A cross-sectional statistical survey analysis on consumer perceptions of domestic relative to foreign goods in Iraq

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Abstract

The research aims to identify the most important factors affecting the acquisition of local or imported goods by designing a questionnaire form that was distributed to a sample of shoppers in Iraq. The Chi-square test was used in the statistical analysis, while the characteristics that were used in the analysis were demographic characteristics, namely sex, age, educational attainment, profession, culture, intelligence, economic status, marital status, number of children, residence, in addition to the personal characteristics that the consumer is accustomed to and other aspects that were addressed. The analysis showed a set of conclusions, in general, that the majority of shoppers prefer cheaper goods if they are of the same quality, and there is a preference for some local needs over imported ones, such as dairy, meat, sweets, and curtains, while imported goods are preferred over local ones when purchasing clothes and furniture.

1. Introduction

After many years of famine and deprivation that Iraqis lived under the siege before 2003, imported goods and foreign merchandise returned to spread in Iraqi trade centers. With the continued spread of goods and merchandise, the demand for purchasing increased, and the demand for imported products increased at the expense of the local product, which became limited and restricted to certain goods without others. The spread of imported goods led to the elimination of local industry and hindered its continuity. Despite the authenticity and quality of the local product, we find that the prices of the imported product competed with the prices of the local product and outperformed it; the Iraqi citizens refrained from purchasing local goods and preferred imported goods, which became cheaper and more widespread. Most people choose one product over another for two reasons: either product quality or to save money that would be useful for purchasing other goods or other benefits. We find that consumers may not be convinced by the local products, or they may have abandoned the option and become accustomed to purchasing imported products. Previous studies on consumer spending patterns have confirmed that the majority of Iraqi families, in order to optimize their income, plan ahead before shopping. In addition, to conserve income, Iraqi consumers generally prefer cheaper imported products over local ones. Even when prices are equal, the majority choose the imported product [1]. Hence, the need to

understand the most important motives and factors underlying the preference for imported products over local ones, and the research objective crystallizes in identifying the factors that most influence consumers' purchase of imported products over further local products, and determining the positive or negative impact of these factors on the purchasing process.

2. Literature review

The Chi-square test has been an important tool in the past and present due to its importance in identifying independent and dependent variables. Many studies have relied on this tool in various social, health, biological, psychological, educational, marketing, and other fields. Among these studies, [2] researched the impact of demographic characteristics on consumer preferences in Karbala Governorate, Iraq; [3] studied the relationship between absenteeism and the type of school. As for the field of marketing, we find [4] analyzed the relationships around certain behaviors. In the field of health and disease, [5] studied the relationship between respiratory diseases and smoking. Researchers [6] analyzed the relationship between preferred products and the characteristics that distinguish customers. Moreover, [7] proposed a new test for high-dimensional data, where the test demonstrated its power in revealing the complexity of relationships; [8] used the chi-square in text classification. Research by [9] provided evidence of the applications of the chi-square in health behaviors, and [10] studied the relationship between graduation rates and participation in learning programs. Researchers [11] used the digital resources by region, educational level, and sex, while [12] studied the factors affecting the consumer during the purchasing process.

3. The methodology

A field study was conducted by designing a questionnaire for a sample of 200 citizens who frequent shopping places in Iraq. The stratified random sample method was used in selecting the sample size using the population census data in Iraq for the year 2024 by applying the proportional stratified sampling formula [14]:

$$nh = \frac{Nh}{N} \times n \qquad (1)$$

Let n represent the total sample size to be drawn, N the total population, Nh is the size of the sub-population (such as males, females, or different governorates), and nh the stratified sample size—that is, the number of individuals to be selected from each stratum. To examine the relationships between variables, an independence test based on the Chi-square distribution is used. This is a non-parametric statistical method [13], which helps identify associations between categorical variables, either nominal or ordinal [15], by comparing observed frequencies with expected frequencies. The variables under consideration include gender, age, educational level, profession, cultural background, intelligence, economic status, social status, number of children, place of residence, and other personal characteristics typically associated with consumer behavior.

