

## Food choices of students with nutritional knowledge

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### ABSTRACT

**Objective:** This exploratory study aims to identify at the students who have acquired basic nutritional knowledge the options based on what healthy / less healthy foods mean, to what extent the conservatism / novelty is important in choosing products and how much independent / dependent their food choices are in fact.

**Methods:** The methodology used in this paper consisted in drawing up a 38-item questionnaire on food choices and its completion by 50 students who attended a nutrition course.

**Results:** This study reveals on the following three major lines developed by the questionnaire - at the axis healthy versus unhealthy food choices there are no significant differences between the two categories (Paired samples test,  $t = 1.20$ ,  $p = 0.235$ ), at the axis choices based on conservatism versus novelty are significant results for conservatism (Paired samples test /  $t = 6.95$ ,  $p = 0.000$ ) and at the axis choices based on decisional independence versus dependence are significant results for independence (Paired samples test,  $t = 5.59$ ,  $p = 0.000$ ).

**Conclusions:** The autonomy of adolescence supplemented by nutritional knowledge can have positive effects in terms of correct food choices. This study shows that students with nutritional knowledge make choices based on conservatism and independence.

**Implication:** Basically, this paper makes a clear radiography of the respondents' food choices and it may also provide

through the questionnaire developed by us a starting point for developing new information, education and marketing strategies to promote the healthy food consumption.

### KEYWORDS

Food choices, teenagers, nutritional facts, food products.

### INTRODUCTION

Studies have proven that the nutrition-based actions regulate the health-disease balance<sup>1,2,3</sup> and that an optimal nutrition supports life and maintains the psycho-somatic health as well as the adaptive balance to the surrounding environment<sup>4,5,6</sup>. Therefore, as the food - health / disease inter-relationship is pretty obvious<sup>7</sup>, we may say that people's food choices have a preventive or corrective nature and they may be seen as a regulatory mechanism in relation to what such people understand to be a healthy diet, including here the scientific-cultural perspective.

The use of nutritional information is influenced by two aspects: attention to and understanding of nutritional information, as Miller & Cassady<sup>8</sup> say, each coming with its limitations, but we believe that having nutritional information can be a strong point in food decisions.

Story et al.<sup>9</sup>, K. Trew<sup>10</sup>, C. Symmank<sup>11</sup> point out 4 categories of factors that influence people's food choices, information that was integrated in the preparation of our questionnaire:

1) *Individual or intrapersonal influences* - which include biological factors (sensory perceptions and the way the brain operates), psychological factors (nutritional knowledge, beliefs, habits, preferences, self-regulation mechanisms, emotions, the personality, weight control patterns), demographic factors (cultural or convenience-type factors) and situational factors (budget, time, hunger) etc.

2) *Social, environmental or interpersonal influences* - which include influences coming from family, friends, the elderly, and basically the people with whom the subjects interact directly.

3) *Physical environmental influences* - which refer to the range of products (intrinsic and extrinsic attributes of products, type of food), everything that determines the access and the availability for consumption, location, living environment and accessibility to food.

4) *Macrosystem or societal influences* - which refer to the media and advertising, as well as to everything that has an indirect and distal impact on food choices, government food policies, social and cultural initiatives and standards, industry regulations and influences, etc.

Nutritional information is therefore strained through our personal filter and bears the imprint of each of us, as they are part of a "machine" that influences individual food choices.

There are certain studies that show that nutritional information, in terms of adolescents' food choices, is less important<sup>12,13</sup>, their choices being highly influenced by their food beliefs and food concerns. However, it should be noted that teenagers are a special category who consider that eating healthy means something uncool, and that being different from others and giving up what they like, restricting their freedom or reducing problems that might arise someday in the future is something uninteresting, reason for which it is quite difficult to change these perceptions and convince them that healthy choices<sup>14,15</sup>: are in fact the normality, that they do not involve a threat to the self, that they are convenient and attractive, that they may be individualized and that they may bring momentary benefits. Healthy options may therefore be blocked by a number of factors such as: negative image of healthy food (healthy eaters), the conflict between personal body image and social pressure, the perception of what food means and its relationship to the health, etc.<sup>14</sup>.

