

Sustainable health – emotional eating or cognitive control?



Overweight and obesity is an epidemic that appears in the developed countries of the world. Overweight and obesity means a serious expenditure for the consumers, for the employers and for the states both in the prevention and in the treatment phases. In the national and international literature many authors deal with the research from the dimensions of healthy lifestyle either in a complex way or focusing on a special area (e. g. smoking, alcohol consumption, physical activity or eating behaviour). There are many tests investigating food consumption, but the most widely used ones are the Three Factor Eating Questionnaire (TFEQ) and the Dutch Eating Behaviour Questionnaire (DEBQ). These scales were validated in many countries on the population with normal weight and overweight obese individuals and three types of eating behaviour were identified, namely emotional eating, restrained eating and external eating.

The aim of this study is to introduce the adaptation possibilities of each scales (TFEQ 16, DEBQ, TFEQ 20) measuring eating habits. In an empirical research 1323 adult people were interviewed and 407 people answered to the attitude statements of TFEQ 16, 404 people reacted to the DEBQ and finally 512 people filled in the TFEQ 20.

The results of the primary research do not completely support the original factor structure. In the case of TFEQ 16 the emotional eating appears in two factors. In the case of DEBQ the external eating can be classified into three factors, (1) the effect of taste, (2) the effect of smell and (3) the effect of society. In the case of TFEQ 20 only three items of cognitive control can be validated. In the future the authors plan to extend the research to examine different relationships with BMI and to segment the population based on their eating styles in order to develop an effective marketing program for them.

[1] Széchenyi István University, Assistant Professor, kellerv@sze.hu.

[2] Széchenyi István University, Assistant Professor, dernoczy@sze.hu.

INTRODUCTION

Due to the conditions of modern market economy, overconsumption and physical inactivity characterize the eating and life styles of the population of developed countries, which together with the combined effect of individuals' genetic endowments inflict overweight and obesity.^[3] According to the announcement of OECD (Organization for Economic Co-operation and Development) from 2014, among the population aged over 15 years 17.7% of men and 18.7% of women living in the 34 countries of OECD were obese in 2012 (BMI \geq 30). In the first place we can find the United States, where this problem affects more than one third of the population. The United States is followed by New-Zealand, Australia and Mexico. In Hungary 29% of the population aged over 15 years are considered obese (26.3% of men and 30.4% of women), which is more than one and a half times higher than the average of OECD member states. With this data we belong to the 'leading group' within the EU. According to the health survey of KSH (Central Statistical Office) from 2014, more than half of the entire Hungarian population (54%) is overweighed-obese ($25 \leq$ BMI $<$ 30). This rate is higher in the case of men (61%) than in the case of women (48%), however, the survey found that women underestimate their weight and overestimate their height, because the establishment of body mass index was based on self-declaration. Based on temporal comparison, it can be stated that considering the combined rate of overweighed and obese an obvious increase among middle-aged and older men, a decline among middle-aged women, and stagnation among older women can be observed. During 21st century a slight drop among young men and a slight increase among young women could be observed (European Health Interview Survey 2014). Diseases appearing as a consequence of overweight and obesity mean a significant financial burden for consumers, for employers and for national states as well both in the prevention and in the treatment phases. In Hungary health care expenditures were 2 216 billion HUF (7.9% of GDP) in 2012, which meant almost 223 400 HUF/capita/year.^[4]

The analysis of the relation between obesity and eating habits were mainly published in psychological and sociological studies both in international and in domestic literature. A relatively few scientific publications deal with the management of BMI and eating style from a marketing viewpoint. The present study is a part of a complex research, and in the current phase of the research we reveal the main dimensions of eating behaviour among adult population.

[3] Tolnay, Pál – Szabó S., András (2004): *Testtömeg-optimalás, a sikeres fogyókúra ismérvei*. Élelmezési Ipar, 58(2). 60–61.

[4] KSH (2013): *Az egészségügyi kiadások legfőbb jellemzői, 2007–2012*. Statisztikai Tükör, 98.

