

## ASSOCIATION BETWEEN OPTIMISM, DIETARY HABITS, LIFESTYLE AND GENERAL HEALTH SELF-ASSESSMENT: A PILOT STUDY

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**ABSTRACT:** *The aim of the study was to develop and standardize a new questionnaire to examine the relationship between optimism, dietary habits, lifestyle and general health self-assessment. A pilot study was conducted in a sample of 114 individuals of general population in Sparti/Greece. The questionnaire combines a general health self-assessment questionnaire (GHSAQ), the GrLOT-R, the weekly dietary habits, a personal/family medical history and a lifestyle questionnaire. The mean score of GrLOT-R and GHSAQ was found equal to 20.209(±3.817) and 27.482(±4.164) respectively. Higher score on GHSAQ was associated with the frequency of consumption of kiwi ( $p=0.027$ ), orange ( $p=0.022$ ), green tea ( $p=0.044$ ) and raw olive oil ( $p=0.044$ ). Higher score in GrLOT-R was associated with the frequency of consumption of fruits ( $p=0.028$ ), pepper ( $p=0.037$ ), red cabbage ( $p=0.011$ ) and carrot ( $p=0.023$ ). GHSAQ and GrLOT-R have acceptable internal validity (Cronbach's  $\alpha=0.719$  and  $0.723$  respectively) and a very high Test-Retest reliability (Pearson's  $r=0.928$  and  $ICC=0.962$  for GHSAQ and Pearson's  $r=0.950$  and  $ICC=0.983$  for GrLOT-R). The new questionnaire is reliable and valid. High vitamins, antioxidants intake and water consumption seem to influence positively optimism and general health self-assessment.*

**KEYWORDS:** Optimism, Dietary Habits, Lifestyle, Health Self-Assessment, Pilot Study, Questionnaire Standardization

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### INTRODUCTION

“A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty”. Perhaps Winston Churchill's quote is not familiar to a lot of people. However, many people have acquaintances in their environment who admire for their courage, their optimism and their positive attitude towards adversities and obstacles that emerge in their daily lives. Where does this optimism derive from? What is the extent of our ability to affect optimism or even to enrich it and in what way is it possible?

Despite the fact that the roots of optimism and pessimism concepts in modern psychology lay years behind, researchers and mental health experts begun to examine actively the positive impact of the aforementioned on human being's life, particularly following Scheier's and Carver's studies (Domino & Conway, 2001; Scheier & Carver, 1985).

There are two primary theoretical models regarding optimism. The first scientific approach concerns Scheier's and Carver's (1985) theoretical model, who defined dispositional optimism as “the generalized expectation that good, rather than bad things, will occur in a person's life”. According to this definition, pessimism is the tendency to believe that “if something is supposed to go wrong in a person's life then it will” (Scheier & Carver, 1992). The second scientific approach uses the concept of “explanatory style” by Peterson and Seligman. They defined optimism and pessimism as “the way in which people routinely explain events in their

life”, a fact that affects both an individual’s view when facing difficulties and adversities and his/her way of responding to them (Gillham, Shatte, Reivich, & Seligman, 2001).

It is believed that optimism derives from a combination of factors. Although there are indications of a genetic predisposition, these are not sufficient to explain the way and the functions of optimism’s development. A growing number of evidence indicates the existence of environmental factors which can play a significant role in optimism’s development (Gillham & Reivich, 2004; Plomin et al., 1992). Studies have showed a rather surprising positive image supporting the advantages of an optimistic prospective; whether optimism is referred as a predisposition or as the way we interpret incidents in our lives (Carver & Scheier, 2001; Peterson, Seligman, & Vaillant, 1988). It is noted that optimism’s highest levels relate both to subjective results regarding health, like better health perception and to objective results, like mortality and survival rates (Achat, Kawachi, Spiro, DeMolles, & Sparrow, 2000; Karademas, Frokkai, Tsotra, & Papazachariou, 2013; Chida & Steptoe, 2008; Allison, Guichard, Fung, & Gilain, 2003).

