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A revisit to the role of gender, age, subjective and objective knowledge in consumers' attitudes towards organic food

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ABSTRACT

We identified the major determinants of consumers' attitudes towards organic food, including subjective and objective knowledge, sources of information and socio-demographic profiles of consumers in Lebanon. We used quantitative analysis for data collected from 371 questionnaires in the city of Beirut. The results indicate that consumers have, in general, low confidence in their knowledge of organic food, despite being well informed about it. Whilst objective knowledge has a significant positive effect on consumers' attitudes towards organic food, subjective knowledge has a negative effect. Women are more aware than men about organic food and younger consumers tend to have higher objective knowledge than mature ones. As subjective and objective knowledge and the resulting attitudes of consumers are influenced by sources of information, marketing campaigns and strategies need to emphasize the fact that the attributes of organic food are distinguished from those of conventional foods, using credible information channels. While subjective and objective knowledge of organic food have not been studied previously in our target region, we believe that unlike most previous research which studied the role of knowledge in organic food acceptance and consumption, our study aims to assess and explore this relationship using two different variables (subjective and objective knowledge).

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1. Introduction

The demand for organic farming and organic food production has been on the rise in recent years, the global market for organic food has grown and organic food and drink sales have expanded significantly by nearly 5% (Willer & Lernoud, 2016). This is mainly due to a considerable increase in the global awareness of health, food safety and environmental concerns (Gil et al., 2000; Loureiro et al., 2001). Currently, 1% of the world's agricultural land is organic (Willer & Lernoud, 2016).

On the other hand, consumer food choice has become a complex process as consumers are demanding higher quality products (Grunert, 2005, 2011). In their quest for quality, consumers are seeking viable alternatives to unhealthy, unsustainable and

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conventional food production. Among these alternatives lies the choice of organic food. Consumers' motives to buy organic food include health benefits (Chen et al., 2014; Magnusson et al., 2003), better taste and novelty (Roitner-Schobesberger et al., 2008), and readiness to be green (Arli et al., 2018). According to Aertsens et al. (2011), the strongest motivations of organic food consumption include a synthetic pesticide-free production, environmental motives and higher quality. Additionally, sensory factors, availability and price are also found to be influential in consumers' food choice (Aschemann-Witzel & Aagaard, 2014; Honkanen & Frewer, 2009; Koen et al., 2018).

The relationship between consumers' attitudes and behaviour in the organic food context is an assertive one (Tsakiridou et al., 2008). Moreover, demand for organic food is directly linked to the level of awareness of organic food consumers (Briz & Ward, 2009). According to De Magistris and Gracia (2008), providing consumers with the correct stream of knowledge might yield increased purchases and consumption of organic food. In fact, the lack of knowledge about organic foods constitutes one of the main reasons for their low consumption (Mesias Mesías et al., 2012). Various studies have investigated the knowledge, awareness and attitudes toward organic food in the west (Bonti-Ankomah & Yiridoe, 2006; Bredahl et al., 2004; Briz & Ward, 2009; Gil & Soler, 2006; Hempel & Hamm, 2016; Pieniak et al., 2010; Van Loo et al., 2013; Zagata, 2014).

Nevertheless, previous research on awareness, knowledge and attitudes to organic food is minimal in the Middle East and little is known about consumer knowledge and attitudes towards organic food in Lebanon. In Lebanon, the recent food scandals, the increased regulation and restrictions on the use of pesticides, herbicides and other chemicals in food production have played a key role in raising awareness of the benefits of a healthier diet (Fleming-Farrell, 2012). As a result, demand for organic products in Lebanon is growing and shopping for organic food is becoming a trend that can be seen in the rising number of health shops and specialty stores (Halawi, 2009). However, with the lack of awareness and the culture of poor communication and marketing for organic food in Lebanon, and the recent socio-economic crisis in the country resulting in the collapse of Lebanese Pound and necessitates the need to be a self-dependent country, a study that encompasses an understanding of the relationship between consumers' attitudes and knowledge of organic food has become imperative in that country and region. Additionally, consumers' subjective and objective knowledge of organic food have not been studied previously in Lebanon or in the Middle East. Furthermore, most past research on the role of knowledge in organic food acceptance and consumption combined measures of subjective and objective knowledge into one variable. Given this context, the study aims to assess and explore the relationship between consumers' attitudes and their previous subjective and objective knowledge in relation to organic food.