Increased autonomy in adolescence also contributes to this, which means detachment from parental control, overcoming dependence on others and focusing on the freedom to make one's own choices<sup>16</sup>. In terms of nutritional choices, increased autonomy may be seen as a risk due to the teenagers' wrong / unhealthy choices<sup>17,18,19</sup>, but we also need to emphasize that it may also mean a replacement of bad eating habits previously acquired in the family.

As this is the age when the identity of a responsible food consumer (healthy-eating identity) is outlined, it is important to identify their perception of what healthy / less healthy foods mean, to what extent the conservatism / novelty is important in choosing products and how much independent / dependent their food choices are in fact.

## RESEARCH METHODS

This exploratory study aims to identify the food options of students undergoing nutritional training courses, by applying a

38-item questionnaire through which we managed to outline their food choices in relation to certain food products, using a 5-step Lickert scale ( 1- not at all, 2 - rarely, 3 - neither rarely nor often, 4 - often, 5 - very often). The questionnaire was particularly designed and it is structured on 3 axes in which the items were dichotomized based on the research of specialists in the field<sup>20,21,22</sup>: axis 1 related to choices based on the perception of healthy foods products (items Q1, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q14)) versus less healthy / unhealthy products (items Q2, Q3, Q4, Q5, Q13), axis 2 related to choices based on conservatism (items Q15, Q16, Q17, Q20, Q21, Q23, Q26) versus novelty (items Q18, Q19, Q22, Q24, Q25) and axis 3 related to choices based on independence (items Q27, Q35, Q36, Q37, Q38) versus dependence (items Q28, Q29, Q30, Q31, Q32, Q33, Q34). Each item is described in the tables from the results section. The notation Q1 - Q38 indicates the item number in the questionnaire.

The group-participants include 50 students (teenagers, 21-22 years old) who took a course in Human Nutrition (28 hours), students in the second year of food engineering undergraduate studies. The group profile is structured on a series of classification criteria 23, 24 according to which other studies have identified differences in eating behaviour: sex (males 36%, females 64%), origin / residence (rural 40%, urban 60%), family budget (average 68%, above average 32%), BMI - body mass index weight (underweight 4%, normal weight 58%, overweight 28%, obesity 10%). We can notice that we have a heterogeneous group from the perspective of the mentioned criteria. Regarding of ethics in research, the students' participation in the study was voluntary and was based on ensuring anonymity.

Statistical processing was conducted by means of the statistical program SPSS20 (Statistical Package for the Social Sciences).

We tested the normality of the distribution by applying the statistical test Kolmogorov - Smirnov Z (SPSS) and we identified a distribution that does not differ from a normal distribution for each category: Healthy ( $z = 0.785$ ,  $p = 0.569$ ), Unhealthy ( $z = 1.157$ ,  $p = 0.138$ ), Conservatism ( $z = 0.732$ ,  $p = 0.657$ ), Novelty ( $z = 0.902$ ,  $p = 0.390$ ), Dependence ( $z = 0.733$ ,  $p = 0.656$ ), Independence ( $z = 0.815$ ,  $p = 0.520$ ), the test not being significant statistical.

We will check if there are statistically significant differences for each of the 3 axes.

## THE RESULTS OF RESEARCH

### *Options on the healthy / unhealthy axis*

Further to making a comparison between the healthy and unhealthy options, we obtained no statistically significant differences (Paired samples test,  $t = 1.20$ ,  $p = 0.235$ ), but important information can be obtained by analysing the hierarchy of options.

**Table 1.** Student choices as consumers of healthy and less/unhealthy food products

<b>Healthy Options</b>	<b>Mean</b>	<b>Hierarchy</b>
Fresh products	4.34	Q1
Products high in calcium, minerals, vitamins, fiber	3.46	Q10
Whole foods with optimal calorie intake, carbohydrates, lipids, proteins	3.44	Q11
Products without additives or with a small number of additives	3.18	Q7
Organic (bio) products	3.10	Q12
Non-genetically modified products	2.98	Q6
Light products with low fat content and low carbohydrates	2.94	Q8
Products without gluten, lactose and other potential allergens	2.44	Q9
Products dedicated to a certain category (children, adolescents, active persons, loss weight, diabetics, vegetarians and others)	2.36	Q14
<b>Unhealthy Options</b>	<b>Mean</b>	<b>Hierarchy</b>
Industrially processed animal products	3.18	Q3
Products provided under the catering system/ restaurants / canteens / self-service sector	3.04	Q13
Precooked products	2.94	Q4
Processed vegetable products (frozen, preserved, dehydrated)	2.88	Q2
Fast food products	2.84	Q5

Mean Healthy Options (compute variable) =3.13 (Std. Deviation=0.616).