Consumers' choice of local or imported goods is influenced by the following variables: age, gender, marital status, occupation, number of family members, educational attainment, general culture, geographic area, and intelligence level.

The definition of product is a general term that includes everything manufactured or prepared for sale, marketing, and export to individuals, groups, or countries. This includes industrial, agricultural, and service products [16]. A consumer is any person who is offered a product to satisfy their personal or family needs, or with whom a transaction or contract is made in this regard. Consumers are influenced by different types of influences: psychological, cultural, social, and personal [17].

Industry in Iraq is a traditional industry that has been and continues to be linked to the petroleum industry. Oil refining, fertilizer production, and chemical industries are the country's main industries. Industries in Iraq are divided into two main categories – extractive and processing industries.

Extractive industries: These industries rely on the extraction of petroleum and natural gas, in addition to minerals such as sulfur and phosphate.

Processing industries can be divided into:

- Food: These include the dairy industry, the edible oil industry, and the sugar industry (the sugar produced in Iraq is known for being among the finest and purest types of sugar), in addition to the canning industry, the beverage industry, and water purification plants.
- Leather and textile industries: These include cotton textiles and spinning, woolen weaving, silk weaving, leather, carpets, rugs, ready-made garments, and others.
- Building materials industries: These include the cement industry, which is considered the strongest and oldest industry in Iraq, as well as the brick and other building materials industry.
- Chemical industries: These include petrochemicals. Such as the liquefied natural gas (LNG) industry, the refining industry, and the chemical fertilizer industry. There are also cleaning materials, glass, paper, pharmaceuticals, and batteries.

The reason for the decline in the added value of the manufacturing sector is attributed to several factors, the most important of which are [18]:

1. The cessation of production in some factories and companies due to the security situation.
2. Frequent power outages for long periods.
3. The collapse of infrastructure.
4. The halt of most investment operations due to the budget deficit, the decline in investment spending, and the cancellation and postponement of some projects.
5. The dominance of foreign products in the market.

There are other factors that contributed to the deterioration of Iraqi industry after the adoption of an open-door policy regarding foreign trade, which resulted in filling the markets in Iraq with products from various countries around the world [19], sometimes from unknown origins, without regard for the protection of local production or the Iraqi consumer. This chaos has led to the manufacturing industry reaching its final slump.

Chi-square test used with count data in the form of replication. It is a test of independence and is used for estimating the probability that some non-random factor accounts for the noticed correlation [13]. Chi-square is a statistical measure symbolized by the Greek symbol χ. It was first developed by Karl Pearson in 1900, and it has evolved into a widely adopted method in the field of statistical analysis. The basic idea of the χ^2 Chi-square test is to determine the difference between the observed values actually obtained from the sample and the corresponding values expected to be obtained in the population, and to test the extent of this difference.

Assumptions of the Chi-square test [20][21]:
- The data in each cell are frequencies, not percentages.
- It is essential that the data be randomly selected from the population of interest.
- The variables are mutually exclusive.
- The study groups must be independent.

As a general instruction, if the observed frequencies are more than 200% Chi-square should not be used for the expected frequencies, i.e., less than 5 in the table. This problem can be overcome in two ways: either by combining some of the classes (if this combination does not affect the results of the experiment) or by obtaining more data (by increasing the sample size).

The steps for conducting this test are:

Step 1. Formulate the hypotheses.
      H0: There is no relationship between the two variables.
      H1: There is a relationship between the two variables.

Step 2. Determine the expected values for each cell in the table. The formula for calculating the expected values requires the sample size, the total number of rows, and the total number of columns.

Step 3. To assess whether the data provide sufficient evidence to reject the null hypothesis, the observed frequencies obtained from the sample are compared with the expected frequencies calculated under the assumption of independence.

The ready-made statistical program SPSS calculates the expected values in each cell when conducting the Chi-square test.

