ANALYSIS OF FACTORS AFFECTING TURKISH SUNFLOWER OIL CONSUMER BEHAVIOR: THE CASE OF ERZURUM PROVINCE

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ABSTRACT

Sunflower oil consumption in Turkey has been increasing for the past decade due to dietary and health concerns. However, consumption of sunflower oil exceeds its production. Efforts have been made to overcome the production deficit for the last decade by importing the oil, but this deficit has continued to increase. The aim of this study was to explore Turkish consumer behaviour with respect to sunflower oil consumption in the city of Erzurum. Factor and regression analyses were used to determine significant factors related to sunflower oil attributes and the socioeconomic and demographic characteristics of the consumers. To this end, factor and multiple linear regression analyses using the SPSS statistical program were carried out on the data from a 250-household survey. The results show that consumer satisfaction with sunflower oil and its price play an important role in consumer buying decisions and the amount bought is related to sunflower oil attributes. With regard to consumer buying power and frequency, vegetable oil expenditures are directly affected by the stage of the life-cycle and job position. These factors also play an important role in consumer buying attitudes and behaviour. These findings are also beneficial to marketers, manufacturers and retailers for product design and developing new marketing tactics and strategies.

- Key words: consumer behaviour, factor analysis, regression analysis, sunflower oil -

INTRODUCTION

Fats are usually divided into two groups: animal fats and vegetable oils. Consumption of animal fats, such as butter and edible tallow which are high in saturated fats has remained stable. In contrast, vegetable oils, such as sunflower, corn, soybean, olive and cottonseed oil which are low in saturated fats are covering an increasing percentage of the total fat and oil intake (GRIGG, 1999; BAYAR and YILMAZ, 2004; GOKSU, 2007).

Fats and oils improve the texture and mouthfeel of foods and are a source of energy. If consumed in the correct proportion to other foods, they are a primary source of energy. In addition, fats and oils help humans absorb fat-soluble vitamins, including vitamins A, D, E and K, and they are necessary building blocks of cellular membranes. Sterols found in fats and oils also help hormone production and regulation and the absorption of calcium (GRIGG, 1999; DEMIRCI and BOLUKBASI, 2003; AYAZ, 2008; NSA, 2009; URE, 2009).

To consume the right kind of fats or oils is very important for health and dietary concerns. Sunflower oil is light in taste and appearance and supplies more Vitamin E than any other vegetable oil. In addition, it is a combination of monounsaturated and polyunsaturated fats with low saturated fat levels. Therefore, consumers have shown a strong preference for sunflower oil because about 90% of the fat found in sunflower oil is unsaturated, so cholesterol levels are lower (GRIGG, 1999; NSA, 2009). Consumers prefer sunflower oil because of the taste, frying performance and health benefits. The vitamin E in sunflower is a required nutrient that functions as an antioxidant and decreases the risk of heart disease and cancer and bolsters immune function (GRIGG, 1999; NSA, 2009).

Spurred by increased income and a 1.3% population growth in Turkey, as well as rapidly expanding food processing industries and socioeconomic changes, the overall growth in consumption of sunflower oil is outpacing that of most other vegetable oils. While the average annual consumption of sunflower oil (sunflower oil production plus import minus export) in the world, EU and Turkey increased by 2.1, 3.3 and 6.4%, respectively, between 2000 and 2007; that of corn, soybean and olive oils in the world, EU and Turkey changed as follows: 0.9, 5.4 and 2.0%; -3.4, 8.8 and 1.8%; 4.5, -6.1 and -2.9%, respectively (Table 1).

When sunflower oil consumption in Turkey is compared with that in the EU and the world, it is clear that Turkish sunflower oil consumption is much higher. While sunflower oil production and importation have been increasing in the last decade, its exportation has been steadily decreasing. This is due to the domestic consumption of sunflower oil; about 50% of all vegetable oil consumed in Turkey is sunflower oil (KOLSARICI *et al.*, 2000; GOKSU, 2007). Sunflower oil consumption per capita in 2000 and 2007[1] was 1.6 and 1.7 kg in the World, 5.4 and 6.7 kg in the EU, and 7 and 9.7 kg, in Turkey, respectively (Table 1). This shows that sunflower oil consumption per capita increased more in Turkey than in the EU and throughout the world.