Mean Unhealthy Options (compute variable)=2.97 (Std. Deviation=0.583).

Paired Samples Test/  $t=1.20$ ,  $p=0.235$ , *unsignificant*.

### **Options on the conservatism / novelty axis**

Statistically significant results were also gained in terms of conservatism (Paired samples test /  $t = 6.95$ ,  $p = 0.000$ ), contrary to the assumption that adolescents have an openness to the new.

### **Options on the independence / dependency axis**

Statistically significant results were registered in terms of decisional independence (Paired samples test,  $t = 5.59$ ,  $p = 0.000$ ), but we must analyse all internal and external factors.

Furthermore significant correlations (Pearson Correlation) were identified: the orientation towards healthy products correlates with the orientation towards conservatism (0.466 \*\*,  $p \leq 0.01$ ) and with the decisional independence (0.368 \*\*,  $p \leq 0.01$ ); the orientation towards unhealthy products can be associated with the decisional dependence on extrinsic factors (0.312 \*,  $p \leq 0.05$ ); the orientation towards novelty correlates

with the orientation according to external factors (0.482 \*\*,  $p \leq 0.01$ ) and the orientation towards conservatism correlates with the orientation towards intrinsic factors (0.387 \*\*,  $p \leq 0.01$ ).

## **DISCUSSIONS**

**Options on the healthy / unhealthy axis** (Table 1) show no significant statistically differences, but reveals the hierarchy of *healthy options*: fresh products (Q1), products high in calcium, minerals, vitamins, fiber (Q10), whole foods with optimal calorie intake, carbohydrates, lipids, proteins (Q11), products without additives or with a small number of additives (Q7). Furthermore, there is a positive impact of simple messages such as the consumption of fresh, natural, organic food with high nutritional value. It should be noted that the lowest average was recorded for products dedicated to a certain category (Q14) and for products without gluten, lactose and other potential allergens (Q9), which indicates low needs of this type. As for the *unhealthy options*, we note the option for industrially processed animal products (Q3), products pro-

**Table 2.** Student choices as consumers in relation to conservatism and novelty

<b>Conservatism Options</b>	<b>Mean</b>	<b>Hierarchy</b>
Products originating from / manufactured in Romania	3.70	Q15
Products with clear specifications on the label	3.68	Q23
Safe products with certification and quality control and explicit validity info	3.60	Q26
Products manufactured from local ingredients and local recipes	3.54	Q16
Old products on the market (regardless of brand)	3.40	Q20
Brand products established on the market	3.32	Q21
Products obtained in EU countries	3.22	Q17
<b>Novelty options</b>	<b>Mean</b>	<b>Hierarchy</b>
Products with environmentally friendly packaging	3.18	Q25
Products with interesting packaging design	3.08	Q24
Brand-new products available on the market	2.82	Q22
New products on the market (regardless of brand)	2.80	Q19
Products manufactured outside the EU	2.50	Q18

Mean Conservatism (compute variable) = 3.49 (Std. Deviation = 0.546).

Mean Novelty (compute variable) = 2.87 (Std. Deviation = 0.596).

Paired Samples Test,  $t=6.95$ ,  $p=0.000$ .

**Table 3.** Student choices as consumers in relation to internal and external sources of decision-making influence

<b>Independence options (internal sources)</b>	<b>Mean</b>	<b>Hierarchy</b>
Preferred products due to constant personal consumption	4.08	Q27
Products adapted to current needs	3.88	Q38
Budget-adjusted products	3.64	Q37
Exclusive products (delicacy)	2.94	Q36
New product to be tested by me	2.18	Q35
<b>Dependence options (external sources)</b>	<b>Mean</b>	<b>Hierarchy</b>
Products consumed / recommended by own family	3.64	Q31
Products recommended by specialists (nutritionists, health books)	3.16	Q28
Products recommended / used by friends, colleagues	3.12	Q30
Products promoted by mass –media (TV, radio, internet)	2.48	Q32
Products promoted in brochures / promotional catalogues of bidders	2.40	Q33
Products recommended by sales staff	2.32	Q34
Products recommended by influencers	2.10	Q29

Mean Independence (compute variable) = 3.34 (Std. Deviation = 0.529).