2. Organic food consumption in Lebanon

In Lebanon, organic farming became more visible in 1990 as a reaction to the overuse of chemicals and pesticides. In the early nineties, conventional agriculture was widespread and excessive use of agrochemicals produced large losses in soil richness and biodiversity,

which in turn caused water pollution and deteriorated ecosystems (Albitar, 2004). The gravity of this situation led to a major change at different levels, both political and administrative (Khoury, 2004). Although the organic food market is a relatively small one, Lebanese consumers' awareness and demand for organic products have dramatically grown, especially for the younger generation, and local farmers who have turned from traditional to organic farming (Al-Bitar, 2008; Khoury, 2004; Touma, 2003). A major drive of this shift has included the food scandals and the pesticide scare that developed in Lebanon due to the lack of food safety laws (Fleming-Farrell, 2012; Hattam, 2009).

Despite being a small country, Lebanon presents a great potential for organic agriculture given its varied typography and diverse climatic conditions which are optimal for agricultural crops (Kimbrell, 2007). In the last few years, the organic sector has significantly developed; in 2001, organic agriculture involved 17 farmers and a cultivated area of approximately 250 hectares (Estephan, 2002) whereas in 2009, the number of farmers involved, and cultivated areas increased respectively to 302 farmers and 3300 hectares (Al-Bitar et al., 2011). The drivers behind this progress are the country's well-developed agro-industrial sector, the will of many farmers to switch to organic farming as a viable alternative and the contribution of many local and international Non-Governmental Organizations (NGOs) to the sector development, such as Greenline, MECTAT, World Vision and the American University of Beirut (AUB) (Estephan, 2002; Khoury, 2004; Touma, 2003). Recently, various agricultural policy institutions have started to play a key role in the development of the sector and the steady growth of the local market (Pugliese et al., 2013).

Whilst the Lebanese organic market is a promising niche, it is subject to diverse challenges including the lack of farms and marketing capacities, export difficulties, lack of farmers' awareness of organic farming, and the relatively high cost of organic production, in addition to the lack of credibility of organic certifications (Halawi, 2009). Other hurdles include the inability of public institutions to promote organic agriculture, the lack of agreed-upon organic standards and a trusted guarantee system (Bteich, 2002), absence of coordination between the various participants concerned (Khoury, 2004), as well as the lack of an organized market and public awareness of organic food (Charbaji, 2003). Furthermore, Bteish (2004) identified the major barriers to the development of the organic sector in Lebanon. These include the recent economic crisis which directly affected and is still affecting the market demand and farmers' production, the lack of private and public investments in the agricultural sector, the absence of organic farming regulations and legislations and, most importantly, the ambiguity and lack of information and know how on organic farming at both the farmers' and consumers' level. In fact, the majority of Lebanese consumers find it difficult to distinguish between organic and traditionally grown food, usually referred to as 'Baladi'. It is worth mentioning that Lebanese consumers perceive both foods as a relatively new fashion trend (Holman, 2011; Pugliese et al., 2013).

3. Consumers' knowledge and source of information for organic food

Brucks (1985) differentiated between three types of knowledge: subjective knowledge, objective knowledge and prior experience the consumer has with the product. Subjective knowledge is what consumers think they know about a certain product and is often

referred to as perceived knowledge. On the other hand, objective knowledge is what consumers actually know about a certain product. House et al. (2004) add that it is vital to measure both subjective and objective knowledge as they constitute important factors that affect consumers' willingness to accept new products, although their impacts might vary.