Considering sunflower oil consumption and production levels in Turkey, it is clear that sunflower oil production can not meet the national demand. While total consumption of sunflower oil was 467,782 and 707,520 tons, in 2000 and 2007, respectively, production in 2000 and 2007 was 481,370 and 577,260 tons, respectively (FAOSTAT, 2009). These figures show that the sunflower oil deficit has increased gradually each year. To offset this deficit, the importation of sunflower oil has increased. This has also caused an important foreign currency outflow.

Given these trends, the following questions arise: Why do people tend to prefer more sunflower oil? What salient attributes of sunflower oil attract consumers to purchase it? To answer these questions, it is important to analyze Turkish sunflower oil consumers' attitudes. Today consumers have more choices, so purchasing decisions are more complex and many factors influence purchasing decisions. These factors can be classified as marketing-related, psychological and sensorial factors (TOPCU *et al.*, 2009). Consumer attitudes and behaviour in relation to the purchase of vegetable oil have been widely studied (NIELSEN *et al.*, 1998; DA COSTA *et al.*, 2000; MURRAY and DELAHUNTY, 2000; WĄDOŁOWSKA *et al.*, 2002; ZENNER *et al.*, 2003; KRYSTALLIS and NESS, 2005; NEWBY *et al.*, 2006; AKBAY, 2007; HADDAD *et al.*, 2007; TOPCU *et al.*, 2008, 2009; TOPCU and ISIK, 2008; TOPCU, 2009; TOPCU and UZUNDUMLU, 2009). These studies have shown that the most important factors affecting consumer decisions were price, quality, oil type, brand-name, nutritional value, taste, freshness, health and dietary concerns.

Consumers have limited processing capacity and so they can use only a certain part of the available information when choosing a product in order to reduce the complexity of selection (LAROCHE *et al.*, 2001). Brand-name can make this process less complex since consumers believe that brand, price and quality are closely correlated. Consumers create a link between brand-names and product attributes. If the product is a well-known, trusted brand-name then, without further questioning of the price or quality, the consumer decides to purchase the product. The brand benefits the decision-making process by identifying major attributes and the quality image of the product which reduces the feeling

Table 1 - Total annual vegetable oil consumption and per capita consumption*.

Oil types		World				EU				Turkey			
		2000	2005	2006	2007	2000	2005	2006	2007	2000	2005	2006	2007
Sunflower	**C**	9893	10387	11325	11527	2601	2857	3419	3290	468	711	927	708
	P	**1.6**	**1.6**	**1.7**	**1.7**	**5.4**	**5.8**	**7.0**	**6.7**	**7.0**	**10.0**	**12.9**	**9.7**
Corn	**C**	2049	2108	2081	2195	260	210	212	189	112	124	140	152
	P	**0.3**	**0.3**	**0.3**	**0.3**	**0.5**	**0.4**	**0.4**	**0.4**	**1.7**	**1.7**	**2.0**	**2.1**
Soybean	**C**	25249	33557	33506	36143	1947	2507	3112	3310	231	388	301	119
	P	**4.1**	**5.2**	**5.1**	**5.4**	**4.0**	**5.1**	**6.3**	**6.7**	**3.5**	**5.5**	**4.2**	**1.6**
Olive	**C**	2645	2707	2877	3064	1790	1821	2138	2043	171	23	92	132
	P	**0.4**	**0.4**	**4.4**	**0.5**	**3.7**	**3.7**	**4.4**	**4.1**	**2.6**	**0.3**	**1.3**	**1.8**

Source: (FAOSTAT, 2009).
C: Annual consumption (1,000 tons); P: Annual consumption per capita (kg).
*Consumption and per capita consumption for all years were calculated as (production+import/export) and (production+import/export)/population from FAOSTAT data, respectively.

of risk. Moreover, the brand-name can give the consumer prestige in social settings, and it allows them to learn and evaluate the results of different shopping experiences.

The aim of this study was to analyze Turkish sunflower oil consumer behaviour and purchasing decisions in Erzurum, Turkey. Due to the increasing consumer demand for sunflower oil and the growing competition between manufacturers and retailers, this study could be important for determining variations in consumer trends due to different sunflower oil attributes.

MATERIAL AND METHODS

The preliminary data used in this study were obtained from a survey conducted in Erzurum[2], Turkey. In order to determine the sample size, while minimizing sample bias and representing the population correctly, the city centre was divided into three districts: the west-side Aziziye district with 6,562 households, the south-side Palandoken district with 30,022 households, the nord and east-sides Yakutiye district with 44,077 households (ANONYMOUS, 2007).

