

# Nutrition among Adolescent Spaniards: Healthy and Non-healthy Motives of Food Choice

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**Abstract** Health is one of the issues which most concern both the general public and institutions. Correct nutrition is a fundamental variable due to its medium and long term effects. The present work focuses on examining the nutrition among adolescent Spaniards, especially the healthy and non-healthy motives of food choice, as well as the effect of this choice on future health problems. In order to confirm the *Food Choice Questionnaire's* (FCQ) applicability to the sample of young people polled, and examine the possible differences related to the socio-demographic and anthropometric variables (weight and height (BMI)), a two phase methodology was used (Principal Component Factor Analysis (PCFA); ANOVA, t-test, Pearson Chi-Square). Selection of the respondents has been carried out with multistage random sampling in two stages, stratified and cluster, taking into account the type of high school (public or private). The sample was composed of 590 pupils from different high schools in the city of Valencia (Spain), aged between 13 to 18 years old. Our findings show that Spaniards young people choose their food in terms of the sensory aspects and price, without concerning themselves with the effects that their eating habits may have on their weight. Moreover, the findings showed significant differences taking into account gender of the participants and the type of high school they attend. In all the socio-demographic groups studied, the aspects related to the senses are the most important factor in the food choice. The least important factor is related to ethical characteristics of the food producers.

**Keywords:** nutrition, motives, adolescent Spaniard, food choice, overweight, public and private high schools, gender

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## 1. Introduction

Different factors have become fairly influencing in consumer's food choice [1]. The understanding of these factors contributes to promote the consumption of more healthy options. In developed countries as Spain, and more and more in the rest of Mediterranean countries, one of the most important issues related to health is the correct choice of food, and its medium and long term effect. Improved knowledge and understanding of food choice motives can be beneficial for a wide diversity of decisions in the adolescence, focusing in improving healthier eating habits [2].

Effectively, the excessive consumption of high fat food is creating important problems in developed countries. Thus, over 300 million people in the world are obese; in the case of children (between 2 and 17) 10% are obese and 20% are overweight [3]. A recent study carried out in Spain [4] presented even higher figures in relation to the prevalence of overweight in young people: 45 % in the 8 to 13 age bracket; 25.5 % in the 14 to 17 age bracket.

Choosing food is a complex process which depends on a variety of variables or stimuli, as much of a sensory nature (taste, etc.) as non-sensory (price, etc.), related to

the customs and surroundings of the decision maker [5]. In turn, a variety of social, cultural and economic factors favour maintaining or, on the contrary, changing behavioural nutritional patterns [6]. Hence, the problems related with overweight should not only be examined from a medical perspective, but also as a possible problem of a psychological or even, socio-cultural nature [7].

In the specific case of teens and young Spaniard people, the problems are not only in the present, but especially related to their future. In infancy, they can produce different complications of a metabolic, respiratory, digestive, or endocrinology nature, besides, an obese child has an 80% possibility of remaining so as an adult [8]. Therefore, it is important to improve knowledge about young people's nutritional habits, which is important information for decision making of a socio-political nature as well as decisions of an entrepreneurial nature, given that, young people today, are the potential patients and consumers of the future.

Following [9] researches, nutritional disorders during infant and youth growth development could conduce to serious health consequences in the elderly population [10]. It is widely known the link between fat food and sugar consumption with many diseases such as obesity, which is one of the most widespread and important health concerns for policymakers in Spain [11]. Furthermore, imbalances

between intake and overconsumption of calories can also lead to other diseases, such as non-insulin-dependent-diabetes, hypertension, atherosclerotic cardiovascular disease, endometrial cancer and gallstones [12].

Following the recent literature [9,13] the food choice questionnaire (FCQ) is a tool to measure the motives underlying people's selection of food. It consists of 36 questions testing in a systematic way health-related and non-health related motives of food choice. The FCQ hasn't been successfully applied to adolescent Spaniards. In this research, the nine usually found factors appear as groups of statements related to health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern. Nevertheless, some of the items and their correspondent factors (specifically "Mood" and "Convenience") were eliminated considering them unsuitable for the population under study (adolescents from 13 to 18).

In relation to the definition and measurement of obesity in adolescents and young people, there is no agreed criterion [4], despite the fact that the majority are based on the body-mass index (BMI). In recent years in Spain, the *enKid* study has been widely used [14]. It evaluated the nutritional habits of children and young people in Spain during the years 1998 to 2000, and which considers overweight at the 85<sup>th</sup> percentile and obesity at the 95<sup>th</sup> percentile for age and sex [15].