Although consumers' awareness of organic food might be high, their knowledge of it is still considerably low, especially for occasional and regular consumers (Naspetti & Zanoli, 2009). Therefore, consumers' lack of knowledge regarding organic agriculture and organic food constitute a major barrier to organic food demand (Roitner-Schobesberger et al., 2008; Sangkumchaliang & Huang, 2012). As a matter of fact, consumers' purchasing behaviour is directly affected by their knowledge level (Tsakiridou et al., 2008). In this context, Briz and Ward (2009) imply that the more knowledge consumers have about organic food, the more likely they are to purchase or consume these products. Similarly, Stobbelaar et al. (2007) and De Magistris and Gracia (2008) report that the more knowledgeable consumers are about organic food, the more positive attitude they will have towards these foods. Moreover, Briz and Ward (2009) report that potential consumers may not even be aware of organic foods or may have the wrong perception even when aware.

Several studies have investigated the effect of information on consumers' knowledge. Park et al. (1994) indicate that knowledge assessment is based more on product-related experience memory in the form of information search, product usage, and/or ownership than on the memory for product-class information. The effect of information available on organic food on consumers' subjective knowledge was also found to be significant in a study by Gracia and De Magistris (2013). According to Bigne´ (1997), information obtained from the public administration, mass media, ecological associations and shopping site affects consumers' knowledge. In addition, Stolz et al. (2011) imply that information sources and media and communication strategies could play a significant role in building up positive attitudes about organic foods. Kihlberg et al. (2005) indicated that providing information about organic production affects consumers' liking of bread by its perceived sensory properties. Park et al. (1994) refer to stored product information as a vital determinant in consumers' objective knowledge. However, research shows that consumers' decisions regarding buying of organic food tend to be very subjective in nature (Hughner et al., 2007; Shafie & Rennie, 2012).

The considerably little research that differentiated between subjective and objective knowledge has shown that there exists a weak to moderate relationship between subjective and objective knowledge (Aertsens et al., 2011; Klerck & Sweeney, 2007; Pieniak et al., 2010).

Based on the above research on consumers' attitudes towards and knowledge of organic food, we propose the following first two hypotheses:

H1: There is a moderate relationship between objective and subjective knowledge

H2a: Sources of information have an impact on consumers' objective and subjective knowledge

H2b: Sources of information affect attitudes towards organic food

4. Socio-demographic profile of consumers and their knowledge of organic food

The socio-demographic profile of consumers seems to widely affect their knowledge levels (Bigne´, 1997). In particular, highly educated consumers tend to be more knowledgeable than those with lower education (Briz & Ward, 2009; Gil & Soler, 2006; House et al., 2004). Although women tend to buy organic food more than men (Lockie et al., 2002; Radman, 2005), findings show that men are more aware of organic food (Briz & Ward, 2009; Kumar & Ali, 2011). Moreover, men were found to be more confident about their knowledge concerning organic food (Aertsens et al., 2011). Overall, consumers who have a high income were found to be more aware of organic food (Briz & Ward, 2009; Gil & Soler, 2006). With respect to age, younger consumers tend to be more aware of organic food than their elder counterparts (Kumar & Ali, 2011). Thus, consumers' socio-demographic profiles and information on organic food are both factors affecting consumers' organic knowledge levels. Consequently, we propose the following two hypotheses:

H3: Men have both higher objective and subjective knowledge than women

H4: Younger consumers tend to have higher objective knowledge

5. Attitudes towards and knowledge of organic food

Studies on attitudes towards organic food are of mounting importance since the majority of past research refers to attitudes as a predictor of intention of eating organic food (Saba and Messina, 2003; Çabuk et al., 2014). Attitudes towards organic food are generally positive (Saher et al., 2006). In fact, organic foods are perceived as much more healthy, natural, nutritious, and sustainable than conventional foods (Chen, 2007). Other studies reported that they are more expensive, but also healthier than conventional foods (Magnusson et al., 2001).

Attitudes towards organic food seem to be influenced by the socio-demographic profile of consumers, including age, gender and education. In fact, women tend to have more positive attitudes towards organic food (Davies et al., 1995). Previous studies found that higher awareness and knowledge about organic food had a positive influence on the attitude towards and consumption of organic food (Stobbelaar et al., 2007; De Magistris and Gracia, 2008). Specifically, consumers who are aware of the environment and are concerned about its protection tend to have positive attitudes towards organic foods (Chen, 2007). Equally, environmental concerns were found as strong motivating factors in attitudes to organics (Tsakiridou et al., 2008).