In the general context, as far as chronic diseases are concerned, a positive effect of optimism has emerged not only on patients’ adjustment to the disease and its development, but also on reporting milder symptoms (Giltay, Kamphuis, Kalmijn, Zitman, & Kromhout, 2006; Ironson et al., 2005; Vollmann, Scharloo, Langguth, Kalkouskaya, & Salewski, 2013). Specifically, many studies’ findings regarding optimism’s effect on cardiovascular diseases appearance, on mortality rates and on cardiovascular diseases patients’ re-hospitalization rates, showed its beneficial role. Studies’ findings regarding optimism’s effect on emotional/behavioral functioning and survival of cancer patients are similar (Allison et al., 2003; Giltay et al., 2006; Kubzansky, Sparrow, Vokonas, & Kawachi, 2001; Scheier et al., 1999; Williams, Davis, Hancock, & Phipps, 2010; Sohl et al., 2012).

In addition, in a number of studies it is observed that optimists report less pain sensitivity, better pain management and treatment, as well as better results concerning the quality of life in patients with chronic diseases (Costello et al., 2002; Goodin et al., 2013; Bargiel-Matusiewicz & Krzyszkowska, 2009; Kepka et al., 2013; Tsakogia, Lyrakos, Damigos, Mayreas, & Dimoliatis, 2010). As far as mental health is concerned, optimists appear fewer symptoms of depression, easier psychological adjustment to chronic diseases, while according to Leamy et al “hope and optimism” are one of the five processes leading to mental health rehabilitation (Vickers & Vogeltanz, 2000; Fournier, de Ridder, & Bensing, 2002; Leamy, Bird, Le Boutillier, Willams, & Slade, 2011).

Regarding the relationship between optimism and lifestyle, optimists tend to choose higher levels of physical activity, to apply more positive practices regarding their health, such as lower levels of tobacco and alcohol consumption and to follow a more healthy diet (Kelloniemi, Ek, & Laitinen, 2005; Boehm, Williams, Rimm, Ryff, & Kubzansky, 2013; Van de Rest et al., 2010). Nonetheless, the mechanisms that determine optimism’s positive effect, its relationship to health and lifestyle, still remain inconclusive.

The present pilot study’s aim was to examine the relationship between optimism, dietary habits and self-assessment of the general health. For this purpose, a general health self-assessment questionnaire combined with a questionnaire consisted of dietary habits, personal - family medical history and lifestyle questions were developed and standardized.

## **METHODOLOGY**

### **Sample**

A pilot study was conducted on a sample of 114 individuals (18 years old and above) of general population in Sparti, Greece (Dec. 2013 – Jan. 2014). The questionnaires were distributed personally and were completed voluntarily (with signed participation consent). Prior to that, the participants were informed of the study's objectives and the anonymity and confidentiality of all responses was stressed to them as well. All individuals were asked to complete the same questionnaire for a second time, two weeks later, in order to examine its test-retest repeatability. Of them, 110 returned the questionnaire in order to assess its repeatability (participation rate 96%).

### **Measurement Instrument**

As far as it is concerned, there is not a single questionnaire in the bibliography that combines a general health self-assessment questionnaire with an optimism measure and weekly dietary habits, personal - family medical history and lifestyle self-report. Thus, after an extensive review of the relevant literature, we developed a new questionnaire which is quite short, offers a clear picture regarding health understanding, can be answered by both healthy and unhealthy general population and enables to evaluate how participants assess their health compared to the past and to their peers. It included 99 closed-ended questions and consisted of the following parts:

#### **General Health Self-Assessment Questionnaire (GHSAQ).**

The GHSAQ consists of eight closed-ended questions of 5-point Likert scale investigating participants' self-perspective of general health. Respondents are asked to indicate the extent to which they agree with each item on a 5-point Likert type scale where 1 = strongly disagree and 5 = strongly agree. Four of the questions are positively- and four are negatively-worded. A final GHSAQ score can be created as the simple sum of the 8 responses after reversing the four negatively-worded items. The score range from 8 to 40, with higher values representing better self-reported health. Subsequently, participant's health assessment score is classified into three categories: bad, moderate, and good.

#### **Life Orientation Test (GrLOT-R).**

The Greek Life Orientation Test-Revised (GrLOT-R) to measure the optimistic and pessimistic life orientation was used (Lyrakos, Damigos, Mavreas, Kostopanagiotou, & Dimoliatis, 2010). The LOT-R is a 10-item self-report test by Scheier, Carver & Bridges (1994), which examines the generalized positive expectations of each individual and evaluates the positive attitude towards life (dispositional optimism) (Scheier & Carver, 1985). It consists of three positively-worded items measuring optimism, three reverse-coded items measuring pessimism and four filler items which are not calculated to the questionnaire's final score. Respondents indicate their agreement with statements on a 5-point Likert type scale where 0 = strongly disagree and 4 = strongly agree. The GrLOT-R score is calculated as the simple sum of the 6 items. Score ranges from 0 to 24, with high values indicating high levels of optimism.