In sum, the objective of the present paper has been focused on examining the Mediterranean culture, especially the healthy and non-healthy motives in the choice of food among adolescent Spaniards, from 13 to 18 years, as well as their effect on possible problems related to their weight (being underweight or overweight and obese) and other demographic variables. To analyse the motives which lead people to the choice of given foodstuffs we have used, on the basis of the consulted literature, the questionnaire named *Food Choice Questionnaire* [15], which examines the multidimensionality of factors which, at an individual level, determining the choice of food.

## 2. Methodology and Materials

In order to carry out our study, a questionnaire based on the *FCQ* [15] was designed; in addition, respondents were questioned on socio-demographic factors of about themselves and their surroundings. Given that the respondents were minors and that the interviews took place in schools, the authorization and collaboration of the *Conselleria de Educaci3n, Cultura y Deportes de la Generalitat Valenciana* (Ministry of Education Culture and Sports of the Valencia Region), as well as each of the different schools involved in the study, was requested.

### 2.1. Questionnaire

In order to collect the information for the investigation a questionnaire was designed which consisted of a first part, based on the *FCQ*, which required the respondent to value the importance of diverse affirmations related to a normal day's food. This questionnaire, which has been used and adapted in several studies, demonstrating its usefulness in various contexts [16], consists of 36 items grouped into 9 factors in its original version. After its

revision by a group of experts, who eliminated some of the items, and their correspondent factors (specifically "Mood" and "Convenience"), as they were considered unsuitable for the population under study, namely adolescents.

Following the experts' recommendation and Pigford's proposal [17], a scale from 1 "Not at all important" to 5 "Very Important" was used to evaluate different affirmations related with the motives for choosing the respondents food on a normal day.

In addition, as indicated previously, information was requested about different socio-demographic variables (gender, age and type of education centre). Two questions related to the height and the weight of the respondent were included to gather information about anthropometric variables, that is, they were not measured directly, rather the respondents' estimation was used [18]. The BMI used to estimate the level of overweight was calculated with this information.

### 2.2. Sample

Selection of the respondents has been carried out with multistage random sampling in two stages, stratified and cluster, taking into account the type of school (public or private).

The information was compiled in the course 2014-2015, using the figure of the interviewer, who questioned the pupils who satisfied the randomness conditions specified, at the entrance of the previously chosen high schools after requesting the pertinent authorization.

The sample comprised 590 pupils, aged between 13 and 18, from different educational centres in the city of Valencia, both public and private centres. The description of the sample, by type of centre and gender of the respondent, is presented in Table 1.

Table 1. Description of the sample (mean values and percentages)

	Sample (100%)	State (59.7%)	Private (40.3%)	Female (53.6%)	Male (46.4%)
Age (years)	15.04	15.04	15.05	15.03	15.05
Weight (Kg.)	58.76	58.92	58.51	55.65*	62.34*
Height (cm.)	166.28	167.71*	164.17*	162.55*	170.54*

\* Significant differences,  $p < 0.05$ . Source: Own elaboration.

The average age of the sample was slightly over 15 years, for both female and male subjects. With respect to the anthropometric variables, there were no significant differences for weight between the public and private centres, but there were differences when comparing female and male weight. The average global height in public schools was significantly higher than that of private centres. In terms of the variable gender, male subjects were much taller than the female ones.

### 2.3. Data Analysis

In order to confirm the *FCQ's* applicability to the sample of young people polled, and examine the possible differences related to the socio-demographic and anthropometric variables (weight), a two phase methodology was used. All the analyses were carried out with the program SPSS (version 19), applying a confidence level of at least 0.05 in all the tests realized.

Firstly, the 23 items used in the *FCQ* were submitted to a Principal Component Factor Analysis (PCFA);

previously, compliance with the conditions of applicability of this analysis was checked. Therefore, the majority of the coefficients of the matrix correlation were above 0.3; The Kaiser-Meyer-Olkin (KMO) value was 0.843 (greater than the minimum recommended level of 0.6); and the Bartlett test of sphericity was significant ( $p < 0.05$ ). In addition, to ensure the internal consistency of the resulting factors, Cronbach's alpha coefficient was calculated for each of them, all the coefficients were greater than 0.6, which ensures the internal consistency of all of the resulting factors [19].

Secondly, different analyses of the mean differences (ANOVA, t-test, Pearson Chi-Square) were carried out in order to analyse the existence, or not, of differences in relation to the motives for food choice. All of these based on the weight of the respondents and on the socio-demographic variables considered.

