and encouraging appropriate eating habits, which lay the groundwork for a long and healthy life.

The understanding of young adults' motivation behind the food decision is crucial not only to the government, but also to the marketers and food industry players. Higher education students can serve as representatives of young adults by contributing their perspectives, concerns, and insights of the food choice motives. Thus, this study aims to identify the importance of food choice motives perceived by the higher education students and to determine the factors of food choice motives among the respondents.

Literature Review

Food Choice Motives (FCM) and Food Choice Questionnaire (FCQ)

The FCM is known as the people's intentions, reasons, or motives to decide on food consumption (Onwezen et al., 2019). The FCM can identify the factors that influence individual's food choices. Many studies have been conducted in the past to investigate differences in people's motives for eating and meal selection habits. The motives vary widely among diverse population due to demographics, dietary habits, lifestyle, culture, and environment.

A number of systematic questionnaire methods have been developed to understand dietary behaviours such as in eating disorders (Polivy et al., 1978), dietary restraint, disinhibition and hunger (Stunkard & Messick, 1985), children's food choices (Michela & Contento, 1986), and eating behaviour (van Strien et al., 1986). However, the aforementioned questionnaires did not include multidimensional measures of people's food choices to evaluate the perceived significance of various factors influencing consumers' food choices. With regards to this, Steptoe *et al.* (1995) developed the Food Choice Questionnaire (FCQ), which has been one of the most prominent approaches in understanding the motivations behind human's food decision.

Steptoe et al. (1995) introduced the FCQ consisting of 36-item in nine dimensions: *health* with six items concerning the prevention of chronic diseases and general nutrition; *mood* in which six items related to general awareness and mood; *convenience* with five items associated with the ease or difficulty of food purchase and preparation; *sensory appeal* which included four items with elements of smell, taste and appearance; *natural content* involved three items with additives and natural ingredients used; *price* considers three items concerning the cost of food; *weight control* concerning three items related to low calories and fat; *familiarity* consists of three items regarding the importance of eating accustomed diet, rather than trying novel food; and *ethical concern* with three items which is related to environmental and political issues.

Since its introduction, the FCQ has been widely utilized in more than 40 countries, and it has been translated into more than 20 languages (Cunha et al., 2018). Several studies have investigated the differences in food choice motives among different population. For example, one of the earliest cross-cultural studies conducted by Prescott et al. (2002) in four countries found that Taiwanese and Malaysian Chinese consumers exhibited similar preferences over food choice motives with *health*, *natural content*, *weight control*, and *convenience* as the most important factors. However, Japanese consumers favoured *price* as the most important while New Zealand consumers chose *sensory appeal*. With the exception of Japan, all countries rated *familiarity* and *ethical concern* as the least important factors, according to the same study. Another cross-cultural study on four different nations concluded that while *sensory appeal* was rated as the most important factor among European consumers (Belgium, Hungary, and Romania), the Philippines have rated *health* as the most significant motive (Januszewska et al., 2011). In addition, a study by Markovina et al. (2015) across nine European countries also found differences in the food motives' rankings. In five countries (Spain, Greece, Ireland, Portugal, and the Netherlands), *price* was shown to be the most significant factors when making food choices; in three other countries (Norway, Germany, and the UK), *sensory appeal* was placed highest; and in Poland, *natural content* was found to be the most significant motive. Consumers in all covered countries in the study listed *familiarity* and *ethical concern* as the least important motives.

Interestingly, several recent studies have focused on the differences in food choice motives before and during COVID-19. For example, Mertens et al. (2022) observed that *sensory appeal* was the most important component followed by *convenience* and *health* respectively before and during the COVID-19 pandemic in Belgium. Other study by Głabska et al. (2020) among Polish adolescents indicated that there were significant differences in food choice motives before and during the COVID-19 global pandemic, with the increased importance of *health* and *weight control* and the decreased in *mood* and *sensory appeal* during the pandemic.