LITERATURE REVIEW OF EATING BEHAVIOUR

Psychologists elaborated more measuring methods for the analysis of obese people and individuals with normal body weight: latent obesity survey,^[5] eating attitudes test,^[6] restraint scale.^[7] In present research we highlight the Three Factor Eating Questionnaire (TFEQ),^[8] and the Dutch Eating Behaviour Questionnaire (DEBQ)^[9] from the food consumption behaviour tests as these were developed and validated based on previous tests. Our choice is supported by the fact that the use of these tests is the most widespread within the scientific fields of psychology and sociology.

The Three-Factor Eating Questionnaire Revised-21 item (TFEQ-R21) was constructed from the 51-item scale compiled by Stunkard and Messick. First, Karlsson et al., then Tholin et al. defined its current form.^[10] TFEQ analyses food consumption through three subscales: uncontrolled eating scale, cognitive restraint scale and emotional eating. Uncontrolled eating scale analyses whether individuals keep or lose control over eating during their food consumption in case if they are hungry and in case if they are exposed to external stimuli. Cognitive restraint scale measures the reduction of food consumption in favour of affecting body weight and figure, while emotional eating scale examines whether the individual overconsumes during their meals in the moods of anger, sadness, loneliness and dispiritedness.^[11] The scale was tested related to both psychological and marketing fields of researches in Hungary.

Edit Czeglédi^[12] executed the adaptation of 21-item TFEQ to Hungarian language and its psychometric analysis in the sample of university students

[5] Pudel, V. – Metzдорff, M. – Oetting, M. (1975): *Zur Persönlichkeit Adiposier in psychologischen Tests unter Berücksichtigung latent Fettsichtiger*. Zeitschrift für Psychosomatische Medizin, 21. 345-361.

[6] Garner, D. M. – Garfinkel, P. E. (1979): *The Eating Attitudes Test: an index of the symptoms of anorexia nervosa*. Psychological Medicine, 9. 273-279.

[7] Herman, C. P. – Polivy, J. (1980): *Restrained eating*. In: Stunkard, A. J. (ed.): *Obesity*. Saunders, Philadelphia. 208-225.

[8] Stunkard, A. J. – Messick, S. (1985): *The Three-factor Eating Questionnaire to Measure Dietary Restraint, Disinhibition and Hunger*. Journal of Psychosomatic Research, 40. 71-83.; Karlsson, J. – Persson, L. O. – Sjöström, L. – Sullivan, M. (2000): *Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study*. International Journal of Obesity, 24(12). 1715-1725.; Tholin, S. – Rasmussen, F. – Tynelius, P. – Karlsson, J. (2005): *Genetic and environmental influences on eating behavior: the Swedish Young Male Twins Study*. American Journal of Clinical Nutrition, 81. 564-569.

[9] Van Strien, T. – Frijters, J. E. R. – Bergers, G. P. A. – Defares, P. B. (1986): *The Dutch Eating Behavior Questionnaire (DEBQ) for Assessment of Restrained, Emotional, and External Eating Behavior*, *International Journal of Eating Disorders*, 5(2). 295-315.

[10] Czeglédi, E. – Bartha, E. – Urbán, R. (2011): *Az évesi magatartás összefüggéseinek vizsgálata főiskolai hallgatóknél*. Magyar Pszichológiai Szemle, 66(2). 299-320.

[11] Czeglédi, E. – Bartha, E. – Urbán, R. (2011): op. cit.

[12] Czeglédi, Edit – Urbán, Róbert (2010): *A háromfaktoros évesi kérdőív (Three Factor Eating Questionnaire Revised 21-item) hazai adaptációja*. Magyar Pszichológiai Szemle, 65(3). 463-494.