On the other hand, both subjective and objective knowledge have different influences on attitudes and behaviour. For instance, objective knowledge was found to affect the intention to purchase organic (Sangkumchaliang & Huang, 2012). In other studies, objective knowledge was categorized as an attribute which enhances Genetically Modified (GM) food acceptance (Costa-Font et al., 2008). In contrast, Aertsens et al. 2011) assert that subjective knowledge, rather than objective

knowledge, leads to higher levels of consumption of organic food. In parallel, House et al. (2004) have shown a positive relationship between subjective knowledge and GM food consumption. Nonetheless, this relationship is not applicable in the case of objective knowledge. Chryssochoidis (2000) found an effect of subjective knowledge on the relationship between attitude and behaviour. Equally, subjective knowledge was found to be positively related to attitudes (Ellen, 1994; Pieniak et al., 2010). Van Loo et al. (2013) investigated the objective knowledge of consumers of organic yogurt. His findings revealed a relatively weak relationship between objective knowledge and attitudes toward organic yogurt. In another study by Aertsens et al. (2011), objective knowledge had a direct and significant positive impact on attitude towards organic vegetables. It is worth mentioning that studies such as that by Aertsens et al. (2011) reported that subjective knowledge has a stronger positive relationship with attitude and behaviour than objective knowledge. Consequently, we propose the following three hypotheses:

H5: Objective knowledge and attitudes towards organic food are positively related

H6: Subjective knowledge and attitudes towards organic food are positively related

H7: Women, as opposed to men, have more positive attitudes towards organic food

6. Data collection and sample

To test the above hypotheses, we collected data via structured questionnaire on a sample of 400 individuals in the city of Beirut and its suburbs in Lebanon during spring and summer of year 2018, prior to the recent pandemic situation and the socio economic and political instability in the country. Participants were selected using convenience sampling methods and had to complete a self-administered questionnaire. Participants' selection was influenced by their willingness to participate and their agreeing to fill out the questionnaires fully. The questionnaires were distributed in shopping streets, restaurants, and two different universities in Lebanon: the Modern University for Business and Science and the American University of Science and Technology. The participants had to meet the following criterion: their age should be higher than 18. In total, 371 surveys were completed by the participants with a response rate of 93%.

The questionnaire consisted of various sections related to the knowledge level of organic food labels, attitudes towards organic foods, purchase frequency, quality attributes of organic foods, consumers' food lifestyles and socio-demographic information of the respondents.

To measure the knowledge level of organic food, respondents first were asked if they had ever heard of organic food. In order to measure the *consumers' subjective knowledge*, participants had to evaluate their knowledge by indicating whether they agreed or disagreed with a set of statements. A 5-level Likert scale was used. The statements were: (1) In comparison with an average person, I know a lot about organic food, (2) I know a lot about how to judge the quality of organic food, and (3)

People who know me consider me as an expert in the field of organic food. These were adopted from Flynn and Goldsmith (1999). The adopted measure is also consistent with previous studies (Aertsens et al., 2011; Park et al., 1994).

Next, *consumers' objective knowledge* was measured by asking respondents whether five statements of organic food definitions were true or false. These statements were: (1) Organic food is grown without the use of synthetic pesticides and chemical fertilizers, (2) Organic food is environmentally friendly, (3) Organic farming is the same as natural/traditional farming, (4) Organic farming has strictly controlled production systems, and (5) Organic food doesn't contain Genetically Modified Organisms (GMOs). The objective knowledge was calculated as the total number of correct responses of five statements describing organic food, ranging from 0 to 5.

Attitudes towards organic food were measured using a nine-item measurement scale that describes consumers' attitudes towards organic food in general using a 5-level Likert scale (Gil et al., 2000). Cronbach's Alpha results (0.69) showed acceptable consistency of the items (Hejase & Hejase, 2013).

Consumers' food lifestyles were measured using the FRL (Food Related Lifestyle) instrument developed by MAPP and introduced by Grunert et al. (1993). Four items that study consumers' environmental attitudes, derived from Gil et al. (2000), were added to the instrument. In total 31 items were included. The modified scale has high internal consistency (Cronbach's alpha = 0.874).