Step 4. Compute the Chi-square statistic

The calculated test statistic helps evaluate whether the variation between observed and expected frequencies reaches a level of statistical significance [21][22][23][24]:

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} \qquad (2)$$

where, O_i is the actual frequency, E_i is the expected frequency.

Step 5. Calculate the degrees of freedom, make the comparison, and make the decision:

Before conducting a test on the expected and actual data for one or two independent samples, we must extract the degrees of freedom. This helps us determine the degrees of significance in the probability tables so that we can compare the test results with them and thus determine the significance of the significant difference between the actual and expected data for one, two, or more samples. Finding the value of the degrees of freedom depends on the number of columns and rows in the statistical tables. The following equation is used to extract the degrees of freedom:

$$d.f = (r\text{-}1)\,(c\text{-}1) \qquad (3)$$

where, $d.f$ is used to indicate the degree of freedom; r represents the total number of distinct rows present in the contingency table, and c denotes the total number of column categories in the contingency table.

The testing process is summarized by the following steps:

1. Formulate the statistical hypotheses
2. Determine the degrees of freedom
3. Select an appropriate significance level, often set at 5%
4. Consult the Chi-square distribution table
5. Estimate the Chi-square test statistic using Formula 2
6. Compare the calculated χ^2 value with the tabulated value of χ^2. If the calculated Chi-square value exceeds the critical value, this suggests that the discrepancy between the observed and expected frequencies is statistically significant, leading to rejection of the null hypothesis. Conversely, if the test statistic is less than the critical value, the result is not statistically significant, and the null hypothesis is retained.
   a. Alternatively, the P-value approach may be used; if the calculated Chi-square value is smaller than the tabulated value, we conclude that the difference is not significant. Similarly, if the P-value is greater than the significance level, we accept the null hypothesis, and vice versa.

4. Results and discussion

A statistical questionnaire was designed containing a number of questions related to the subject of the problem to be studied, including sex, age, educational attainment, income, marital status, number of children, and place of residence. The questionnaires were distributed to a total of 200 shoppers who were randomly chosen to participate in the study from a number of retail outlets in all Iraqi governorates. The ready-made statistical

program SPSS and the Chi-square test calculator were used. Using Formula 1 [24] and the results of the 2024 General Population Census, the following measures were calculated:

The total population size is 46,118,793 = N. The total sample size is 200.

Male population size = N_1= 23,154,869,

Female population size =N_2 = 22,963,924.

The sizes of the sub-populations (males or females) according to the census results are as follows: $n_1 \simeq 100$ $n_2 \simeq 100$.

Table 1. Proportional allocation for each governorate by stratified random sampling

Province	Sub-Population *Nh*	Sample Size *nh*
Baghdad	8,780,000	42
Nineveh	3,730,000	18
Basra	3,223,000	16
Erbil	2,932,800	14
Sulaymaniyah	2,250,000	11
Duhok	1,772,000	9
Babil	1,820,000	9
Dhiqar	2,095,000	10
Diyala	1,637,000	8
Karbala	1,219,000	6
Najaf	1,472,000	7
Kirkuk	1,598,000	8
Muthanna	815,000	4
Maysan	1,112,000	5
Qadisiya	1,291,000	6
Salah al-Din	1,595,000	8
Anbar	1,800,000	9
Wasit	1,400,000	7

The relationship between sex and the preference for cheaper local or imported products is based on:

H_0: Sex and the choice of a cheaper local or imported product are statistically independent.

H_1: There exists a statistically significant association between the respondent's sex and their preference for either a cheaper local or imported product.