In Malaysian context, past studies have reported some similarities in the most and least important motives of food choices in diverse categories of respondents. One of the most important motives rated were *health* (Asma et al., 2010; Abdul Rahman et al., 2012; Saipudin et al., 2022), *sensory appeal* (Abdul Rahman et al., 2012; Mohd-Any et al., 2014; Tan et al., 2021; Mohammad Johari et al., 2023), *price* (Mohd-Any et al., 2014; Tan et al., 2021; Mohammad Johari et al., 2023), *convenience* (Asma et al., 2010; Mohd-Any et al., 2014; Tan et al., 2021), and *mood* (Mohammad Johari et al., 2023). Due to the fact that majority of the population are Muslims, some studies incorporate the *religion* motive introduced by Asma et al. (2010) and found *religion* as one of the most important factors (Asma et al., 2010; Abdul Rahman et al., 2012). On a different note, *familiarity* (Asma et al., 2010; Abdul Rahman et al., 2012; Saipudin et al., 2022; Mohammad Johari et al., 2023) and *ethical concern* (Asma et al., 2010; Abdul Rahman et al., 2012; Mohammad Johari et al., 2023) were ranked as the least important motives of food choice. Asma et al. (2010) found, surprisingly, that, in contrast to other studies that have reported *sensory appeal* as one of the highest rated important motives, it was rated as one of the bottom three motives of food choice in both groups of Malay husbands and wives in urban communities.

The Factors of Food Choice Motives

A number of studies have added items to the FCQ in addition to the original nine dimensions. Among others, by including political values, ecological welfare, and religion in the FCQ, Lindeman and Väänänen (2000) came to the conclusion that all of the new items were generally rated as less important than many of the original items in the food choice motives. Other study on food choice motives in an urban setting in Malaysia as discussed earlier has added religion factor into the FCQ to align with the respondents' cultural traits (Asma et al., 2010).

From the initial nine factors of the FCQ, some studies have been able to determine new factor structures. In accordance with Lindeman and Väänänen's (2000) research, a revised FCQ was administered to Irish teenagers in order to ascertain their motives for choosing particular foods using exploratory factor analysis (EFA) which resulted with five components (Share & Stewart-Knox, 2012). The factors include *health*, *mood*, *price/convenience*, *animal rights*, and *religion*. Seven factors were found in another study conducted by Jauregui-Lobera and Rios (2011) among the relatives of Spanish school students, which included *price*, *weight control*, *mood*, *convenience*, *sensory appeal*, *familiarity*, and *health and natural content*. In addition, Wang et al. (2015) discovered a new food choice motive components in China that is thought to be more applicable in the setting of Chinese consumers, which includes six components as follows: *mood*, *health concern*, *sensory appeal*, *time or money saving*, *availability and familiarity*, and *food safety concern*. A more recent study in Brazil combined *weight control* and *natural content* components into a new component known as *nutritional composition* (Marsola et al., 2020). The study also divided the originally *convenience* factor to form separated components which being labelled as *convenience of preparation* and *convenience of purchase*.

In Malaysia, several studies have applied EFA to propose new structures of food choice motives. Mohd-Any et al. (2014) derived a seven-factor solution with six of the factors (*mood, price, convenience, sensory appeal, ethical concern, and familiarity*) were consistent with Steptoe et al. (1995). The items from the original factors of *health, weight control, and natural content* were combined to form the seventh factor, which was labelled as *balanced diet*. The findings of the abovementioned study indicates that the FCQ can be further adapted in Malaysian setting. Furthermore, a study by Ooi et al. (2015) has identified six factors that explained 45.9% of the variance in food choice motives which were named as *health and nutrition knowledge, price and convenience, mood and sensory appeal, media, peers, and parents*. The study also concluded that variables including *familiarity, ethical concern, and religion* have been eliminated since their components were not clearly loaded on a single factor.

It is indisputable that FCM as implied in FCQ can be used to identify the importance as well as the underlying factors of Malaysians' higher education students regarding the food choice motives. To the best of the authors' knowledge, there are limited current studies of the factor analysis of food choice motives applied in the country. Hence, the following research questions are developed:

- RQ1 : What are the top three important food choice motives among the higher education students?
- RQ2 : What are the bottom three important food choice motives among the higher education students?
- RQ3 : What are the factors derived from the factor analysis, and how much of the variance is explained by the factors?

Methodology

Participants

The responses were acquired by conducting a combination of convenience and snowball sampling via an online survey. By using the two approaches, a larger population can be reached by utilizing digital platforms and networks. The Google Form was used due to its ability in distributing brief surveys, generating charts, and extracting data for spreadsheet analysis (Nayak & Narayan, 2019). The present study targeting Malaysian students from higher learning institutions in the country who are 18 years and older. The targeted respondents were approached via social media platforms including Facebook, Instagram, and Whatsapp. They were then requested to fill out the Google Form. Additionally, they were also asked to assist in sharing the Google Form link to their friends and relatives. The survey was conducted from 24th July to 7th November 2023. Before answering the questionnaire, respondents were asked to provide informed consent, which signifies that they have willingly accepted after being fully advised of the ramifications of taking part in the study.