Sources of information's measurement was adopted from Aertsens et al. (2011). Respondents were asked whether they used several sources often. These sources are: the product tag, the organic label, newspapers, the internet, information at supermarkets, specialized organic shopkeepers, government information, consumer organizations, scientific reports, contacts with organic farmers and information from friends. Respondents had to answer on a five-point scale ranging from 'never' (1) to 'very often' (5).

The possible effect of a higher level of *education* on knowledge was measured by dividing the population into four groups: (1) intermediate; (2) secondary; (3) undergraduate and (4) superior. *Income* was divided into six different groups using the local currency (Lebanese pound). Other demographic variables were measured using dummy variables, e.g., gender (male).

The survey's results were analyzed using the statistical software SPSS version 20. First, descriptive statistics including the sample's socio-demographic profile and cross tabulations were retrieved. Second, the various items included in the questionnaire were reduced into factors using the Principle Component Analysis (PCA) with subsequent rotation (initially using Varimax and later Direct Oblimin). The PCA was conducted on a total of 85 items. Items with low factor loadings (less than .40), high cross loading with other items (greater than .40), or low communalities (less than .30) were all deleted. Only factors exhibiting an eigenvalue greater than 2 and factor loading of .40 or greater were retained. Third, Chi-square, Mann-Whitney U and Kruskal Wallis tests were used as a method to test the research hypotheses.

7. Results

7.1. Descriptive statistics

The total sample consisted of 197 women (53%) and 174 males (46.8%). With respect to age, 72.3% of the respondents' ages ranged between 18 and 24 years of age and between 25 and 34 years of age. Therefore, participants were mature enough to talk about their experiences with organic food. Also, 96.5% of the respondents held a bachelor's or a master's degree, where 50% of the respondents have master/ PhD degrees which is associated with the high percentage of educated people in Lebanon. Such a result supports the fact that respondents probably read selectively by choosing from the available sources of information about organic food. 79% of the respondents did not have children below the age of 12. With respect to income and household size, the majority of respondents (86%) had a high monthly income and a moderate household size. Sample characteristics are presented in Table 1.

The descriptive statistics of the variable 'attitudes' are shown in Table 2. The table shows mean scores of consumers' general attitudes toward organic food. Most respondents have positive attitudes towards organic food. As is clearly shown, consumers believe that organic food is healthier, more attractive, has no harmful effects and is safer than conventional foods. Additionally, there was agreement on organic food being more

Table 1. Socio-demographic Characteristics of the Sample.

Gender	Male	46.8	Nationality	Lebanese	95.7
	Female	53.0		Other	3.2
Age (years)	18–24	40.3	Income (L.L./month)	<600,000	1.1
	25–34	32.0		600,000– 1,000,000	2.2
	35–44	12.9		1000,001– 1,500,000	10.6
	45–54	8.3		1,500,001– 2,500,000	21.4
	55–64	5.9		2,500,001– 3,500,000	30.9
	>64	0.3		>3,500,000	33.7
Education	Secondary	2.2	Children below 12	Yes	19.4
	Undergraduate	46.5		No	79.0
	Superior	50.0			
Religion	Muslim	34.4	Household Size	1	4.8
	Christian	25.3		2	14.5
	Druze	4.0		3	19.1
				4	26.6
	Other	23.9		5	23.9
				>5	9.9

Table 2. Attitudes towards organic food.

Items	Mean	SD
Organic products are healthier	4.27	0.953
Organic products have superior quality	3.76	1.044
Organic products are a fraud	2.26	1.009
Organic products are more tasty	3.59	1.045
Organic products are produced using environmentally and animal friendly farming methods	3.86	0.873
Organic products are safer	4.02	0.988
Organic products are worse than the conventional ones	1.98	1.079
Organic products are more expensive	4.13	0.944
Organic products are more attractive	3.48	0.984
Organic products have no harmful effects	3.79	0.999
Organic products are in fashion	3.08	1.304

expensive, and produced using environmentally and animal friendly farming methods. Consumers seem to find organic foods tastier than conventional ones. On the other hand, Lebanese consumers disagreed that organic food is worse than conventional food and that it is a fraud.