(262 respondents). 20 items of the questionnaire have to be evaluated on a 4-point scale, whereas one item has to be evaluated on an 8-point scale. The cross-sectional questionnaire survey confirmed the original factor structure, and 3 factors were identified with confirmative factor analysis: 1. Uncontrolled eating (9 items), 2. Cognitive restraint (6 items), and 3. Emotional eating (6 items). However, psychometric analysis showed a moderate or poor fit, therefore further examinations are needed. Czeglédi executed the control of factors' temporal stability as a result of which the temporal stability of binge eating / and cognitive restraint factors was confirmed. Czeglédi et al. identified the three factors of eating behaviour by confirmative factor analysis within the frames of a research applying complex approach, similarly to the previously conducted research. Nevertheless, the findings can be generalized to the Hungarian female population with restrictions, since the sample was chosen from a special target population.

Szabó et al.^[13] examined the health behaviour of Hungarian population referring to eating attitude and body attitude. As an examining method they used the means of a questionnaire which was filled in by a nationally representative sample of 1000 people from adult population. Based on the “Three Factor Eating Questionnaire” and the “Body Attitude Test” they executed the determination of factor structure, and then they conducted cluster analysis and they classified the Hungarian population into five consumer groups. Based on their research findings they identified 3 factors: 1. emotional eating (6 items), 2. uncontrolled eating (3 items), 3. cognitive restraint eating (3 items). They excluded 9 items from the 21-item scale validated by Czeglédi, since these items had low factor loading. The 1st of the factors characterizing the eating behaviour of university students corresponds with the elements of emotional eating factor of the entire population. In case of 2nd factor 6 items were removed, since these did not contribute to the explanation of binge eating. From the 3rd factor 3 items regarding cognitive restraint were removed. It can be stated that emotional eating has a greater role in the eating behaviour of the entire adult population than cognitive restraint, which is confirmed by the explanatory power of the factors. To check the internal consistency of the newly formed scales they counted Cronbach alpha values which were above 0.8 in case of all three eating styles, thus it is considered reliable to execute further research in this sample. The analysis of eating habits resulted in the correlation with other elements of health behaviour in more Hungarian researches through the questioning of teenagers from the West-Transdanubian region.^[14]

[13] Szabó, S. – Szigeti, O. – Soós, M. – Szakály, Z. (2014): Az élelmiszerfogyasztás mögöttes dimenziói: étkezési és testi attitűdök kapcsolata. In: „Marketing megújulás”. Marketing Oktatók Klubja 20. Konferenciája. Szeged. 1-10.

[14] Huszka, Péter – Ercsey, Ida (2014): *Fiatalok egészsége az életminőség és a fogyasztói magatartás tükrében*. Táplálkozásmarketing, 1(1-2) 87-95.

The Dutch Eating Behaviour Questionnaire (DEBQ) containing 33 items was elaborated in 1986 by van Strien and her colleagues.^[15] The questionnaire originally included 46 items, but the number of its attitude statements was reduced to 33, which was validated in more countries (The Netherlands, Spain, France, USA, Hawaii).^[16] DEBQ analysed food consumption through three subscales: external eating, restrained eating and emotional eating. External eating means food consumption due to external stimuli irrespective of the individual's feeling of hunger. Restrained eating scale analyses the deliberate reduction of food consumption to avoid being overweight. Emotional eating examines whether the negative emotions of the individual – anger, fear, anxiety, stress, loneliness – lead to overconsumption. The elaboration of DEBQ took place in a sample of 657 people containing obese and non-obese men and women. Originally a distinction was made between eating due to diffuse emotions (boredom, loneliness, idleness) and eating due to clearly labelled emotions (maltreatment, depression, gloom, unpleasant experience, anxiety, fear, frustration); however, later these were contracted. The final questionnaire contains 33 attitude statements measured on a 5-point Likert-type scale; from these 33 statements 10 refers to restrained eating, 10 refers to external eating and 13 refers to emotional eating. To check the internal consistency (validity and reliability) of the thus formed subscales, Cronbach alpha values were counted in different subsamples – women, men, obese people, and people with normal weight. Thus, the validity and reliability of restrained eating, emotional eating and external eating was confirmed by high Cronbach alpha values.