**Dietary habits, personal and family medical history and lifestyle questionnaire.**

It consisted of 75 closed-ended, self-report questions concerning participants' weekly dietary habits, grouped in the following categories: fast/junk food, types of meat, fruits and vegetables -according to their vitamin and mineral content-, cereals, legumes, dairy products, beverages, nuts and food cooking methods. Participants reported the frequency of consumption (portions) of various foods on a weekly basis and also their lifestyle information (physical exercise, sleep duration, smoking) on a reference period of the previous 12 months, personal and family medical history data and their screening/diagnostic tests which perform annually.

**Socio-demographic characteristics.**

The fourth and final part included the socio-demographic information.

The questionnaire does not require more than 15 minutes to be completed.

**Statistical analysis**

Continuous variables are presented as mean  $\pm$  SD. To assess the relationship between the GHSAQ score and the GrLOT-R score, Pearson's correlation coefficient was calculated. Parametric t test for independent samples and one way analysis of variance (ANOVA) were performed in order to examine the effect of several qualitative variables on the GHSAQ and GrLOT-R scores. Whenever normality was violated, Mann-Whitney and Kruskal-Wallis tests were applied.

Reliability was assessed in two ways. Internal consistency was evaluated through Cronbach's alpha coefficient while test-retest reliability was assessed through Pearson's correlation coefficient and intraclass correlation (ICC) coefficient. Paired samples t-test was used as well. The statistical analysis was conducted through IBM SPSS Statistics 22.0 (SPSS, Chicago, IL, USA) and all tests were considered statistically significant at  $p < 0.05$ .

**RESULTS****Descriptive Statistics**

The socio-demographic characteristics of the 114 individuals who participated in the study are presented in Table 1.

	n	%		n	%
<b><i>Gender</i></b>			<b><i>Age</i></b>		
Male	34	29.8	32.4 ( $\pm$ 13.4) <sup>1</sup>		
Female	80	70.2			
<b><i>Marital Status</i></b>			<b><i>Number of children</i></b>		
Single	67	58.8	No children	78	68.4
Married	39	34.2	One children	9	7.9
Cohabitation	3	2.6	Two children	23	20.2
Separated	2	1.8	Three children	3	2.6
Divorced	1	0.9	Four children	1	0.9
Widowed	2	1.8			

<b>Education</b>			<b>Work Status</b>		
Primary education	5	4.4	Unemployed	45	39.5
Lower secondary education	5	4.4	<b>Civil servant</b>	17	14.9
Higher secondary education	25	21.9	<b>Private employee</b>	18	15.8
Undergraduate student	38	33.3	Self employed	12	10.5
University education	30	26.3	Farmer	5	4.4
Postgraduate studies	11	9.6	Retired	5	4.4
			Other	12	10.5
<sup>1</sup> Mean ( $\pm$ SD)					

**Table 1. Socio-demographic characteristics****Validity and Reliability**

## Content validity:

The initial edition of the questionnaire was reviewed by 3 experts (a GP doctor, a nutritionist, and a psychologist) in order to evaluate the clarity and appropriateness of the questions or recommend exclusions of any questions that should be omitted from the questionnaire. Additionally, the clarity and appropriateness of the questions were assessed by 10 people of the general population. Specifically, they were asked to check whether the general structure-format of the questionnaire was readable and understandable, whether the questions were ambiguous, to suggest changes and specify what our questions meant to them. All suggestions were taken into consideration and were incorporated in the final text and version of our questionnaire.

## Internal consistency and test-retest reliability:

The analysis showed that the results were consistent, stable and highly repetitive (Table 2). After the first completion of the Questionnaire, the internal consistency reliability of the GHSAQ was acceptable (Chronbach's  $\alpha=0.719$ ). After the second completion of the questionnaire Chronbach's  $\alpha=0.704$  till remain in an acceptable level. Similar results were obtained for GrLOT-R (Chronbach's  $\alpha=0.723$  and  $0.731$  for the two completions, respectively).