The results of the questionnaire show that less than 13% of the respondents identified themselves as experts in the field of organic food. On average, consumers' subjective knowledge level is considerably low as most respondents exhibited little confidence in their knowledge of organic foods (see Table 3). The percentages of the correct answers for the statements regarding objective knowledge of organic food are shown in Table 4. The most common knowledge is that 'organic food is grown without the use of synthetic pesticides and chemical fertilizers'. Whilst many respondents agreed that 'Organic food is environmentally friendly', there is a clear misconception about organic farming being the same as natural/ traditional farming, as most respondents had an incorrect answer regarding this statement. Similarly, respondents' objective knowledge about organic food containing Genetically Modified Organisms (GMOs) seems to be weak, as a considerable percentage of consumers gave a wrong response.

Respondents rely on word of mouth (information from friends) when they want to buy organic food. A less important source of information seems to be product tags. The rest of the sources presented in Table 5 have lower importance to respondents.

7.2. Hypotheses testing

Consumers' responses were analyzed taking into consideration the standardized data using SPSS. Computations were performed using descriptive statistics, correlation analysis as well as Chi-Square. The results are displayed in Table 6.

Table 6 shows that all hypotheses proposed were not rejected as is; however, when a specific demographic variable is tested, further analysis is required using descriptive statistics and Mann-Whitney U tests (See Tables 7 and 8). Consequently, hypotheses 3, 4,

Table 3. Subjective knowledge of organic food.

Items	Mean	SD
In comparison with an average person I know a lot about organic food	3.13	0.809
I know a lot about how to judge the quality of organic food	2.86	0.849
People who know me consider me as an expert in the field of organic food	2.60	0.939

Table 4. Percentages of correct vs. wrong answers on the objective knowledge items.

Statement	Correct answer	% correct response	% wrong response
Organic food is grown without the use of synthetic pesticides and chemical fertilizers.	I agree	89.0%	11.0%
Organic food is environmentally friendly	I agree	85.2%	14.8%
Organic farming is the same as natural/traditional farming	I don't agree	40.6%	59.4%
Organic farming has strictly controlled production systems	I agree	62.6%	37.4%
Organic food doesn't contain Genetically Modified Organisms (GMOs)	I agree	59.4%	40.6%

Table 5. Sources of information.

Statement	Mean	SD
Product tags (information concerning the product)	3.30	1.147
Organic label (authenticity of organic production)	3.21	1.127
Newspaper	2.17	1.133
Internet	2.83	1.320
Information at supermarket	2.66	1.212
Specialized organic shopkeepers	2.30	1.134
Government information	2.13	1.097
Consumer organizations	2.21	1.077
Scientific reports	2.46	1.212
Contacts with organic farmers	2.12	1.149
Information from friends	3.61	1.387

Table 6. Hypotheses testing.

Hypothesis	Value	df	Asymp. Sig. (2-sided)	Relation
H1: There is a moderate relationship between objective and subjective knowledge	79,679.969	76,936	.000	Accepted
H2a: Sources of information have an impact on consumers' objective knowledge	102,198.536	99,468	.000	Accepted
H2b: Sources of information have an impact on consumers' subjective knowledge	72,453.976	70,150	.000	Accepted
H3: Men have higher objective and subjective knowledge	*	*	*	***
than women	341.198	332	.352	Not
H3a. Gender has no impact on consumers' objective knowledge	242.010	237	.398	Accepted
H3b. Gender has no impact on consumers' subjective knowledge				Not Accepted
H4: Younger consumers tend to have higher objective	*	*	*	***
knowledge	1717.575	1660	.159	Accepted
H4a. Age has no impact on consumers' objective knowledge				
H5: Objective knowledge and attitudes towards organic food are positively related	107,692.650	105,624	.000	Accepted
Pearson R = +0.321 (Sig. P =.000)				Positive Relation
H6: Subjective knowledge and attitudes towards organic food are positively related	79,447.433	77,220	.000	Accepted but Negative
Pearson R = – 425 (Sig. P = .000)				Relation
H7: Women, as opposed to men, have more positive	*	*	*	***
attitudes towards organic food	338.791	332	.387	Not
H7a. Gender has no impact on consumers' attitude towards organic food				Accepted