Mean Dependence (compute variable) = 2.74 (Std. Deviation = 0.542).

Paired Samples Test,  $t=5.59$ ,  $p=0.000$ .

vided under the catering system (Q13), etc. However, it should be noted that fast food products (Q5) are rejected. There is an overlap between healthy special product options (bio, low, light, non-genetically and dedicated to a category) and unhealthy options. We agree that a food's perceived healthiness is not a dominant factor in adolescents' food choices<sup>25,26</sup>, we only notice the tendency to reject what is considered unhealthy.

**Options on the conservatism / novelty axis** shows statistically significant differences for *conservatism* (Table 2) and also shows the hierarchy of *options for conservatism* that reveals the increased interest in: products originating from / manufactured in Romania (Q15), products with clear specifications on the label (Q23), safe products with certification and quality control and explicit validity info (Q26), products manufactured from local ingredients and local recipes (Q16). From an informational point of view, we noticed a tendency towards conservatism with an emphasis on the traditional, brand and food safety and with reluctance towards the new and uncertain origin. As for the *novelty category*, we noticed a restraint towards the choice of products manufactured outside the EU (Q18), towards new products on the market regardless of the brand (Q19) and towards the brand-new products available on the market (Q22). Chen and Antonelli in a recent study indicate that: social environment is the most addressed factor influencing food choice<sup>27</sup>, but here we capture the options in relation to the variety of offers from manufacturers. To understand consumers are a priority for many food producers<sup>28</sup>, and here we have identified that surprisingly teenagers have no openness to the new.

**Options on the independence / dependency axis** show statistically significant differences for *independence*. As for the source of influence in choosing food stuffs, the independence of student consumers is noted (Table 3) by approving the products that have been ranked as preferred products following constant personal consumption (Q27), products adapted to current needs (Q38), followed by budget-adjusted products (Q37).

In terms of external influences, we noted that the hierarchy reveals the main sources of influence: products consumed / recommended by their own family (Q31), products recommended by specialists (Q28) and products recommended / used by friends, colleagues (Q30). The following external sources, arranged in ascending order, have the least influence on the teenagers subject to our review: products recommended by influencers (Q29), products recommended by sales staff (Q34), products promoted in brochures / promotional catalogues of bidders (Q33), products promoted by mass-media (Q32). The results support the idea that adolescents manifest their decisional independence, and the main dispute / fight is in relation to family, specialists, friends, and respectively other reliable sources<sup>17-19,27-29</sup>. It is very important to understand the mechanism by which the mentioned

sources support autonomy, but also support the correct food decisions<sup>30</sup>. The results highlight the decisional independence of adolescents based on needs, preferences, beliefs, family habits, which may be positive if the previous nutritional education was properly taught. On the other hand, the denial of influence exercised by other sources (more or less credible) may be interpreted in the same note: it is negative if credible sources are rejected and it is positive where negative and manipulative sources are rejected.

## CONCLUSIONS

This exploratory study shows that students undergoing nutritional training courses are oriented towards food options focused on *conservatism and independence*. As for the orientation towards conservatism and food safety, this is materialized by the option for local products, the safe products, the products that have been on the market for a long time and the branded products. In terms of the orientation towards independence, we noticed that the internal sources of influence dominate the decision-making process, and in the case of external sources, the impact of the following sources should also be noted: family, specialists and friends. In relation to the students' orientation towards healthy / less healthy products, the difference is insignificant.

## IMPLICATION

In its final sections, the study through the questionnaire developed by us (all items are described in this paper) allows the identification of new aspects by replicating its findings on other categories of people, in other contexts, provided that some aspects are deeply analysed. Thus, we may identify the state of affairs regarding the healthy nature of the eating behaviour, we may also outline information strategies with an impact on nutrition education or marketing strategies that support the healthy choices of consumers.

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