### 3. Results and Discussions

#### 3.1. Motives for the Food Choice

As mentioned previously, firstly, a PCFA was applied to the 23 items of the *FCQ* in order to group the motives that the subjects have polled have for choosing food. As a result of this process, six factors were obtained (Table 2) which together explains 60.23 of the variance.

**Table 2. Principal motives for the choice of food by young people**

It is important that the food I eat on a typical day ...		Cronbach's $\alpha$
<b>Factor 1.- Health and Natural (fcq1)</b>		0.802
Is nutritious.	0.794	
Contains lots of vitamins and minerals.	0.749	
Is high in proteins.	0.662	
Is healthy.	0.644	
Is high in fibre.	0.561	
Contains natural ingredients	0.465	
Contains no artificial ingredients.	0.454	
<b>Factor 2.- Price (fcq2)</b>		0.795
Is cheap.	0.815	
Is not expensive.	0.814	
Is good value for money.	0.784	
<b>Factor 3.- Sensory appeal (fcq3)</b>		0.699
Has a pleasant taste	0.748	
Has a pleasant texture.	0.702	
Has a pleasant smell.	0.678	
Has a pleasant appearance.	0.619	
<b>Factor 4.- Weight control (fcq4)</b>		0.759
Is low in fat.	0.821	
Is low in calories	0.774	
Helps me control my weight.	0.718	
<b>Factor 5.- Ethical concern (fcq5)</b>		0.722
Comes from countries I approve of politically	0.800	
Has the country of origin clearly marked	0.753	
Is packaged in an environmentally friendly way.	0.633	
<b>Factor 6.- Familiarity (fcq6)</b>		0.640
Is like the food I ate when I was younger.	0.730	
Is what I usually eat.	0.695	
Is familiar to me.	0.684	

Source: Own elaboration.

The first factor, "Natural and healthy" comprised 7 items which combine the factors "Health" and "Natural content" on the original scale, this combination is similar to that obtained in previous studies [13]. This combination could be due to the fact that young people associate natural with something healthy and wholesome, both concepts being similar in relation to the food choice.

The second factor, "Price", includes 3 items relative to the economic value of the food and coincides with the original factor in the *FCQ*. The third factor, "Sensory appearance" comprised 4 items related to the principal senses related to taste, and smell, also agreed with the original scale. The fourth factor, as in the *FCQ*, refers to 3 items related to "Weight control", which is one of the generally most important aspects in the choice of food consumed. The fifth factor, "Ethical concern", is related to aspects about the surroundings and origin of the chosen food, and is formed by the same 3 items as in the reference scale.

Finally, the sixth factor, called "Familiarity", comprised 3 items about the respondent's personal surroundings, as in the *FCQ*. An important and practical conclusion of previous results is the applicability of the scale *FCQ* to young people.

Table 3 shows the results of the analysis of correlations between the factors. It was shown that all of the coefficients are significant, therefore, there are no problems of multicollinearity between the data, and each factor can be considered to be different to the rest of the factors.

**Table 3. Matrix of correlations between factors**

	Mean	SD	fcq1	fcq2	fcq3	fcq4	fcq5	fcq6
fcq1	3.43	0.77	1					
fcq2	3.42	1.03	0.251*	1				
fcq3	4.20	0.71	0.174*	0.247*	1			
fcq4	3.19	0.96	0.512*	0.164*	0.177*	1		
fcq5	2.63	1.01	0.518*	0.247*	0.116*	0.291*	1	
fcq6	2.96	0.96	0.202*	0.321*	0.402*	0.184*	0.216*	1

\* Significant correlations  $p < 0.01$ . Source: Own elaboration.

In order to discern the importance that each factor has in the choice of food, the average evaluation for each of the six identified factors was calculated (mean and standard deviations). As it was shown (Table 3), the most important factor for young people, when it comes to choosing food, is related to its sensory aspects (fcq3). What they like or do not like is a fundamental element in their choice of habitual consumption. Although with an adult sample, a similar result was obtained in a study [9] carried out in different European countries to check the applicability of the *FCQ* in different contexts.

The least valued aspect was the factor "Ethical concern" (fcq5) which hardly scores 2.5 (out of 5), therefore, young people do not seem very concerned about the origin or production method of the food they are going to consume. This result is also similar to the obtained by [20]. Thus, the previous knowledge of the food (Familiarity (fcq6)), is not very important in the choice of a food, perhaps because young people's desire is to taste new things, including new food. The same result was also obtained in studies with adult samples [9].