and 7 need further analysis. Referring to Table 6, it can be observed that there are differences in males' and females' attitudes toward organic food as well with respect to their objective and subjective knowledge. Moreover, Table 6 shows that gender does not affect how consumers look at the sources of information and their awareness about organic food. However, gender does have a pattern as reflected from the results of Mann-Whitney U tests (Table 7). Looking into the descriptive statistics results, it is shown that indeed females have higher objective and subjective knowledge as compared to men. When studying the ratios of the responses obtained from cross-tabulations, one finds that on average, females' score on objective knowledge agreement is 34.91% versus a score of 29.06% for males, and score on subjective knowledge agreement 39.13% versus 31.1% for

Table 7. Hypothesis Test Summary – Mann-Whitney U- tests.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of ZATTITUD is the same across categories of ZGENDER	Independent-Samples Mann-Whitney U Test	.000	Reject the Null Hypothesis
2	The distribution of ZOBJKNOWLEDGE is the same across categories of ZGENDER	Independent-Samples Mann-Whitney U Test	.006	Reject the Null Hypothesis
3	The distribution of ZSUBJKNOWLEDGE 1 is the same across categories of ZGENDER	Independent-Samples Mann-Whitney U Test	.024	Reject the Null Hypothesis
4	The distribution of ZSOURCESOFINFO is the same across categories of ZGENDER	Independent-Samples Mann-Whitney U Test	.574	Retain the Null Hypothesis
5	The distribution of AWARENESS is the same across categories of ZGENDER	Independent-Samples Mann-Whitney U Test	.065	Retain the Null Hypothesis

Asymptotic significances are displayed.
The significance level is .05

Table 8. Hypothesis Test Summary – Kruskal-Wallis- tests.

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of ZATTITUD is the same across categories of ZAGE	Independent-Samples Kruskal-Wallis Test	.372	Retain the Null Hypothesis
2	The distribution of ZOBJKNOWLEDGE is the same across categories of ZAGE	Independent-Samples Kruskal-Wallis Test	.055	Retain the Null Hypothesis
3	The distribution of ZSUBJKNOWLEDGE 1 is the same across categories of ZAGE	Independent-Samples Kruskal-Wallis Test	.000	Reject the Null Hypothesis
4	The distribution of ZSOURCESOFINFO is the same across categories of ZAGE	Independent-Samples Kruskal-Wallis Test	.581	Retain the Null Hypothesis
5	The distribution of AWARENESS is the same across categories of ZAGE	Independent-Samples Kruskal-Wallis Test	.514	Retain the Null Hypothesis

Asymptotic significances are displayed.
The significance level is .05

males. These results help to reject Hypothesis 3 which states 'Men have higher objective and subjective knowledge than women'.

In addition, females show a score of 34.1% versus 24.7% for males when studying their positive attitude towards organic food, thus confirming Hypothesis 7 which states that 'Women, as opposed to men, have more positive attitudes towards organic food'. On the other hand, when studying the averages describing the age impact on objective knowledge, results show that the younger consumers form an overall average score of 49.55%

of having higher objective knowledge, therefore confirming that age does have an impact but the distribution of age categories with respect to their objective knowledge is marginally higher in the younger age category (18 to 34 years old) versus the older age categories (35 to above 64 years old). Such a marginal distribution was reflected in the Kruskal-Wallis test (Table 8) as evenly distributed ($p = 0.055$, marginally higher than $\alpha = 5\%$). This result confirms Hypothesis 4 which states 'Younger consumers tend to have higher objective knowledge'.

8. Discussions and conclusions

Results show that Lebanese consumers perceive organic food as healthier, more environmentally friendly, more trustworthy, tastier, and better quality than conventional food. These results are in accordance with previous research on organic foods (Magnusson et al., 2001; Saba and Messina, 2003). The considerably high objective knowledge score of the respondents indicates that Lebanese consumers are relatively knowledgeable about organic food in spite of the fact that the organic industry in Lebanon is still comparatively new. Despite having high objective knowledge, consumers show low confidence in their knowledge about organic foods. This result is consistent with Pieniak et al.'s (2010) study that attributed consumers' weak subjective knowledge to the low confidence they have in organic food caused by lack of experience and expertise. In a study by House et al. (2004), subjective rather than objective knowledge was found to be influential in consumers' acceptance of GM foods, especially for those individuals who have high education profiles. In Lebanon, the case might be similar where low organic food consumption rates might be associated with Lebanese low subjective knowledge levels.