Pearson's correlation coefficient and intraclass correlation (ICC) revealed an excellent correlation at the total score of the GHSAQ (Pearson's  $r=0.928$ ;  $p<0.001$  and  $ICC=0.962$ ;  $p<0.001$ ). The results were similar for the GrLOT-R (Pearson's  $r=0.966$ ;  $p<0.001$  and  $ICC=0.983$ ;  $p<0.001$ ) as well.

The mean total score of GHSAQ, after the first completion, was  $27.482 (\pm 4.164)$  while after the second completion was  $27.282 (\pm 3.950)$ . There was no statistically significant difference between mean scores ( $t(109)=1.349$ ,  $p=0.180$ ). As far as the GrLOT-R is concerned, the mean total score after the first completion was  $20.209 (\pm 3.817)$  while after the second completion was  $20.173 (\pm 3.687)$ . The difference between mean scores was not statistically significant ( $t(109)=0.387$ ,  $p=0.700$ ). All correlations, between GHSAQ scores and each item that

constitutes it, resulted statistically significant (Pearson's  $r \geq 0.525$ ;  $p < 0.001$ ), which points out that the questionnaire's convergent validity was high. The same applies to GrLOT-R, as well (Pearson's  $r \geq 0.449$ ;  $p < 0.001$ ).

### Correlation between the GHSAQ score and the GrLOT-R score

A moderate significant positive correlation between the GHSAQ and GrLOT-R scores ( $r=0.315$ ;  $p=0.001$ ) was observed.

### Associations between the General Health Self-Assessment Questionnaire, dietary habits and exercise

The GHSAQ score was statistically significant associated (Table 3) with the weekly consumption frequency of kiwi (Mann-Whitney  $U=429.0$ ,  $p=0.042$ ), orange ( $F(2,111)=3.967$ ,  $p=0.022$ ), green tea (Kruskal-Wallis  $\chi^2(2)=6.225$ ,  $p=0.044$ ), raw olive oil (Kruskal-Wallis  $\chi^2(2)=6.225$ ,  $p=0.044$ ), fried food (Kruskal-Wallis  $\chi^2(2)=8.969$ ,  $p=0.011$ ) and the weekly exercise frequency (Kruskal-Wallis  $\chi^2(2)=7.840$ ,  $p=0.020$ ). Individuals who consumed kiwi and green tea two to four times a week, oranges and raw olive oil more than four times a week, fried food once a week at the most and exercised more than four times a week, had higher mean GHSAQ score.

**Table 2. Reliability properties**

	Property	Measure	Value	Significance
<b>GHSAQ</b>	Internal consistency	Cronbach's a	0.719 <sup>a</sup>	–
			0.704 <sup>b</sup>	
	Repeatability	Pearson's r	$r=0.928$	$<0.001$
	Test – retest reliability I	ICC (95% CI)	0.962 (0.944; 0.974)	$<0.001$
Test – retest reliability II	Paired t-test	27.482 ( $\pm 4.164$ ) <sup>a</sup> 27.282 ( $\pm 3.950$ ) <sup>b</sup>	0.180	
<b>GrLOT-R</b>	Internal consistency	Cronbach's a	0.723 <sup>a</sup>	–
			0.731 <sup>b</sup>	
	Repeatability	Pearson's r	$r=0.966$	$<0.001$
	Test – retest reliability I	ICC (95% CI)	0.982 (0.974; 0.988)	$<0.001$
Test – retest reliability II	Paired t-test	20.209 ( $\pm 3.817$ ) <sup>a</sup> 20.173 ( $\pm 3.687$ ) <sup>b</sup>	0.700	
ICC = Intraclass Correlation Coefficient CI = Confidence Interval <sup>a</sup> initial assessment <sup>b</sup> reassessment				