To determine the sample size for each district, the following formula was used (TOPCU, 2009):

$$n = \frac{Z^2 * p * (1 - p)}{c^2} = 250$$

Where:
n = sample size
Z = Z value, (1.96 for 95% confidence level)
p = percentage making a choice, (0.8 used for sample size needed)
c = confidence interval, (used 0.05 = ±5).

Then, based on the population of each district, the weighted sample size and distribution of the surveys for each district were determined proportionally. A total of 250 surveys were distributed with 20, 93 and 137, questionnaires allocated to the Aziziye, Palandoken and Yakutiye districts, respectively.

Each district was divided into sub-districts and then a face-to-face survey was conducted with randomly selected heads of households (either the wife or husband) in various parts of the sub-districts. The survey was conducted either in their home or at shopping centres.

Participants in the survey were asked to respond to each statement, indicating the significance level of the sunflower oil attributes for them. A Likert-format 1-5 scale was used (where 1 refers to the least important and 5 refers to the most important attribute). Of the 35 attributes, five are related to physical attributes (packaging material and appearance, product weight (litre (*L*)), shelf life, ease-of-use), nine are related to sensory and real quality (food safety and hygiene, brand name, loyalty and individuality, health and dietary concern, nutrition and energy value, colour and viscosity, taste and flavour, quality), eight are related to the sale-increasing activities (ISO registration certificate, promotion/discount, price, brand penetration, new design, product variety, outreach to customer, brand/retailer advertisement), ten are related to individual preferences (specialized product line, trust of manufacturer and retailer, manufacturer experience, use of environment-friendly material, price-quality relation (perceived value of food product), product origin, natural/ecological oil, retailer loyalty, consumer experience), three are related to social status (reference groups and influence of customs, roles and status). Each question was reduced to a single statement to which responses were collected using the Likert scale described above.

Demographic and socioeconomic information about the consumer was also gathered (gender, age and occupation group, education, vegetable oil, food and other expenditures, social influence, income, etc.) in the survey. These data consist

of string variables (i.e. gender: 1: male and 2: female; occupation: 1: businessman, 2: blue-collar state worker, 3: white-collar state employee, 4: small-scale retailer, 5: pensioner, 6: unemployed, 7: housewife and 8: student education: 1: literate, 2: elementary school, 3: high school and 4: college) and numeric variables (i.e. age, monthly vegetable oil expenditure (€/*L*), food and other expenditures) that are measured by scale and nominal measures.

After editing and coding, the data were first subjected to factor analysis to determine the main factors related to sunflower oil attitudes and the demographic and socioeconomic characteristics that affect sunflower oil buying behaviours. Regression analysis was then carried out to measure the effectiveness of target consumers' buying behaviour. The SPSS statistical software was used to perform these two analyses.

These techniques have been widely used in marketing studies that analyze food product attributes (O'CONNOR *et al.,* 2006; TOPCU, 2006; ENNEKING *et al.,* 2007; HADDAD *et al.,* 2007; TOPCU and ISIK, 2008; WADOLOWSKA *et al.,* 2008; TOPCU and UZUNDUMLU, 2009; TOPCU *et al.*, 2009).

Factor analysis is a data reduction technique that reduces the number of variables used in an analysis by creating new variables (called factors) that combine redundancy in the data (SPSS 15.0, 2006).

The first step in factor analysis is to determine the number of relevant factors. The factor analysis in this study reduced the number of sunflower oil attributes and consumers' demographic and socioeconomic characteristics from 35 to 9 and the number of factors from 16 to 5 (total of 14 factors) having Eigen-values greater than 1.0. This was done by principal component analysis[3] using the varimax rotation method[4]. Factor analysis was used initially to identify underlying aspects that could explain a correlation among a set of food attributes and the socioeconomic and demographic attitudes and the associated consumption values. The purpose of the factor analysis was to identify those attributes and consumers' demographic and socioeconomic characteristics that account for a relatively large proportion of the variance in the sample.