Table 2. Contingency table for the relationship between sex and the preference for the cheaper local or imported product

Sex	Local Product	Imported Product	Total
Male	71	29	100
Female	69	31	100
Total	140	60	200

Table 3. Chi-square test results

Chi-square statistic	p-value	Df	Tabulation value	The decision
0.0952	1	1	3.84	The result is not statistically significant, $p > .05$

From Table 3, it is noted that the value of the test statistic (the calculated χ^2 value) reached 0, comparing it with the tabular χ^2 value at a significance level of 0.05 and with one degree of freedom, which is equal to 3.84, it is noted that the tabular χ^2 value is greater than the calculated χ^2 value. This means that the relationship is not significant. Alternatively, we note that the p-value (1) is greater than the significance level (0.05), so we accept H_0, meaning that sex has no effect on the choice of a local or imported product. There is no statistically significant relationship between consumer preference for products and sex.
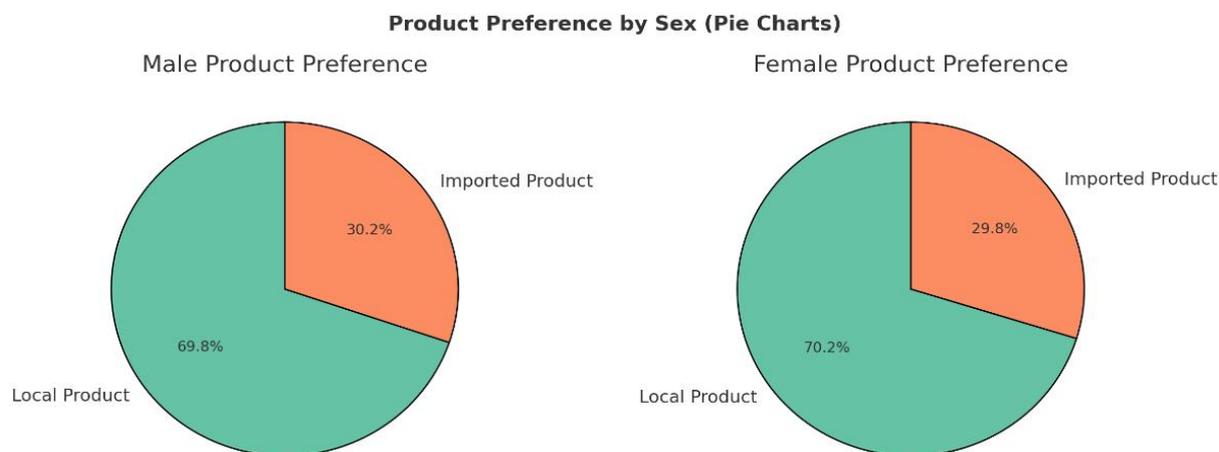

Figure 1. Pie charts for product preference by sex

For a statistical investigation of age-based preferences in choosing local or imported apparel, based on the null hypothesis (H_0), there is no statistically significant association between the respondent's age and their preference for either local or imported clothing products.

For the alternative hypothesis (H_1), a statistically significant relationship exists between the age of the consumer and their selection of local versus imported clothing items.

Table 4. Contingency table for exploring the association between age and clothing product preferences

Age Group	Local Product	Imported Product	Total
Less than 20	14	24	38
20–49	18	44	62
More than 49	46	54	100
Total	78	122	200

Table 5. The test of the Chi-square for product type preference with age

Chi-square statistic	p-value	Df	Tabulation value	The decision
4.723	0.094	2	5.99	The result is not statistically significant at p > .05

From Table 5, it is noted that the calculated value reached 4.723, which is smaller than the table value of 5.99. This means that the relationship is not significant, i.e., age has no effect on choosing the type of imported or local clothing product. Also, by associating with the significance level of 0.05, it is noted that the value is greater than the significance level, so it is rejected, which means that the relationship is not significant.

For the association between educational attainment and the selection of locally produced or imported animal-based products, based on the null hypothesis (H_0), there is no statistically significant association between the respondent's educational attainment and their preference for local or imported dairy and meat products. For the alternative hypothesis (H_1), a statistically significant relationship exists between educational attainment and the consumer's choice of either locally produced or imported meat and dairy items.