**Table 3. Statistically significant associations between weekly dietary habits, exercise and GHSAQ score.**

		N	Mean	SD	p-value
How many times a week do you consume kiwi?	At most once	101	19.25	4.065	0.042 <sup>3</sup>
	2 - 4 times	13	21.92	3.968	
How many times a week do you consume orange?	At most once	32	18.38	4.133	0.022 <sup>1</sup>
	2 - 4 times	47	19.23	3.760	
	More than 4 times	35	21.06	4.256	
How many times a week do you consume green tea?	At most once	76	19.29	4.006	0.044 <sup>2</sup>
	2 - 4 times	24	21.13	3.405	
	More than 4 times	14	18.29	5.312	
How many times a week do you consume row olive oil (e.g. added in salads /food after cooking it)	At most once	14	16.86	3.613	0.044 <sup>2</sup>
	2 - 4 times	43	19.65	4.545	
	More than 4 times	57	20.14	3.696	
How many times a week do you consume fried food?	At most once	36	20.69	3.808	0.011 <sup>2</sup>
	2 - 4 times	65	19.43	4.323	
	More than 4 times	13	17.00	2.708	
How many times a week do you exercise (workout) more than 30 minutes?	At most once	51	18.43	3.996	0.020 <sup>2</sup>
	2 - 4 times	40	19.83	3.829	
	More than 4 times	23	21.57	4.230	
<sup>1</sup> ANOVA					
<sup>2</sup> Kruskal-Wallis test					
<sup>3</sup> Mann-Whitney test					

### Associations between optimism and dietary habits

Table 4 shows the statistically significant associations between weekly dietary habits and GrLOT-R score. The mean score of optimism was statistically associated with the weekly consumption frequency of fast / junk foods (Mann-Whitney  $U=877.0$ ,  $p=0.036$ ), fruits (Kruskal-Wallis  $\chi^2(2)=7.166$ ,  $p=0.028$ ), pepper (Kruskal-Wallis  $\chi^2(2)=6.602$ ,  $p=0.037$ ), pomegranate (Kruskal-Wallis  $\chi^2(2)=6.693$ ,  $p=0.035$ ), red lettuce (Kruskal-Wallis  $\chi^2(2)=9.035$ ,  $p=0.011$ ), carrot (Kruskal-Wallis  $\chi^2(2)=7.583$ ,  $p=0.023$ ), apricot (Kruskal-Wallis  $\chi^2(2)=7.102$ ,  $p=0.029$ ), orange ( $F(2,111)=6.658$ ,  $p=0.002$ ), and fried food (Kruskal-Wallis  $\chi^2(2)=8.673$ ,  $p=0.013$ ). The participants who reported that consume fast / junk food and fried food at most once a week, pomegranate and red lettuce two to four times a week, fruits, pepper, carrots, apricots and oranges more than four times a week, presented higher mean GrLOT-R score.

**Table 4. Statistically significant associations between weekly dietary habits and GrLOT-R score**

		N	Mean	SD	p-value
How many times a week do you consume fast / junk food?	At most once	85	14.53	3.908	0.036 <sup>3</sup>
	2 - 4 times	28	13.14	3.363	
How many times a week do you consume fruits (e.g. pears, bananas, grapes)?	At most once	22	13.32	4.213	0.028 <sup>2</sup>
	2 - 4 times	48	13.56	3.548	
	More than 4 times	44	15.32	3.652	
How many times a week do you consume pepper?	At most once	63	13.46	3.459	0.037 <sup>2</sup>
	2 - 4 times	39	14.92	4.276	
	More than 4 times	12	15.67	3.200	
How many times a week do you consume pomegranate?	At most once	78	13.62	3.794	0.035 <sup>2</sup>
	2 - 4 times	30	15.53	3.569	
	More than 4 times	6	15.00	3.688	
How many times a week do you consume red lettuce?	At most once	88	13.74	3.687	0.011 <sup>2</sup>
	2 - 4 times	20	16.15	4.120	
	More than 4 times	6	14.33	2.422	
How many times a week do you consume carrot?	At most once	50	13.28	3.592	0.023 <sup>2</sup>
	2 - 4 times	52	14.71	4.065	
	More than 4 times	12	15.75	2.527	
How many times a week do you consume apricot?	At most once	69	13.49	3.951	0.029 <sup>2</sup>
	2 - 4 times	26	14.92	3.006	
	More than 4 times	19	15.74	3.724	
How many times a week do you consume orange?	At most once	32	12.97	3.297	0.002 <sup>1</sup>
	2 - 4 times	47	13.68	4.160	
	More than 4 times	35	16.00	3.077	
How many times a week do you consume fried food?	At most once	36	15.19	4.810	0.013 <sup>2</sup>
	2 - 4 times	65	13.95	3.159	
	More than 4 times	13	12.62	3.015	
<sup>1</sup> ANOVA					
<sup>2</sup> Kruskal-Wallis test					
<sup>3</sup> Mann-Whitney test					

### **Associations between the General Health Self-Assessment Questionnaire, optimism and water consumption**

Finally, a weak positive correlation was observed between the quantity of the daily water consumption and the mean GHSAQ score (Pearson's  $r=0.239$ ;  $p=0.010$ ) and the mean GrLOT-R score (Pearson's  $r=0.266$ ;  $p=0.004$ ). Those who consumed daily more water presented higher mean score both at the GHSAQ and GrLOT-R.