Questionnaire

Structured questionnaire was designed to explore the importance of food choice motives among Malaysian higher education students. The first section of the questionnaire covered the demographic questions including gender, age, race, and religion. The second section comprised questions on food choice motives. This study adapted the 36-item of FCQ developed by Steptoe et al. (1995) and added two additional items adapted from Asma et al. (2010) to align to the cultural traits of Malaysians. The original FCQ in English was translated into Malay and was distributed in both languages in the Google Form. In the present study, the respondents were

requested to rank the degree of importance for the 38-item according to the following question, “It is important to me that the food I eat on a typical day...”. Some examples of the items were: “is nutritious”, “contains natural ingredients”, and “comes from the countries I approved of politically”. In addition, the two items adapted from Asma et al. (2010) were “has certification from the government” and “is permissible by religion”. Given that a 5- or 7-point scale has been utilized in most of the previous studies (Markovina et al., 2015), the 5-point Likert scale was used in the present study instead of the original 4-point by Steptoe et al. (1995), ranging from scale 1 = “not important at all” to scale 5 = “extremely important”.

Analyses

Statistical analyses were performed using IBM SPSS software (version 23.0) for the descriptive and factor analyses. The descriptive analyses were conducted to report both the frequency and percentage of respondents by gender, age, race, and religion. Additionally, the analyses also used to describe the central tendency (mean) and variation (standard deviation) of food choice motives in its initial grouping structure including the new factor of *religion* as well as for each item in the food choice motives (percentage, mean, and standard deviation) to achieve the first objective, and to answer the first and second research questions. On the other hand, the EFA was performed to identify underlying factors of food choice motives to fulfil the second objective as well as to answer the third research question of the present study. Finally, the reliability test was performed to test the internal consistency of the proposed factors using Cronbach’s alpha coefficient.

Results

Descriptive Analysis

Demographic Profile

A total of 681 responses were accumulated throughout the study period. However, only 526 responses were retained, and the remaining responses were discarded because they did not fit the requirements of being a student at a higher institution or being 18 years old and above. Table 1 summarizes the demographic profiles. More than half of the respondents were females (59.1%). In the age category, majority of the respondents (nearly 90%) were below 24 years old conforming that they were undergraduate students. More than 60% of the respondents were Malay, with other ethnic groups, notably the natives of Sarawak and Sabah ranked in second with 26.6%. In terms of religion, majority of the respondents were Muslims (71.7%), and the remaining were either Christians, Buddhist, Hindus or other religions/faiths.

Table 1: Respondents’ Demographic Profile (n=526)

Category	Frequency	Percentage
<u>Gender</u>		
Male	215	40.9
Female	311	59.1
<u>Age</u>		
20 and below	129	24.5
21 – 23	341	64.8
24 – 26	52	9.9
27 and above	4	.8

<u>Race</u>		
Malay	323	61.4
Chinese	32	6.1
Indian	31	5.9
Others	140	26.6
<u>Religion</u>		
Islam	377	71.7
Christian	70	13.3
Buddhism	31	5.9
Hinduism	30	5.7
Others	18	3.4

Source: Authors

The Importance of Food Choice Motives

The mean scores (m) for the factors of the food choice motives ranged from 3.76 to 4.38 whereas the standard deviation (sd) ranged from .98 to 1.20 (Table 2). The top three important motives reported by the respondents were *religion* (m = 4.38, sd = 1.04), *sensory appeal* (m = 4.26, sd = .98), and *price* (m = 4.25, sd = 1.00). On the contrary, the bottom three of important motives were *ethical concern* (m = 3.76, sd = 1.20), *familiarity* (m = 3.77, sd = 1.13), and *weight control* (m = 3.78, sd = 1.11).