DEBQ was used in more countries for the comprehensive examination of health. We can also highlight those researches where the main aim is the psychometric analysis of DEBQ. Each of these researches included the analysis of some certain correlations and eating style was analysed as a latent variable of research models. In the present study we refer to the revealed relations, however we put the emphasis on the identified factors and the eating style.

[15] Van Strien, T. – Frijters, J. E. R. – Bergers, G. P. A. – Defares, P. B. (1986): *The Dutch Eating Behavior Questionnaire (DEBQ) for Assessment of Restrained, Emotional, and External Eating Behavior*. International Journal of Eating Disorders, 5(2). 295–315.

[16] Van Strien, T. – Frijters, J. E. R. – Bergers, G. P. A. – Defares, P. B. (1986): op. cit.; Evers, C. – Stok, F. M. – Danner, U. N. – Salmon, S. J. – Ridder, D. T. D. – Adriaanse, M. A. (2011): *The shaping role of hunger on self-reported external eating status*. Appetite, 57. 318–320.; Bailly, N. – Maitre, I. – Amand, M. – Hervé, C. – Alaphilippe, D. (2012): *The Dutch Eating Behaviour Questionnaire (DEBQ): Assessment of eating behavior in an aging French population*. Appetite. doi: <http://dx.doi.org/10.1016/j.appet.2012.08.029>.; Nolan, L. J. – Halperin, L. B. – Gelibter, A. (2010): *Emotional Appetite Questionnaire. Construct validity and relationship with BMI*. Appetite, 54. 314–319.; Schembre, S. M. – Geller, K. S. (2011): *Psychometric Properties and Construct Validity of the Weight-Related Eating Questionnaire in a Diverse Population*. Obesity, 19(12). 2336–2344.

The relation between eating styles and total energy intake (fat and carbohydrate consumption)^[17] by controlling body weight and physical activity was examined among university female students (475 respondents) in the Netherlands.^[18] The 33-item DEBQ scale was validated in the sample of young women with normal weight. Restrained eating has the highest factor loading in the factor structure, and this was followed by external eating and emotional eating. In another Dutch study, within the frame of two different empirical researches (one cross-sectional research with 382 respondents followed by an experiment with 74 people), it was analysed to what extent hunger affects the external eating behaviour of individuals. In the research the relation between external eating and hunger was examined (3 questions on a 7-point Likert-type scale: how hungry the respondent is, to what extent the respondent wants to eat something, to what extent the respondent wants a bite). The scale of external eating (EE – external eating) and the 33-item DEBQ scale were validated based on the questionnaire which was filled in by university female students.

The correlation between emotional appetite questionnaire (EMAQ) and DEBQ as well as between EMAQ and BMI were analysed to make a more complex analysis of emotional eating. The 22-item EMAQ scale distinguishes eating due to positive and eating due to negative emotions or situations. Each item was measured in a 9-point Likert-type scale (1: I eat much less, 5: I eat the same amount, 9: I eat much more). Nine attitude statements refer to eating in response to negative emotions (sad, bored, angry, anxious, frustrated, tired, distressed, feared, lonely), whereas five statements refer to eating in response to positive emotions (satisfied, happy, reposed, heart some, eager). Five statements refer to eating in negative situation (under pressure, after a heated debate, due to the tragedy of a close person, after the end of a relationship, after losing money or fortune), while three statements refer to eating in positive situation (be in love, after starting an enjoyable hobby, hearing good news). During the research the validity and the reliability of EMAQ was confirmed and it was verified that there is a strong relationship between emotional eating and BMI. The 13-item emotional eating scale could be validated among American adults (aged between 18 and 52) population by questioning 272 respondents with normal weight (74.9%) and with obese-overweight (25.1%). The researchers found that EMAQ scale is more suitable for the measurement of emotional eating than the 13 items of the DEBQ's emotional eating subscale.

[17] To state total energy intake, respondents had to note which they had consumed from the 145 food enumerated in the questionnaire for 28 consecutive days. Calorie intake was counted with the help of software developed for this purpose.