Table 6. Contingency table for the relationship between academic achievement and preference for dairy and meat products

Academic Achievement	Local Product	Imported Product	Total
Elementary school	10	22	32
Intermediate and secondary school	18	40	58
Bachelor's degree	26	34	60
Postgraduate studies	36	14	50
Total	90	110	200

Table 7. Chi-square test results

Chi-square statistic	p-value	Df	Tabulation value	The decision
21.809	0.0001	3	7.82	The result was found to be statistically significant at the 0.05 level

Since the calculated test statistic in Table 7 is greater than the tabulated Chi-square value, the null hypothesis is rejected, suggesting the presence of a statistically significant relationship. This suggests that there is a relationship between educational attainment and product choice, i.e., consumers with higher educational attainment are more likely to choose local products and prefer them over imported products. There is a statistically significant relationship between consumer preference for products and educational attainment. For assessing the association between income level and consumer preference for locally produced versus imported furniture.

For the null hypothesis (H_0), there is no statistically significant association between the consumer's income level and their preference for local or imported furniture products.

For the alternative hypothesis (H_1), a statistically significant relationship exists between income level and the type of furniture product selected (local or imported).

Table 8. The cross-tabulation of respondents' income levels and their corresponding choices regarding furniture and furnishings, distinguishing between local and imported products

Income Level	Local Product	Imported Product	Total
Excellent or good	12	52	64
Average	20	44	64
Poor	12	60	72
Total	44	156	200

Table 9. Chi-square test results

Chi-square statistic	p-value	D.f	Tabulation value	The decision
4.779	0.092	2	5.99	The result is not statistically significant at p > .05

The analysis shown in Table 9 that the calculated test value falls below the tabulated threshold, leading to the conclusion that the relationship between income and the selection of local or imported furniture is not statistically significant. Thus, the null hypothesis is retained. Income level does not appear to be a determining factor in the selection of local or imported furniture and furnishings, as the relationship was found to be statistically nonsignificant.
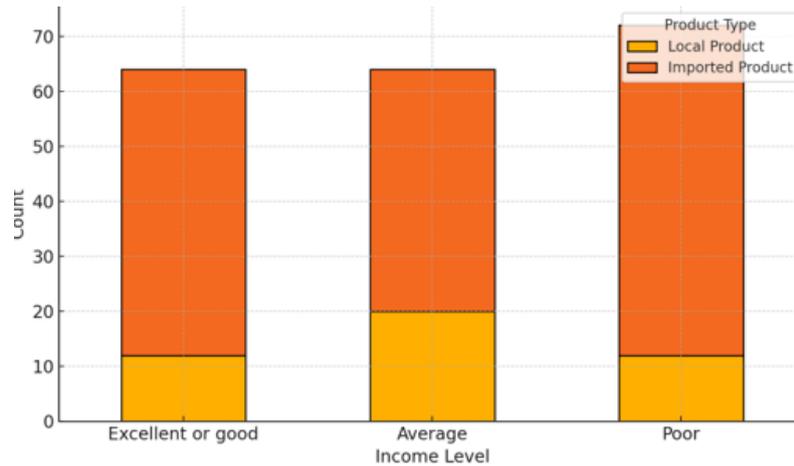
Figure 2. Bar charts for product choice for furniture and furnishings, and income

The relationship between marital status and choice of local or imported curtains has been evaluated based on:

H_0: There is no relationship between marital status and choice of local or imported curtains.

H_1: There is a relationship between marital status and the choice of local or imported curtains.

Table 10. Contingency table for the relationship between marital status and choice of curtains

Marital Status	Local Product	Imported Product	Total
Single	48	58	106
Married	78	16	94
Total	126	74	200

Table 11. Chi-square test results

Chi-square statistic	p-value	Df	Tabulation value	The decision
28.774	0.0000	1	3.84	The analysis indicates a significant relationship, supported by a p-value under the 0.05 cutoff.