In the second step of the analysis, the data obtained from the factor analyses were used for multiple linear regression analysis. For this end, linear functional form and enter regression selection technique were chosen to estimate the relationship between a dependent variable and the independent variables. SPSS 15.0 statistical software program was used for both factor and regression analyses. The multiple linear regression model could be written as follows:

$$SFC = f(F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, \text{å}_i)$$

Dependent Variable

SFC: Monthly sunflower oil consumption (L/month)

Independent Variables

F1 : Social status
F2 : Brand loyalty
F3 : Food reliability
F4 : Product freshness
F5 : Manufacturer image
F6 : Retailer loyalty
F7 : Satisfaction with food quality
F8 : Product price (€/L)
F9 : Consumer experiences
F10 : Current expenditure (€)
F11 : Family life-cycle stage
F12 : Vegetable oil expenditure (€/L)
F13 : Job position
F14 : Fixed expenditure (€)

Coefficient estimates were obtained using ordinary least squares (OLS). Individual and group significance of these coefficients were tested using t and F tests, respectively. Multicollinearity among variables was detected by calculating the variance-inflating factor (VIF). The presence of auto-correlation was assessed using the Durbin-Watson d statistic (GUJARATI, 2005; SPSS 15.0, 2006).

RESULTS AND DISCUSSION

Kaiser Normalization (KMO) which compares partial correlation coefficients with observed ones was calculated as 0.83 for sunflower oil attributes and as 0.69 for consumer demographic and socioeconomic characteristics, which means that the data sets are at a perfect level for factor analyses since the test score is greater than 0.50 (Tables 2 and 3).

The principal component analysis, using varimax rotation, first grouped 35 variables related to sunflower oil attributes into nine factors with Eigen-values greater than 1.0. These nine factors explained 62.29% of the total variance. F1 accounted for 24.82% of the total variance and was dominated by attributes and customs of the reference group. Therefore, F1 is associated with social status. F2 accounted for 8.94% of the total variance, and is information about brand and usage. Hence, F2 is more associated with brand loyalty. F3 reported 6.15% of the total variance, and was dominated by food safety, hygiene and food content. So, it could be named as food reliability. F4 explained 4.59% of the total variance and related to product freshness due to natural or ecological product with shelf-life, taste and flavour attributes. F5, F6, F7, F8 and F9 accounted for 4.25, 3.70, 3.54, 3.29 and 3.02% of the total variance, respectively, on the other hand; and dealt with manufacturers and retailers attitudes, the product sensory quality

Table 2 - Factors and correlated variable loadings related to sunflower oil attributes.