[18] Anschutz, D. – Strien, T. – Ven, M. O. M. – Engels, R. C. M. E. (2009): *Eating styles and energy intake in young women*. *Appetite*, 53. 119–122.

French researchers^[19] developed a shortened, 16-item version of DEBQ scale. Their analysis was conducted among women (178 respondents) and men (84 respondents) aged above 65 years, the 65.6% of whom were obese or overweighted. The attitude statements irrelevant for elder people (e.g. I can't stand against fast food restaurants, I eat during cooking, I eat less if I put on some weight) were removed from the survey for the easier use of DEBQ applied by diverse scientific fields. As a result of their research, in case of external eating 5 items, in case of emotional eating 6 items and in case of restrained eating 5 items of DEBQ could be validated among the older population. Each subscale is well-differentiated and their internal consistency is appropriate. The explained variance is sequentially 30.27%, 13.39% and 10.37%.

A prominent researcher of eating styles van Strien and her colleagues^[20] examined the relationships between SANOS (sport, alcohol, nutrition, obesity, smoking) lifestyle factors and eating styles (external eating, emotional and restrained eating), as well as the relationships between obese, workplace activity and the perceived general state of health within the frames of a monumental cross-sectional research. The survey was conducted among sedentary office staff (1254 women and 2018 men) working at Dutch large banks, and 49.2% of the sample can be considered obese or overweighted. Factor analysis was executed involving each examined variables and two factors were revealed from which the first is lifestyle factor related to health, while the other is lifestyle factor related to obesity. To measure eating style the English version of Dutch Eating Behaviour Questionnaire was used, all 33 items of which could be validated according to the original questionnaire.

Cebolla et al.^[21] examined food consumption from more viewpoints, thus in their research they analysed eating behaviour, eating disorders and restrained eating. The survey was conducted among Spanish adults (aged between 18 and 65 years) women, the sample size was 647. The findings confirmed the conclusions of previous international surveys, therefore it can be stated unequivocally that there is a positive relationship between emotional and external eating and the management of body weight. Eating behaviour was measured by using the 33-item DEBQ. Having executed the factor analysis, three factors could be identified: emotional eating, external eating and restrained eating. In case of the Spanish adaptation of DEBQ one item had low factor loading (“Desire to eat when nothing to do.”), while it is not clear in case of another item (“Desire to eat when bored.”) to which factor it belongs based on its factor loading. DEBQ is an effective means to measure

[19] Bailly, N. – Maitre, I. – Amand, M. – Hervé, C. – Alaphilippe, D. (2012): op. cit.

[20] Van Strien, T. – Koenders, P.G. (2012): *How do life style factors relate to general health and overweight?* Appetite, 58. 265-270.

[21] Cebolla, A. – Barrada, J. R. – Strien, T. – Oliver, E. – Banos, R. (2014): *Validation of the Dutch Eating Behavior Questionnaire (DEBQ) in a sample of Spanish women.* Appetite, 73. 58-64.

the eating behaviour of women, and in Spain minimal modifications must be made to apply the scale.

The above-introduced researchers were able to validate the 33-item Dutch Eating Behaviour Questionnaire. The attitude statements of each item were measured by a 5-point Likert-type scale, where 1 meant ‘never’ and 5 meant ‘very often’. High Cronbach α (above 0.76 in each case) values prove the validity and the reliability of scale items. All in all, it can be stated that TFEQ and DEBQ are questionnaires measuring similar constructs; but only the previous one was adapted in Hungary.

EMPIRICAL RESEARCH OF EATING BEHAVIOUR

The purpose of analysis is to adapt the previously introduced scales regarding eating behaviour (TFEQ16, DEBQ and TFEQ20), and to do so, one cross-sectional research was chosen from primary research methods.^[22] Quota sampling method was used to do the fieldwork. During sampling our aim was to question nearly the same number of individuals in case of the three eating behaviour tests and to follow proportional sample based on gender and age within each subsample: 50-50% is the rate of women and men, 20% is the rate of each age group (five age groups altogether). The planned size of sample was 1500 respondents.