Table 2: Food Choice Motives – Mean and Standard Deviation (n=526)

It is important to me that the food I eat on a typical day ...	m	sd
Health	4.11	1.00
9. is high in fibre and roughage	3.85	1.04
10. is nutritious	4.14	.99
24. contains a lot of vitamins and minerals	4.08	1.00
29. is high in protein	4.10	1.00
31. keeps me healthy	4.28	.97
32. is good for my skin/teeth/hair/nails/etc	4.19	1.00
Mood	4.04	1.06
13. cheers me up	4.33	1.00
16. helps me cope with stress	4.14	1.06
26. keeps me awake	3.59	1.18
28. helps me relax	4.02	1.05
33. makes me feel good	4.17	.98
36. helps me cope with life	3.96	1.08
Convenience	4.15	.99
1 is easy to prepare	4.15	.98
11 is easily available in shops and supermarkets	4.21	.96
15 can be cooked very simply	4.25	.98
30 takes no time to prepare	4.02	1.06
37 can be bought in shops close to where I live or work	4.11	.99
Sensory Appeal	4.26	.98
4 tastes good	4.47	.91
14 smells nice	4.35	.94
18 has a pleasant texture	4.19	1.00
27 looks nice	4.02	1.06

Natural Content	3.82	1.09
2 contains no additives	3.62	1.10
5 contains natural ingredients	3.90	1.09
25 contains no artificial ingredients	3.94	1.08
Price	4.25	1.00
6 is not expensive	4.27	.98
12 is cheap	4.24	1.03
38 is good value for money	4.24	.99
Weight Control	3.78	1.11
3 is low in calories	3.64	1.11
7 is low in fat	3.80	1.08
17 helps me control my weight	3.91	1.15
Familiarity	3.77	1.13
8 is familiar	3.93	1.10
23 is like the food I ate when I was a child	3.56	1.18
35 is what I usually eat	3.83	1.11
Ethical Concern	3.76	1.20
19 is packaged in an environmentally friendly way	3.93	1.13
20 comes from countries I approve of politically	3.47	1.32
34 has the country of origin clearly marked	3.89	1.14
Religion	4.38	1.04
21 has certification from the government	4.31	1.07
22 permissible by religion	4.45	1.01

Source: Authors

In order to identify which individual statement/s perceived as the most as well as the least important motives of food choice, the information on the individual statement list along with the percentage of each scale, mean, and standard deviation are provided in Table 3. By combining responses from “very important” (scale 4) to “extremely important” (scale 5), ten items scored more than 80% indicating a high level of importance. These items include “tastes good” (89.1%), “smells nice” (85.9%), “permissible by religion” (85.4%), “cheers me up” (82.7%), “keeps me healthy” (82.7%), “is easily available in shops and supermarkets” (82.7%), “can be cooked very simply” (81.2%), “has certification from the government” (81.2%), “is not expensive” (80.8%), and “has a pleasant texture” (80.1%). On the other hand, five items had a level of importance less than 60%. The least importance item reported by the respondents was “contains no additives” (50.5%), followed by “comes from countries I approve of politically” (51.3%), “is like the food I ate when I was a child” (51.7%), “is low in calories” (55.0%), and “keeps me awake” (55.5%).

The mean scores for the individual food choice motives ranged from 3.47 to 4.47 with standard deviations ranging from .91 to 1.32. The three highest means recorded was for the item “tastes good” ($m = 4.47$, $sd = .91$), “permissible by religion” ($m = 4.45$, $sd = 1.01$), and “smells nice” ($m = 4.35$, $sd = .94$). On the contrary, the least mean scores were for the items “comes from countries I approve of politically” ($m = 3.47$, $sd = 1.32$), “is like the food I ate when I was a child” ($m = 3.56$, $sd = 1.18$), and “keeps me awake” ($m = 3.59$, $sd = 1.18$).

Table 3: Percentage, Mean and Standard Deviation of Food Choice Motives (n=526)