From Table 11, since the calculated value is greater than the tabulated value, we reject H_0 and accept H_1 that there is a significant relationship between marital status and product choice. We find that married people prefer beautiful, high-quality Iraqi curtains over cheaper, simpler-made imported curtains. There is a statistically significant relationship between marital status and choice of curtains.
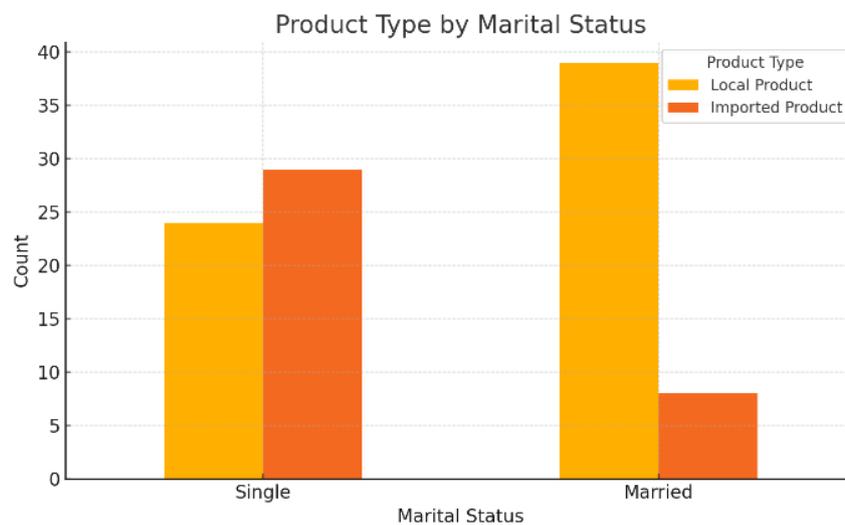

Figure 3. Bar charts for marital status and choice of curtains

Single - Product Preference
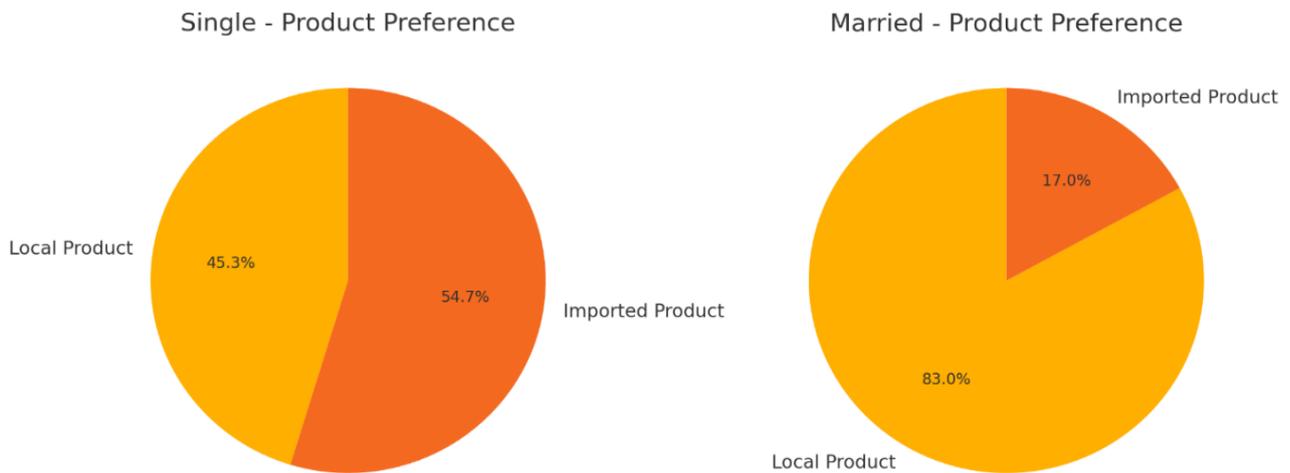
Married - Product Preference

Figure 4. Pie charts for marital status and choice of curtains

A statistically significant association was found between marital status and consumers' preference for curtain products. The relationship between the number of children and the choice of local or imported potato chips and ice cream has been considered.