At an intermediate level, with a score between 3 and 3.5 (out of 5), are found the rest of the factors. On the one

hand, the aspects relative to health and the natural nature of the food (fcq1) and the price (fcq2). They obtained very similar results, which showed that young people are beginning to be aware of the importance of taking care of their health with adequate nutrition and, also, they are concerned about the economic issues in their immediate surroundings. “Weight control” (fcq4) is valued slightly above 3 points on average, in fourth place; therefore, young people value sensory aspects more than the effect of food on their weight, in spite of the fact that this aspect is also important.

### 3.2. Effects of the Food Choice on Overweight

In order to examine the relationship between weight and the food choice by young people, the BMI was calculated to classify the respondents into three groups.

The first group was composed by teens with a BMI <18.5 the group named “underweight”. The second group (desirable) was formed by those who had a BMI >18.5 and <25. The third group was composed by those who were overweight or obese, BMI > 25 [21,22,23].

In order to contrast if the results could confirm a relationship between the motives for food choice and the respondents' weight, an ANOVA test was conducted [24]. The results, shown in Figure 1, didn't confirm this relationship, because no factor presents statistically significant differences between the groups.

Nevertheless, an interesting conclusion from this analysis was obtained. The factor “Weight control” (fcq4) was valued equally by adolescents with overweight and adolescents with desirable BMI, but it was not so valued by adolescents with underweight.

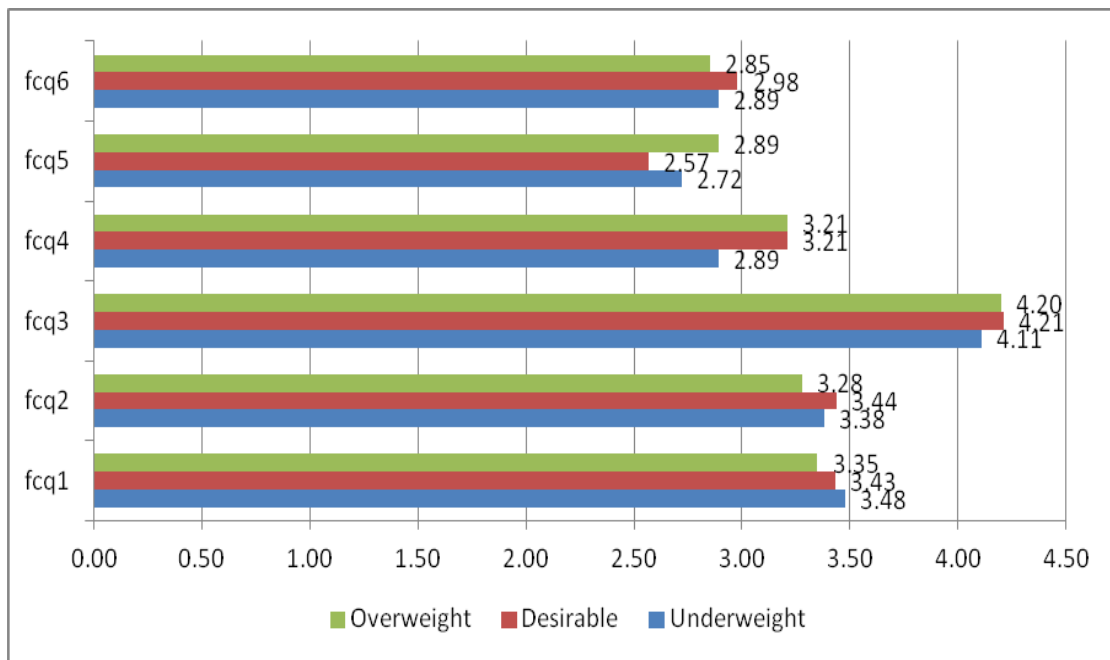


Figure 1. Food choice and weight categories

\* Significant differences, p<0.05. Source: Own elaboration.

### 3.3. Socio-demographic Variables and Food Choice

#### 3.3.1. Type of School: Public or Private

In the process of choosing and consuming food, one of most important variables is the socio-economic level [25]. This variable was analysed basing on the type of school (public or private). The research has shown that there were significant differences, regarding the distribution of the degree of BMI (Table 4), in adolescents Spaniard regarding the type of school they have attended (public or private school). Hence, and following [3], the results stated that in public centre (lower socio-economic level) there was a greater percentage of young with weight problems, both underweight and overweight.