It is important to me that the food I eat on a typical day ...		Percentage						
		1	2	3	4	5	m	sd
1	is easy to prepare	3.0	2.7	15.4	34.2	44.7	4.15	.98
2	contains no additives	4.6	7.2	37.6	22.4	28.1	3.62	1.10
3	is low in calories	4.6	9.3	31.2	27.8	27.2	3.64	1.11
4	tastes good	3.2	1.0	6.7	24.1	65.0	4.47	.91
5	contains natural ingredients	4.2	5.7	22.4	31.2	36.5	3.90	1.09
6	is not expensive	3.2	1.3	14.6	27.0	53.8	4.27	.98
7	is low in fat	3.8	7.6	24.7	32.7	31.2	3.80	1.08
8	is familiar	4.6	5.5	20.3	31.2	38.4	3.93	1.10
9	is high in fibre and roughage	3.4	5.1	27.2	31.9	32.3	3.85	1.04
10	is nutritious	3.4	2.1	16.3	32.9	45.2	4.14	.99
11	is easily available in shops and supermarkets	2.9	2.9	11.6	35.9	46.8	4.21	.96
12	is cheap	3.4	3.0	13.7	25.7	54.2	4.24	1.03
13	cheers me up	3.6	1.5	12.2	23.6	59.1	4.33	1.00
14	smells nice	3.0	1.5	9.5	29.1	56.8	4.35	.94
15	can be cooked very simply	3.0	2.3	13.5	29.3	51.9	4.25	.98
16	helps me cope with stress	3.6	4.2	15.6	27.8	48.9	4.14	1.06
17	helps me control my weight	4.8	6.8	21.5	26.2	40.7	3.91	1.15
18	has a pleasant texture	3.0	3.4	13.5	31.2	48.9	4.19	1.00
19	is packaged in an environmentally friendly way	4.8	6.1	20.9	27.8	40.5	3.93	1.13
20	comes from countries I approve of politically	10.5	12.9	25.3	21.5	29.8	3.47	1.32
21	has certification from the government	4.4	3.0	11.4	19.8	61.4	4.31	1.07
22	permissible by religion	4.0	1.7	8.9	16.2	69.2	4.45	1.01
23	is like the food I ate when I was a child	5.7	12.0	30.6	23.8	27.9	3.56	1.18
24	contains a lot of vitamins and minerals	3.0	2.7	20.2	31.7	42.4	4.08	1.00
25	contains no artificial ingredients	4.4	4.4	21.9	31.7	37.6	3.94	1.08
26	keeps me awake	6.8	10.3	27.4	28.5	27.0	3.59	1.18
27	looks nice	3.8	5.1	17.5	32.9	40.7	4.02	1.06
28	helps me relax	3.8	4.0	19.2	32.3	40.7	4.02	1.05
29	is high in protein	3.2	2.7	18.3	32.9	43.0	4.10	1.00
30	takes no time to prepare	3.0	6.1	19.2	29.7	42.0	4.02	1.06
31	keeps me healthy	3.0	2.3	12.0	29.3	53.4	4.28	.97
32	is good for my skin/teeth/hair/nails/etc	3.0	2.7	16.0	28.7	49.6	4.19	1.00
33	makes me feel good	3.0	2.5	14.6	33.7	46.2	4.17	.98
34	has the country of origin clearly marked	5.1	7.2	19.0	30.8	37.8	3.89	1.14
35	is what I usually eat	4.6	7.2	22.4	31.9	33.8	3.83	1.11
36	helps me cope with life	4.4	4.9	19.6	32.7	38.4	3.96	1.08
37	can be bought in shops close to where I live or work	3.2	2.9	16.2	34.8	43.0	4.11	.99
38	is good value for money	3.0	2.1	15.6	26.4	52.9	4.24	.99

Source: Authors

Exploratory Factor Analysis (EFA)

With direct oblimin rotation in the EFA, thirty-eight items measuring the motives for food choice were analyzed using principal component analysis (PCA). After removing items with low factor loading or cross-loading, the final analysis retained 25 items only. Four-factor solutions were suggested, with items ranging from two to nine. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .959, indicating an excellent value for factor analysis according to Tabachnick and Fidell (2007). The correlation matrix's overall significance was .000, and the Bartlett's test of sphericity yielded a value of 10593.24. This suggests that factor analysis would be a good fit for the data.

The result indicated that, based on each value of eigenvalue greater than 1.0 as minimum requirement, the EFA procedure generated four components or factors. The eigenvalues ranged from 1.06 to 13.48 and the four suggested factors explained 53.94%, 7.45%, 4.90% and 4.23% of the variance in the food choice motives respectively. Overall, these factors explained 70.51% of the total variance, which is greater than the minimum threshold of 60% as suggested by Awang et al. (2017).