Variables	Factor loadings*								
	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**
Social status (F1)									
Reference group influence	**0.795**	-0.013	0.112	0.114	0.005	0.085	0.050	-0.078	0.111
Roles and status	**0.729**	0.142	0.048	0.126	-0.065	0.210	0.065	0.063	0.044
Brand personality	**0.728**	0.269	0.074	-0.003	0.276	0.176	-0.021	0.013	-0.138
Influence of customs	**0.582**	0.114	0.034	-0.160	-0.011	-0.127	0.311	0.039	0.272
Brand loyalty (F2)									
Product origin	-0.013	**0.721**	0.211	0.031	0.091	0.077	0.145	0.076	-0.049
Brand penetration	0.174	**0.612**	0.150	0.317	0.226	0.108	0.102	-0.091	0.187
New design	0.242	**0.586**	0.122	0.150	0.199	0.099	0.020	0.104	-0.161
Brand name	0.155	**0.553**	0.106	0.117	0.026	0.325	0.290	-0.015	0.146
Packaging appearance	0.238	**0.541**	-0.060	0.062	0.008	0.341	-0.055	0.203	0.218
Ease-of-use	0.090	**0.508**	0.339	0.009	-0.111	-0.030	0.103	0.192	0.366
Brand loyalty	0.187	**0.507**	0.160	-0.289	0.203	0.197	0.392	0.132	0.128
Food reliability (F3)									
Health and dietary concern	0.066	0.050	**0.706**	0.200	0.146	-0.139	0.069	0.095	-0.054
Food safety and hygiene	0.019	0.041	**0.651**	0.107	0.035	0.076	0.300	0.028	0.166
Nutrition and energy value	0.074	0.242	**0.619**	0.289	0.074	0.218	-0.042	0.122	0.011
Oil colour and viscosity	-0.056	0.292	**0.600**	0.003	0.167	0.099	0.279	-0.060	0.063
Packaging material	0.042	0.083	**0.538**	0.058	0.073	0.288	-0.066	0.290	0.214
Weight	-0.101	0.354	**0.504**	0.223	0.273	0.015	-0.104	0.139	0.357
Product freshness (F4)									
Natural/ecological oil	0.103	0.366	0.084	**0.738**	0.119	0.178	0.020	-0.103	-0.012
Shelf-life	0.056	-0.015	0.266	**0.706**	-0.012	-0.102	0.282	0.008	-0.025
Taste and flavour	0.174	0.038	0.227	**0.568**	0.269	0.025	0.049	-0.035	0.234
ISO registration certificate	0.208	0.261	0.312	**0.407**	0.094	0.273	-0.142	0.066	0.045
Manufacturer image (F5)									
Specialized at a product line	0.097	-0.057	0.086	0.174	**0.775**	0.154	-0.095	0.123	0.062
Trust to manufacturer	0.077	0.140	0.189	0.154	**0.762**	0.047	0.133	0.030	0.203
Manufacturer experience	0.083	0.116	0.217	0.044	**0.703**	0.351	-0.002	0.067	0.047
Retailer loyalty (F6)									
Using environment-friendly material	0.163	0.235	0.049	0.111	0.184	**0.691**	0.227	0.138	0.039
Product variety	0.172	0.053	0.325	0.020	0.218	**0.675**	0.111	0.134	-0.057
Trust to retailer	-0.389	0.333	-0.062	0.314	0.473	**0.589**	0.134	-0.018	-0.034
Retailer loyalty	-0.175	0.259	-0.306	0.031	0.114	**0.547**	0.317	0.060	-0.052
Reach to customers	0.273	0.329	0.009	0.055	0.382	**0.508**	0.118	0.054	-0.140
Brand/retailer advertisement	0.334	0.115	-0.186	-0.166	-0.248	**0.506**	-0.053	-0.076	0.313
Satisfaction with food quality (F7)									
Quality	0.073	0.015	0.290	0.211	0.062	0.073	**0.679**	-0.011	-0.024
Quality-price relation	-0.015	-0.046	-0.015	0.270	0.114	0.075	**0.577**	0.496	0.250
Product price (F8)									
Price	0.013	0.073	0.119	-0.040	0.070	0.075	0.064	**0.868**	-0.100
Promotion/discount	0.144	0.246	0.180	-0.182	-0.052	0.111	-0.123	**0.587**	0.141
Consumer experience (F9)									
Consumer experience	0.068	0.014	0.226	0.096	0.194	0.060	0.139	0.045	**0.769**
Eigen-value	**8.686**	**3.130**	**2.153**	**1.606**	**1.486**	**1.293**	**1.238**	**1.151**	**1.056**
Share of explained variance (%)	**24.817**	**8.944**	**6.152**	**4.589**	**4.245**	**3.696**	**3.537**	**3.289**	**3.018**
Cumulative share of explained variance (%)	**24.817**	**33.762**	**39.913**	**44.502**	**48.747**	**52.442**	**55.979**	**59.268**	**62.286**
KMO (Kaiser-Meyer-Olkin) Statistic									**0.831**
Bartlett's test of Sphericity									**(Chi-square, df: 595): 3555.608 (p: 0.000)**

*Bold numbers indicate the largest loading for each variable.

Table 3 - Factors and correlated variable loadings related to consumer demographic and socioeconomic characteristics.

Variables	Factor loadings*				
	F10	F11	F12	F13	F14
Current Expenditure (F10)					
General food expenditure	**0.903**	0.024	0.099	-0.038	-0.045
Food expenditure in markets	**0.897**	0.040	-0.047	0.002	0.046
Clothing expenditure	**0.596**	0.001	0.410	0.027	0.037
Family life-cycle stage (F11)					
Lifestyle	-0.009	**0.856**	0.027	-0.094	0.315
Marital status	-0.037	**0.813**	-0.005	0.005	0.232
Age	0.014	**0.806**	0.082	-0.182	-0.026
Gender	-0.064	**0.767**	0.101	-0.295	0.067
Vegetable oil expenditure (F12)					
Store-brand oil expenditure	-0.165	-0.091	**0.805**	-0.197	0.085
Manufacturer-brand expenditure	0.165	-0.154	**0.695**	-0.139	0.215
Job position (F13)					
Income	-0.004	-0.048	0.117	**0.791**	0.224
Education	-0.034	0.114	-0.068	**0.790**	0.020
Occupation	0.065	0.535	-0.002	**0.581**	0.143
Fixed expenditure (F14)					
Education expenditure	0.378	0.073	0.040	0.121	**0.545**
Sheltering expenditure	0.331	-0.052	-0.002	0.368	**0.540**
Health expenditure	0.214	0.176	-0.144	0.299	**0.526**
Entertainment expenditure	0.329	0.100	0.184	0.227	**0.419**
Eigen-value	**3.616**	**2.459**	**1.764**	**1.299**	**1.127**
Share of explained variance (%)	**22.601**	**15.368**	**11.027**	**8.119**	**7.042**
Cumulative share of explained variance (%)	**22.601**	**37.969**	**48.996**	**57.115**	**64.157**
KMO (Kaiser-Meyer-Olkin) Statistic					**0.690**
Bartlett's test of Sphericity					**(Chi- square, df: 120): 1373.407 (p:0.000)**