### **DISCUSSION**

The present pilot study is the first attempt of concurrent research regarding the association between optimism, general health self-assessment, nutrition and lifestyle in Greece, while there are few similar studies that have been conducted worldwide.

The study's primary purpose was the development and standardization of a short general health self-assessment questionnaire that will also incorporate a life orientation test, weekly dietary habits, personal and family medical history and lifestyle. The new questionnaire can be filled by both healthy and unhealthy adult population. The results were consistent, stable and highly repetitive, indicating that the new questionnaire is reliable and valid.

Regarding GHSAQ score, 36% out of 114 participants, assessed their health as good, while only 14.0% assessed it as bad, a result which is not consistent with those of other studies. Specifically, in both studies of Nery Guimarães et al. (2012) in Brazil and Molarious (2007) in Sweden, as well as in relative studies in Greece, the rates of individuals who assessed their health as good to very good were higher than ours (Darviri et al., 2012; Zavras, Tsiantou, Pavi, Mylona, & Kyriopoulos, 2013). Possibly, this fact is due to the negative effect of our country's economic "depression" which affects health perception and to the number of our study's participants (Simou & Koutsogeorgou, 2014).

As far as the optimism score is concerned, the participants' mean GrLOT-R score was up to 20.209 ( $\pm 3.817$ ), a result which is not consistent with relative studies in Greece. For instance, on a study conducted on nursing staff and a study conducted on patients, the mean score was up to 14.4 and 15.5 units respectively (Tsakogia et al., 2010; Lyrakos et al., 2010).

It is worth noting that deviations on the above studies' findings, possibly occur due to sampling differences. For example, the present study conducted on a sample of general population and there are also differences at the number of participants, occupation, geographical location (where the study was conducted) etc. However, the result is consistent with foreign studies, such as Roy's et al. (2010) multinational study in general population where the mean score was 19.9 units.

### **Associations between GHSAQ, dietary habits and physical exercise**

Many studies have pointed out the positive association between a diet rich in vegetables and fruits and health perception (Burkert, Muckenhuber, Großschädl, Rásky, & Freidl, 2014; Lara, McCrum, & Mathers 2014; ZHEN et al., 2014). Examining the present study's results, GHSAQ score has been affected positively by the weekly consumption frequency of kiwi, oranges, green tea and raw olive oil consumption and negatively by fried food consumption. These findings are consistent with Södergren's et al. (2012) results, on a study conducted on

individuals 55-65 years old in Australia. The study indicated that more often consumption of fruits in portions was correlated -considering its increase- with better health perception by the participants.

Additionally, the aforementioned fruits have high antioxidant action, due to their high vitamin C content, which contributes to greater health condition, better diseases management and prevention from creating free radicals, which are involved in pathogenesis and aging process (Domitrović, 2006; Lu, Sun, Wu, Liu, & Sun, 2014).

It is worth mentioning that on Kurowska's et al. (2000) study it was observed that natural orange juice improved the lipids profile at patients' blood with low hypercholesterolemia, while on Naidu's (2003) study, vitamin C enhances iron absorption, protects from common cold and oxidant stress and is correlated with the reduction of cardiovascular diseases risk.

Regarding the present study's association between raw olive oil and green tea consumption with higher GHSAQ score, on a study of Saija and Uccella (2000), it is noted that raw olive oil shows a significant antioxidant action due to its biophenols and therefore reduces the risk of degenerative diseases and bacterial infections. Green tea has similar antioxidant action, which according to Kim's et al. (2014) study is rich in flavonoids, polyphenols, including catechine and therefore contributes positively to a wide range of pathologies like cancer, infections, diabetes, cardiovascular diseases.