The findings of this study indicate a moderate relationship between subjective and objective knowledge, which is consistent with previous research (Brucks, 1985; Pieniak et al., 2010). The results obtained from the correlation analysis as well as Chi-Square, Mann-Whitney U, and Kruskal Wallis tests confirm the study's first hypothesis stating that there exists a moderate relationship between objective and subjective knowledge. Nevertheless, further studies should investigate the nature of this relationship.

The study confirmed that consumers' objective and subjective knowledge are influenced by sources of information, specifically newspapers and scientific reports. This is perhaps due to the fact that organic consumers tend to have high education profiles which explain their dependence on reliable and credible sources of information such as newspapers and scientific reports.

With respect to the relationship between gender and knowledge and in contrast with previous research (Briz & Ward, 2009; Kumar & Ali, 2011), the study's results show that women are more aware than men about organic foods as they showed higher objective knowledge scores, which is consistent with the study conducted by Ureña et al. (2008). It is possible to argue that Lebanese women tend to know more about organic food since they identify themselves as the primary shoppers for their households. Age has also been shown to be influential in consumers' objective knowledge. In effect, younger consumers tend to have higher objective knowledge, confirming hypothesis 4.

The study's findings are also consistent with other studies regarding the relationship between attitudes and objective knowledge (Ellen, 1994). Hence, the study supported the statement that the higher objective knowledge of organic foods that consumers have, the

more positive attitudes they will form towards organic foods. However, in agreement with Aertsens et al. 2011, the relationship between attitudes and subjective knowledge is statistically significant but with a negative relationship.

Based on the aforementioned results, improving consumers' knowledge about organic foods is imperative. Marketing campaigns and strategies need to educate consumers about organic certification, logos and distinction from traditional foods, or 'Baladi' foods as they are called in Lebanon, which in turn would reinforce positive attitudes towards organic foods. The study shows that environmental awareness is influential in attitudes towards organic foods and therefore, should be considered in future research tackling consumers' acceptance of organic food. It would be interesting to study the relationship between environmental awareness, environmental attitudes and acceptance of organic food in Lebanon.

Women also tend to have more positive attitudes about organic food. In this respect, the study confirms other studies' results concerning gender and attitudes (Davies et al., 1995). The study revealed that consumers' acceptance of organic food is determined by the level of education that these consumers have. In particular, more educated consumers are more able to accept those foods than those who have lower education levels. This result is supported by previous studies (Tsakiridou et al., 2008).

In the light of the study's' results, subjective knowledge and, to a lesser extent, objective knowledge, need to be considered by policy makers and organic food marketers as vital drivers behind consumers' attitudes towards organic food. Promotional campaigns that rely on credible sources of information such as scientific magazines and newspapers can contribute to raising consumers' objective and subjective knowledge and reinforce positive attitudes towards organic foods.

The current study contributes to the literature on organic food in Lebanon in general and to understanding the factors that affect attitudes and knowledge of the Lebanese consumers in the light of their organic food consumption in particular. The information presented in this paper is relevant for local as well as international food marketers and health policy makers, as it paves the way for a better understanding of strategies to be adopted for more effective marketing of organic food in the Lebanese market.

Limitations of research include the use of non-probability sampling and the narrow geographical scope of the study. Also, most of our results were based on data collected from mainly two universities in the country, not only ordinary people, which makes almost 50% of the respondents have either MA and PhD degree and would accordingly affect their knowledge about organic food. This is one of limitations that we highlight in our study and therefore, the results may not be representative of all organic consumers in Lebanon. Consequently, more research is needed to verify the findings' reliability. Future studies must expand to other regions in Lebanon using larger, more representative and cross-cultural consumer samples.

Conflicts of interest

No potential conflict of interest was reported by the author(s).

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