The four-factored solution established acceptable factor loadings on all factors (above .5) as shown in Table 4. Factor 1 was made up of nine items with factor loadings ranging from .596 to .928. This factor was labelled as *balanced diet* which included combination of three items each from *health*, *weight control* and *natural content* in the original motives of food choice. Factor 2 comprised eight items with factor loadings from .583 to .844 and was named as *convenience and price*. The items included in this factor were related to *convenience* (four items), *price* (three items), and *sensory appeal* (one item). Factor 3 consisted of six items related to *mood* (three items), *familiarity* (two items), and *ethical concern* (one item) and subsequently was labelled as *comfort food* with factor loadings from .571 to .805 respectively. Finally, Factor 4 which included two items was named as *religion* with factor loadings of .913 for item 'permissible by religion' and .903 for item 'has certification from the government'. Using Cronbach's alpha, the four-factored scale was further examined individually to look at the overall internal consistency of each factor. The four factors had Cronbach's α coefficients ranging from .881 to .939, which suggests very good to excellent internal reliability.

Table 4: Percentage, Mean and Standard Deviation of Food Choice Motives (n=526)

Factor	Factor Loading			
	1	2	3	4
1. Balanced Diet (variance = 53.94%, eigenvalues = 13.48, α = .939)				
3. is low in calories	.928			
7. is low in fat	.818			
2. contains no additives	.804			
5. contains natural ingredients	.789			
9. is high in fibre and roughage	.746			
10. is nutritious	.717			
17. helps me control my weight	.634			
25. contains no artificial ingredients	.612			
24. contains a lot of vitamins and minerals	.596			
2. Convenience and Price (variance = 7.45%, eigenvalues = 1.86, α = .935)				
12. is cheap		.844		
6. is not expensive		.791		
11. is easily available in shops and supermarkets		.700		

38.	is good value for money	.672
14.	smells nice	.660
15.	can be cooked very simply	.639
1.	is easy to prepare	.627
37.	can be bought in shops close to where I live or work	.583
3. Comfort Food (variance = 4.90%, eigenvalues = 1.22, α = .892)		
26.	keeps me awake	.805
23.	is like the food I ate when I was a child	.787
36.	helps me cope with life	.703
35.	is what I usually eat	.669
28.	helps me relax	.640
20.	comes from countries I approve of politically	.571
4. Religion (variance = 4.23%, eigenvalues = 1.06, α = .881)		
22.	permissible by religion	.913
21.	has certification from the government	.903

Source: Authors

Discussion and Conclusion

In a country like Malaysia in which the population is struggling with the health issues particularly involving the healthy and balanced diet, an understanding of the factors influencing people in their choices of food is deemed important. Developing a basis for comprehending Malaysians higher education students' healthy eating habits is the most crucial consideration after examining the motives behind food choices. Although most people may not have changed their unhealthy eating habits, an understanding of the motives will help to encourage healthier eating behaviors (Sharkawi et al., 2021).

The descriptive findings of the importance of food choice motives showed consistency with previous research in which the top three highest rated score were *religion* (Asma et al., 2010; Abdul Rahman et al., 2012), *sensory appeal* (Prescott et al., 2002; Januszewska et al., 2011; Abdul Rahman et al., 2012; Mohd-Any et al., 2014; Markovina et al., 2015; Tan et al., 2021; Mertens et al., 2022; Mohammad Johari et al., 2023), and *price* (Prescott et al., 2002; Mohd-Any et al., 2014; Markovina et al., 2015; Tan et al., 2021; Mohammad Johari et al., 2023). The importance of religion as the top-rated factor is understandable due to the fact that majority of the respondents were Muslims. This is supported by the second highest score of the item "permissible by religion" as rated individually. The attractiveness features of the food which was perceived by the respondents as "tastes good" and "smells nice" further indicates the importance of *sensory appeal* in their food selection. Finally, *price* was ranked as one of the most significant factors, as might be expected. The price factor is vital to students' life survival for obvious reasons, including financial constraints.

With regard to health-related motives, the *health* motive was ranked as the fifth important factor, while *natural content* and *weight control* were placed at seventh and eighth important motives respectively. This further indicates that the health-related motives were not valued as more important than other factors including *religion*, *sensory appeal*, *price*, and *convenience* factors. Some factors may be able to explain this situation. Taste preferences and hedonism, where young adults may seek out instant gratification and enjoyment from their food regardless of whether the food is healthy or not, would be one of the main contributing factors. The busy lifestyles, financial constraints and limited cooking facilities may also contribute to the unpopularity of health-related motives among the higher education students.