On the other hand, the negative correlation between the weekly consumption frequency of fried food and GHSAQ score could be correlated with the negative effect of fat consumption in the appearance of metabolic syndrome, chronic diseases and destabilization of the immune system (Kremmyda, Tvrzicka, Stankova, & Zak, 2011).

Furthermore, many studies indicated that physical activity positively affects physical and psychological condition (Penedo & Dahn, 2005). The association between physical activity with higher GHSAQ score is consistent with Tsai's et al (2010) results, on a study conducted on individuals over 18 years old in USA. Furthermore, the above association agrees with Bize's et al. (2007) systematic review, which pointed out the positive effect of activity and therefore leading to a better health related quality of life.

### **Associations between optimism with dietary habits**

The statistical analysis showed that GrLOT-R score was positively associated with fruit consumption especially pomegranate, apricot and orange as well as some vegetables like pepper, carrot and red lettuce. The above correlation is consistent with Giltay's et al. (2006) results, on a study conducted on men 64-84 years old and with Kelloniemi's et al. (2005) study, performed in Finland. It was observed, that a diet rich in fruits and vegetables was associated with higher levels of optimism and that particular diet is followed more often by optimist persons than pessimists.

A possible interpretation, of the above results, can be the argument that antioxidants' positive effect in psychology and generally the consumption frequency of high rates of vitamins and trace elements influence positively the psychological condition, stress levels, mental and psychological health (Payne, Steck, George, & Steffens, 2012; Park, You, & Chang, 2010; Kennedy et al., 2010). Specifically, as far as optimism is concerned, according to Boehm's et al. (2013) study, it was observed that optimism correlated positively with bigger carotenoids concentrations -a group of antioxidants- on the body system.

In this survey, the optimism score was positively correlated with the quantity of water consumption. This may be due to the fact that moderate dehydration is blamed for bad mood and reduces psychosocial function (Armstrong et al., 2012; Petri, Dropulić, & Goran Kardum, 2006).

Furthermore, according to Boehm's et al. (2013) interesting study, conducted on 990 middle aged individuals, optimists were connected with a healthier lipid profile. Optimists were also better prepared -than less optimistic peers- to meet the challenges of engaging in healthy behavior and maintaining a healthy BMI, which may explain the negative correlation of optimism with the weekly consumption frequency of fried and junk food of the present study.

### **Correlation between general health self-assessment and optimism**

The present survey data statistical analysis showed a weak to medium positive correlation between GHSAQ and GrLOT-R scores. The fact that positive feelings and optimism associate with positive outcomes regarding health, has been pointed out in Chida and Steptoe's (2008) meta-analysis in 70 potential studies. In particular, findings showed that positive psychological characteristics were associated with low death rates and in general with positive results regarding health condition, both at healthy and unhealthy population. For example, there was reduced cardiovascular mortality among healthy population and low death rates among patients with kidney failure and HIV. Moreover, it is estimated that persons with positive attitude, present lower concentrations of inflammatory markers than pessimists (Roy et al., 2010). Cohen's et al. (2006) study, on 193 healthy volunteers at the age of 21 to 55 years old, showed a correlation between increased rates of positive feelings and low rates of verified illness and a fewer reporting symptoms -regardless the virus, sex, education, race, weight and season- after their exposure to Rhinovirus or Influenza A Virus.

### **Limitations**

Although an association between GHSAQ score, optimism and dietary habits was observed, the gender difference, the small sample size and the geographical area where the current study was conducted, do not allow generalization of results. Convergent validity was not tested since there is no other similar questionnaire to use. However, the questionnaire's validity and reliability offers the opportunity to conduct further research on the topic.

### **CONCLUSION**

Clearly, issues of health and optimism are multidimensional and influenced by both, endogenous and exogenous factors. Nutrition rich in fruits and vegetables, especially those containing vitamin C, antioxidants, flavonoids, polyphenols, catechine and in less saturated fat, contributes to a better health self-assessment and to higher levels of optimism.

The new questionnaire, which consists of the general health self-assessment questionnaire, the Life Orientation Test (GrLOT-R), the weekly dietary habits, personal - family medical history and lifestyle questionnaire, is reliable and valid. Further studies in the future, using the new questionnaire may clarify and give new evidence about the relationship between health, optimism, dietary habits and lifestyle. Interventions about the aforementioned topic, health promotion and risk factors reduction are deemed a necessity.

**Conflict of interest**

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