H_0: There is no statistically significant association between the number of children in a household and the preference for local or imported potato chips.

H_1: A statistically significant relationship exists between the number of children and the consumer's choice of either locally produced or imported potato chips.

Table 12. Contingency table for the relationship between the number of children and the choice of local or imported potato chip products

Number of Children	The choice of local potato chips	The choice of imported potato chips	Total
1	20	36	56
2	28	44	72
3 or more	18	54	72
Total	66	134	200

Table 13. Chi-square test results

Chi-square statistic	p-value	Df	Tabulation value	The decision
3.400	0.183	2	5.99	The result is not statistically significant at p > .05

As the calculated chi-square value is less than the critical value from the distribution table, the null hypothesis is not rejected. This indicates that there is no statistically significant relationship between the number of children and the selection of local versus imported potato chips and ice cream products. We find that consumers are more likely to choose imported potato chips or ice cream than local potato chips or ice cream, regardless of the number of children. The statistical analysis revealed no significant association between the number of children in a household and the preference for imported potato chips. The relationship between the place of residence and choice of local or imported sweets has been considered based on the null hypothesis (H_0). There is no statistically significant association between consumers' place of residence and their preference for local or imported sweets.

For the alternative hypothesis (H_1), a statistically significant relationship exists between place of residence and the selection of either locally produced or imported sweet products.

Table 14. Contingency table for the relationship between consumer place and choice of local or imported sweets

Consumer Place	Local sweet	Imported sweet	Total
Close to the city center	76	38	114
Far from the city center	22	64	86
Total	98	102	200

Table 15. The results of the Chi-square test

Chi-square statistic	p-value	Df	Tabulation value	The decision
31.488	0.000	1	3.84	A statistically significant effect was observed, as the p-value was below the 0.05 threshold.

The test result demonstrates that the calculated value exceeds the tabulated threshold, providing sufficient evidence to reject the null hypothesis. This supports the conclusion that a significant relationship exists between the respondent's place of residence and their preference for local or imported sweets. We find that consumers closer to the city center are more likely to choose local confectionery products than imported ones. Conversely, consumers farther from the city center are more likely to purchase imported products than local ones, due to their ease of access and lower price compared to local ones. A statistically significant association was found between the respondents' place of residence and their choice of sweet products.
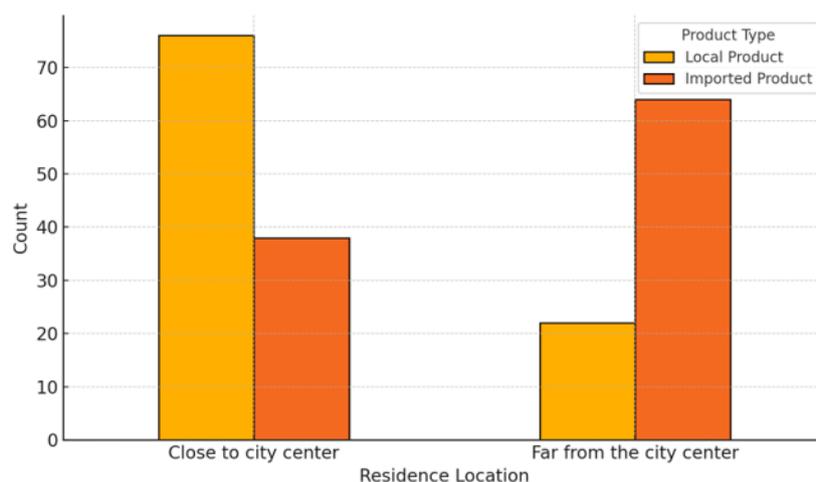

Figure 5. Bar charts between consumers' places and their choice of sweets

The impact of education on viewership choices: local, Arab, or foreign TV Series has been investigated based on:

H_0: There is no statistically significant association between educational attainment and viewers' preference for the type of television series (local, Arab, or foreign).