*Bold numbers indicate the largest loading for each variable.

and price and consumer experiences. The factors were therefore called manufacturer image, retailer loyalty, satisfaction with food quality, product price and consumer experience, respectively (Table 2).

For the second factor analysis based on principal component analysis, using varimax rotation, 16 variables were grouped into five factor groups related to consumers' demographic and socioeconomic characteristics with Eigenvalues greater than 1.0. These five factors explained 64.16% of the total variance. F10, F11, F12, F13 and F14 accounted for 22.60, 15.37, 11.03, 8.12 and 7.04% of the total variance, respectively. Therefore, these factors were named current expenditure, family life-cycle stage, vegetable oil expenditure, job position and fixed expenditure, respectively (Table 3).

The overall multicollinearity in the model was measured by calculating the variance inflating factor (VIF) (Table 3). The calculated VIF values were between 1.006 and 1.086, indicating acceptable levels of multicollinearity since the values were between 1.00 and 2.50. The Durbin-Watson d statistic was used to determine the auto-correlation. The computed d value (2.46) lies between d_u (1.92) and 4-d_u (1.62). Therefore, in the regression model there is no problem related to auto-correlation or multicollinearity (KALAYCI, 2005). So, this data set could be used in regression analysis.

In the regression model, the regression coefficient *(Adj.R^2)* was calculated to be 0.81. The OLS estimates of the model coefficients and other statistical measurements are shown in Table 4. The F-statistic was calculated to be 75.61 (p: 0.000) and the null hypothesis was rejected; all coefficients were equal to zero. On the other hand, the partial regression coefficients of *F4, F7, F8, F10, F11, F12, F13, F14* and *F3, F9* were found to be meaningful at the 1 and 5% significance levels, respectively, an addition, all regression coefficient signs were found to be correct and complied with economic theory.

Two factors, the coefficients of sunflower oil price (*F8)* and fixed expenditure *(F14)* have negative signs (Table 4). As *F8* and *F14* among consumer expenditures increased, the amount of

sunflower oil consumption decreased noticeably. These results show that, if food prices on the competitive market and fixed expenditures among expendable income of consumers increase, sunflower oil consumption decreases with respect to the demand. These results are similar to those reported in previous studies conducted for vegetable and olive oils (MTIMET *et al.*, 2008; TOPCU *et al.*, 2008; TOPCU, 2009).

The other factor coefficients have positive signs; when their effects increased, sunflower oil consumption increased significantly. Sunflower oil attributes, consist of food reliability *(F3)*, product freshness *(F4)*, satisfaction with food quality *(F7)* and consumer experiences *(F9)*, while consumers' socioeconomic and demographic characteristics, include current expenditure *(F10)*, family life-cycle stage *(F11)*, vegetable oil expenditure *(F12)* and job position *(F13)*. All of these factors affect consumer buying behaviour and exert an important influence on sunflower oil consumption (Table 4).

Consumer satisfaction with sunflower oil included the attributes of food reliability and freshness, satisfaction with food quality and consumer experiences which were the most important factors in the decision to purchase it. These findings are supported by previous research related to product satisfaction (MTIMET *et al.*, 2008; TOPCU *et al.*, 2008, 2009; TOPCU and UZUNDUMLU, 2009).

The results of this study also provide improved information about how consumer demographic and socioeconomic characteristics affect Turkish consumer attitudes toward sunflower oil. Based on current expenditures and associated with job position, vegetable oil expenditures are significantly affected by family life-cycle stage. As family life-cycle stage increased and job position improved, vegetable oil consumption increased (i.e. in Turkey more sunflower oil has been consumed in the last decade than vegetable oils such as corn, soybean and olive oil) (FAOSTAT, 2009).