Table 4. BMI by type of school (data in %)

	Underweight	Desirable	Overweight
Public	14.80	74.10	11.10
Private	6.90	83.20	9.90

Pearson Chi-Square = 0.01. Source: Own elaboration.

Moreover, there were important differences between the motives for choosing food between pupils in public and private schools (Figure 2), as they only valued the natural and healthy nature of their usual food in a similar way (fcq1). The pupils in public schools valued the sensory aspect of the food which they consume (fcq4) but they did not value the ethical issues related to it (fcq4) and the familiarity with the products they usually consume (fcq6). Regarding the effect that, the food they have eaten, had on their weight (fcq4), they considered it was important but it did not seem to obsess them. Nevertheless, it is important to note that students from public school were less concerned about the price of food (fcq2) than students from private schools.

On the other hand, private school pupils have valued the sensory aspects of food highly (fcq3) and the price (fcq2), but they had little concern for the ethical aspects (fcq5); besides, the effect that food had on their weight have been concerned to a reasonable degree (fcq4) and they liked to consume products which were familiar to them (fcq6).

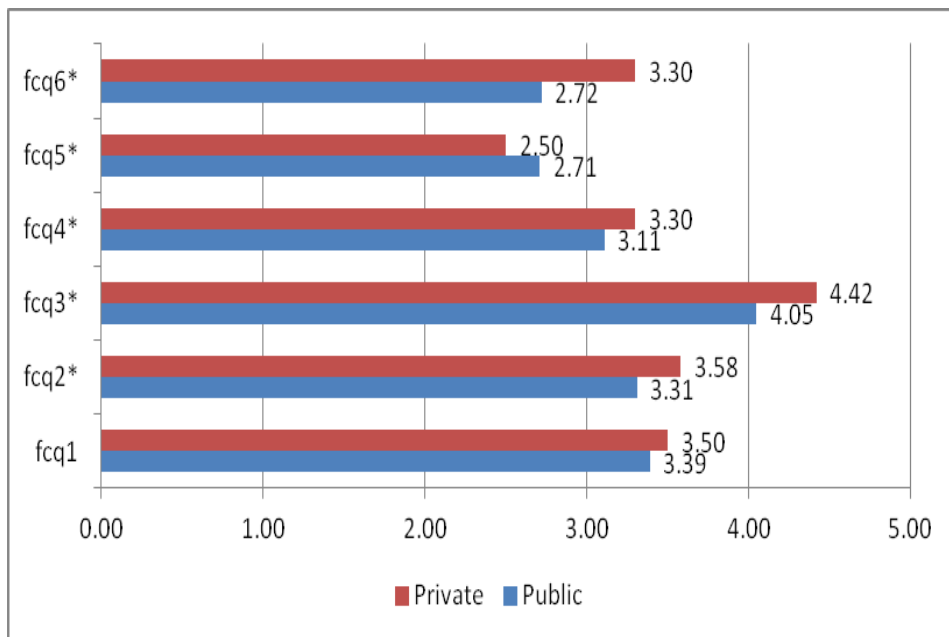


Figure 2. Food choice by type of school

\* Significant differences, p<0.05. Source: Own elaboration.

3.3.2. Variable of Gender

Another of the socio-demographic variables which is commonly used in the analysis of eating habits is the respondent's gender [15,16,26]. As Table 5 shows, and although the differences are not significant, the percentage of young men with overweight is higher than in women

Table 5. BMI by gender (data in %)

	Underweight	Desirable	Overweight
Female	11.70	80.20	8.10
Male	11.60	74.90	13.50

Pearson Chi-Square = 0.11. Source: Own elaboration.

As Figure 3 shows, the female subjects have given more importance to all of the factors related to the food they have consumed than the male subjects, except in the case of the familiarity of the food; this result was in line with the above-cited studies.

As seen on the basis of the results obtained previously, the most important aspect was the sensory one (fcq3) and the least, the ethical one (fcq5). The most important difference between the groups was the importance given to the possible effect of food on weight (fcq4), quite important for the female subjects and at an average level for the male ones; the girls also valued the healthy aspects of their nutrition more than males (fcq1). Price (fcq2) was relatively important for both groups, but there were no significant differences between males and females.