H_1: There is a statistically significant association between educational attainment and viewers' preference for the type of television series (local, Arab, or foreign).

Table 16. Conformity table for the relationship between academic achievement and the following types of TV series, whether local, Arab, or foreign

Academic Achievement	Local TV series	Arabic TV series	Foreign TV series	Total
Secondary school and below	16	44	30	90
Bachelor's degree	10	26	24	60
Postgraduate studies	10	12	28	50
Total	36	82	82	200

Table 17. The results of the Chi-square test

Chi-square statistic	p-value	Df	Tabulation value	The decision
9.192	0.057	4	11.07	Not significant

As the calculated Chi-square value is less than the critical value from the distribution table, the null hypothesis is not rejected. This suggests that there is insufficient evidence to support a significant relationship between the variables under study. This means there is no relationship between educational attainment and the type of TV series, whether local, Arab, or foreign, as we notice that the majority prefer to follow Arab and foreign series, leaving Iraqi series regardless of their educational attainment.

5.   Conclusions

The findings indicate that educational level does not have a statistically significant effect on individuals' choice of TV series categorized by origin (local, Arab, or foreign).

1.   There is no statistically significant relation between choosing the cheapest product and sex. Therefore, we find that everyone, without exception, chooses the cheapest product, whether local or foreign, if it is of the same quality.
2.   There is no statistically significant relation between consumer preference for products and age; therefore, we find that the majority of people of all ages tend to purchase imported clothing and prefer it over local clothing if the prices are similar.
3.   There is a statistically significant relation between educational attainment and the preference for product type for dairy and meat. We find that people with a high educational attainment prefer to purchase Iraqi dairy and meat products over imported products.
4.   There is no statistically significant association between income and the preference for product type, whether local or imported. Therefore, we find that many people prefer imported furniture over locally made furniture, regardless of their income.
5.   There is a statistically significant relation between the preference for locally made Iraqi curtains and marital status. We find that married people prefer beautiful Iraqi curtains, selected according to their tastes, over cheaper, simple-to-make imported curtains.
6.   There is no statistically significant relation between the number of children and the preference for local or imported potato chips and ice cream. We find that consumers resort to choosing imported potato chips or ice cream more than their locally made counterparts, regardless of the number of children, due to their lower price compared to local products.
7.   There is a significant relationship between place of residence and the preference for sweets. We find that consumers closer to the city center resort to choosing local sweets more than imported ones. Conversely, consumers far from the city center tend to purchase imported products more often than local ones, either because they are easier to obtain or cheaper than local ones.
8.   There is no relationship between educational attainment and the type of TV series (local, Arab, or foreign). We note that the majority prefer to watch Arab and foreign TV series, abandoning Iraqi ones, regardless of their educational attainment.

6.   Recommendations

1.   Encourage and support local production and encourage its purchase through advertising and appropriate promotions to draw attention to it.
2.   Reduce taxes imposed on the production of local goods and reduce related costs, such as electricity and water, making their prices competitive with those of foreign goods.
3.   In order to capture the motivations and reasons behind consumers' preferences in more detail, it is suggested to incorporate in-depth interview discussions and insights into future studies.

4. Making comparisons with similar studies involving consumer perceptions conducted in other countries focuses on similarities and differences in consumer preferences.

Declaration of competing interest

The authors affirm that there are no financial or personal conflicts of interest relevant to the content of this manuscript.

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Author contribution statement

Lamyaa Mohammed Ali Hameed: Conceptualization of the study, design of the survey, data collection, and analysis. She also contributed to the interpretation of results and drafted the manuscript.

Suhail Najim Abbood: Assisted in the survey design, conducted statistical analyses, and contributed to the interpretation of findings. He played a key role in reviewing and editing the manuscript.

Ethar Hussain Jawad: Provided guidance on statistical methodologies, contributed to data interpretation, and was involved in the critical revision of the manuscript for important intellectual content.

All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work.

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