In particular, sunflower oil has the highest vitamin E concentration among vegetable oils. It is widely used for meal sector, and is consumed more than other vegetable oils in Turkey (GOKSU, 2007). Consumption has increased yearly and expenditure for sunflower oil has steadily increased compared with other vegetable oils. This increase could be due to increased dietary and health concerns. It is also cheaper than the other oils because it is the most widely produced oil in Turkey. These results were obtained from previous research based on consumer demographic and socioeconomic characteristics (MTIMET *et al.*, 2008; TOPCU *et al.*, 2008, 2009; TOPCU, 2009; TOPCU and UZUNDUMLU, 2009).

CONCLUSION

The results of this study indicate that food reliability and freshness, satisfaction with food quality and consumer experiences (consumer satisfaction with sunflower oil and its price) play an important role in sunflower oil purchasing decisions and consumption. Considering consumer buying power and frequency, demographic and socioeconomic characteristics play an important

Table 4 - Multiple linear regression analysis results.

n: 250	**R^2: 0.82**		**Adj R^2: 0.81**	**F (14,235): 75.61***	**d_L=1.62**		**d_u=1.92**		**DW d_h=2.46**
Variables	**Multiple linear regression model**				**Collinearity statistics**		**Correlations**		
	Coefficients	Std.error	t_h-value	p-value	Tolerance	VIF	Zero-order	Partial	Part
Constant	50.956	1.259	40.472	0.000*	-	-	-	-	-
F1	0.003	1.287	0.114	0.909	0.921	1.085	0.091	0.679	0.088
F2	0.025	1.271	0.885	0.377	0.967	1.034	0.074	0.604	0.072
F3	0.052	1.313	2.573	0.011**	0.944	1.059	0.780	0.795	0.753
F4	0.047	1.286	2.656	0.010*	0.905	1.104	0.107	0.733	0.102
F5	0.029	1.277	1.032	0.303	0.944	1.060	0.043	0.389	0.040
F6	0.037	1.277	1.297	0.196	0.978	1.022	0.058	0.526	0.059
F7	0.025	1.281	2.882	0.008*	0.950	1.053	0.058	0.140	0.013
F8	-0.012	1.288	-3.054	0.003*	0.921	1.086	-0.160	0.078	0.007
F9	0.056	1.283	1.986	0.048**	0.992	1.008	0.069	0.084	0.008
F10	0.003	1.312	3.324	0.001*	0.941	1.062	0.018	0.020	0.002
F11	0.151	1.293	5.312	0.000*	0.971	1.030	0.017	0.038	0.004
F12	0.866	1.330	29.552	0.000*	0.958	1.044	0.136	0.043	0.004
F13	0.187	1.293	6.549	0.000*	0.994	1.006	0.064	0.025	0.002
F14	-0.168	1.289	-5.904	0.000*	0.930	1.075	-0.021	0.019	0.002

*p<0.01
**p<0.05.

role in consumer buying attitudes and level of consumption. Vegetable oil expenditures are affected by life-cycle stage and job position; about 50% of all vegetable oil consumption is sunflower oil. Sunflower oil consumption has continuously increased in parallel with the increase of all the factors considered except for fixed expenditure. These findings could also be beneficial for marketers, manufacturers and retailer for designing a product and developing new marketing tactics and strategies.

While this study has some scientific merit for the academic community and food manufacturing sector, it is not without some limitations. The results of this research have limited generalizability since the data were collected in a single city. If the survey was conducted on a national scale the larger data base would give more objective results about target consumer attitudes. In future studies, this model could be expanded to include more factors and other vegetable oils, and sunflower oil consumers could be divided into groups based on demographic and socioeconomic characteristics.

NOTES

[1] Total annual amounts of vegetable oil consumption and their consumption per capita in 2007 were calculated as (production+import/export) and (production+import/export)/population from FAOSTAT data, respectively.

[2] Erzurum (39°45'N latitude and 41°15'E longitude) is located in the north-east region of Turkey and is on the Silk Road. Erzurum is one of the biggest provinces in the region with a total population; 962,000 and the city centre population is 402,000.

[3] A factor extraction method used to form uncorrelated linear combinations of the observed variables. The first component has the maximum variance. Successive components explain progressively smaller portions of the variance and are all uncorrelated with each other. Principal component analysis is used to obtain the initial factor solution. It can be used when there is a single correlation matrix.

[4] This method is an orthogonal rotation method that minimizes the number of variables that have high loading on each factor. It simplifies the interpretation of the factors.

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