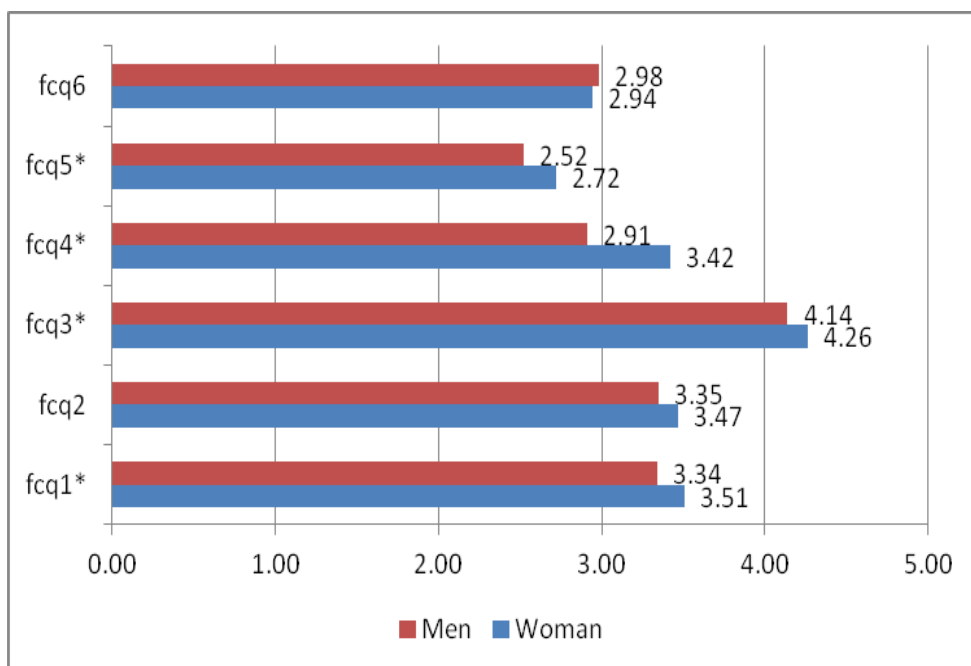


Figure 3. Food choice by gender

\* Significant differences, p<0.05. Source: Own elaboration.

### 3.4. Global Results

In relation to the importance which teens give to the different factors in their decision about what to eat, we can establish a ranking (Table 6).

In the global results of the sample analysed, as in the majority of studies in different contexts, the aspects related to the senses were the most important elements in the choice of food and, the least important, were the aspects related to the ethical characteristics of the producers of such food. Other aspects worth highlighting are that the effect on health of the food usually consumed is important, but the familiarity aspect is not important for young people. Furthermore, these results are verified in practically all the socio-demographic groups studied.

**Table 6. Ranking of factors for choosing food**

	Global	Underweight	Desirable	Overweight
1	Senses	Senses	Senses	Senses
2	Price	Health	Price	Health
3	Health	Price	Health	Price
4	Weight	Familiar	Weight	Weight
5	Familiar	Weight	Familiar	Ethical
6	Ethical	Ethical	Ethical	Familiar
	Public	Private	Female	Male
1	Senses	Senses	Senses	Senses
2	Health	Price	Health	Price
3	Price	Health	Price	Health
4	Weight	Familiar	Weight	Familiar
5	Familiar	Weight	Familiar	Weight
6	Ethical	Ethical	Ethical	Ethical

Source: Own elaboration.

### 4. Conclusions and recommendation

Given the importance of nutrition during adolescence, the intention of the present work was to increase knowledge about which motives affect the decision, by young people, about what to eat. First, we can suggest that the application of the *FCQ* [5] seems adequate with some adaptations for young consumers.

Second, regarding the relationship between the motives for choosing which food to eat and the potential problems associated with young people's weight, it appears that these are not very important for them, as they do not take into account the effect that their choice can have on their weight. This affirmation could be worrying, especially in those young people who already have problems being overweight. Nevertheless, they do take into account aspects related to their health and the natural origin of what they habitually consume.

From a social point of view, we can suggest that there is a difference between public and private school pupils, because they value the choice of their nutrition in a different way, in spite of the fact that both are particularly guided by their senses.

On the other hand, the girls, more than the boys, in addition to the senses, give greater importance to the price and the natural origin of what they eat, as well as to the aspects related to controlling their weight.

Finally, as in every research, we must state that, the conclusions which we have drawn with the present work, have their limitations. On one hand, it shows that, although the sample was large, the study was limited to a specific geographic zone. In addition, for the analysis of the effect of overweight, objective measurements were not taken, the interviewees were asked to estimate their own weight and height. Hence, future studies should consider a wider geographic sampling or even, a longitudinal focus to analyse possible behavioural changes with the course of time.

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