Moving on to the least important motives, two of the bottom three important motives in the present study demonstrated similarities with most of the prior studies. As such, *ethical concern* and *familiarity* were consistently reported in the literatures as being the least important factors (Prescott et al., 2002; Asma et al., 2010; Abdul Rahman et al., 2012; Markovina et al., 2015; Mohammad Johari et al., 2023). However, in contrast with this study which reported *weight control* as one of the least important motives, several prior studies have recorded the motive as one of the most important, for example in Prescott et al. (2002). In fact, a comparison study on Polish adolescents before and during the COVID-19 pandemic showed an increased importance of *weight control* (Głabska et al., 2020). Thus, the findings of the present study warrant further attention. The lack importance of *weight control* motive indicates an alarming health situation of young adults in this country. Being overweight and obese significantly contributing to various NCDs including cardiovascular disease, diabetes mellitus, kidney failure and various types of cancer.

The EFA results suggested that none of the four-factor solution is consistent with the original nine-factor of FCQ. Thus, it implied that some modifications should be made to consider other factors that might fulfil the Malaysians students' food choice motives. The factor structure from the EFA results shows somewhat similar findings as in previous studies attempting to modify the FCQ (Jauregui-Lobera & Rios, 2011; Share & Stewart-Knox, 2012; Wang et al., 2015; Marsola et al., 2020). Furthermore, the suggested first factor is consistent with the seventh factor of a study by Mohd-Any et al. (2014). This therefore confirmed the *balanced diet* factor which combined items from *health*, *weight control*, and *natural content* is the most popular factor people considered in their food choice decisions, not only in other populations but also among Malaysian population. Additionally, the proposed factor suggested that people's perceptions of healthy food consumption may not only specifically related to food that is high in fibre and roughage, protein, vitamin, and mineral or food that is nutritious, keeps ones healthy, and good for body parts, but also includes the motives for controlling weight and consuming food with natural content.

The second factor of *convenience and price*, which consistent with previous studies (Share & Stewart-Knox, 2012; Ooi et al., 2015), included items from *convenience*, *price*, and *sensory appeal* are also important combinations in the people's food choice motives. The busy lifestyles of the higher education students' populations require a change in the food consumption structure. This generation demanded food that is not only convenience to be acquired, prepared, and cooked, but also affordable and tasty.

The third suggested factor, *comfort food* comprised combination items from *mood*, *familiarity*, and *ethical concern*. Looking at the perceived importance, most of the items in this factor were rated rather below than other items in the overall motives, ranging from a mean of 3.47 to 4.02. This indicates that although the students valued food that helps them to relax, they were quite unconcern of the political issues or favored familiar food. This further implies that in this country, novel food may gain popularity among higher education students as this group has the tendency to try irregular food that they are not familiar with, regardless of political concern towards the countries.

The *religion* factor is derived from this study and understandable since majority of the respondents were Muslims and strictly adhered to Islam *syariah* in food consumption. The finding was in line with previous studies conducted for Malaysian population (Asma et al., 2010; Abdul Rahman et al., 2013). Despite the fact that this factor only contributes less than

five percent of the variance in the food choice motives, it should be noted that there were only two items constituted in this factor. Furthermore, the two factors displayed the top three highest loadings in the proposed factor structure. The findings offer some suggestions that future studies should incorporate other items than 'is permissible by religion' and 'has certification from the government'. Muslim populations are known to consume foods that are not forbidden by Islam including no pork, slaughtered animals, and no alcoholic beverages. Obedient Indians also practice diet with beef-free as cow is considered as sacred animal in the religion. Additionally, some ethnics or religions may practice distinct diets such as vegetarians and stringent diet including those with low carbohydrate and sugar.

Overall, the variance of the food choice motives explained by the four factors which was 70.51% is satisfactory, and higher than those reported in most of the prior studies, for example 62.28% in Share and Stewart-Knox (2012), and 45.9% in Ooi et al. (2015). However, future studies especially in Malaysian context should explore other factors that may significantly contribute to the understanding of food choice motives of the population. As the findings suggested that *religion* factor was perceived as the most important factor, further studies should be directed towards the role of religion in explaining the motivations behind the food choices.

The findings of this study will be beneficial for future research in modifying the factors' structure of the original FCQ to better explain the food choice motives. In practical contribution, the findings are important in improving healthy eating campaign intervention among the young adults' population as well as exploring the individual' motivation on food choice decision that will be helpful to the marketers and food industry players. Foods offered in the market should meet the *halal* requirements, be tasty and attractive, reasonably priced, and easy to obtain.

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