The empirical research took place in March 2015 by the means of self-administered online questionnaire and of paper-based questionnaire. The survey was conducted by the authors and university students, and finally 1323 people were questioned. According to the purpose of the questionnaire, 407 respondents filled in the ‘A’ type (TFEQ16) questionnaire, 404 respondents filled in the ‘B’ type (DEBQ) one and 512 respondents filled in the ‘C’ type (TFEQ20) one (Table 1).

Table 1: Demographic distribution of the sample

	Gender		Age categories (years)				
	males	females	19-25	26-30	31-39	40-49	50-59
Type A - TFEQ16	52.6%	47.4%	27.8%	19.7%	27.0%	19.2%	6.4%
Type B - DEBQ	41.6%	58.4%	16.6%	31.9%	21.3%	0.2%	30.0%
Type C - TFEQ20	39.3%	60.7%	24.4%	14.6%	27.9%	11.7%	21.3%
Total sample	44.1%	55.9%	23.1%	21.5%	25.6%	10.5%	19.3%

Source: own research, n = 1323 respondents.

[22] Malhotra, Naresh K. (2010): *Marketing Research: An Applied Orientation*. Prentice Hall.

Research findings

The basis for 'A' type questionnaire is the shortened, 16-item version of the three factor eating questionnaire (TFEQ 16). The variables of eating behaviour were measured on a 4-point coercive scale. In this case we examined those variables, the scale items of which were the same and can be measured on interval scale. In this case the value of Cronbach alpha is 0.88, therefore our scale is reliable. Having analysed whether this value could be increased, we found that the elimination of certain scale items only minimally would increase this value. Based on these facts, our scale is appropriate for further analysis. As the first step of factor analysis we checked the values of KMO and Bartlett sphericity test to prove the applicability of the method. The value of KMO is 0.87, and the high value of the second indicator (2510.058) suggests that the analysed variables can be explained by other factors (Sig.: 0.000). Based on the analysed variables the following factors could be distinguished (Table 2).

Table 2: The results of factor analysis in case of Three Factor Eating Questionnaire

	Statement	Eigen value	Factor
1.	When I see a delicious food or I can smell it, I find it very difficult to keep from eating, even if I have just finished a meal.	0.785	uncontrolled eating (37.9; 0.83)
2.	Being with someone who is eating often makes me hungry enough to eat also.	0.734	
3.	I am always hungry enough to eat at any time.	0.657	
4.	When I see a real delicacy, I often get so hungry that I have to eat right away.	0.633	
5.	Sometimes when I start eating, I just can't seem to stop.	0.629	
6.	I get so hungry that my stomach often seems like a bottomless pit.	0.506	
7.	I am always hungry so it is hard for me to stop eating before I finish the food on my plate.	0.460	
8.	When I feel anxious, I find myself eating.	0.775	emotional I. (12.7; 0.79)
9.	When I feel blue, I often overeat.	0.752	
10.	When I feel lonely, I console myself by eating.	0.726	
11.	When I am stressed, I eat.	0.812	emotional II. (7.95; 0.83)
12.	I usually eat too much if I am sad.	0.664	
13.	When I am stressed or upset, I often feel I must eat.	0.549	
14.	I do not eat some foods because they make me fat.	0.845	cognitive control (6.75; 0.75)
15.	I consciously hold back at meals in order not to weight gain.	0.835	
16.	I deliberately take small helpings as a means of controlling my weight.	0.720	

Source: own research. n = 407 respondents. Method: main component analysis, Varimax rotation.

According to literature we were able to identify ‘uncontrolled eating’ factor which contains those variables which describe those life situations when we eat in response to external effects. In Table 2 we can see those factor loadings based on which factors were classified into the given factor. Contrary to literature, the following factor (eating in response to negative effect) can be identified as two different factors based on the present research. Neither variance proportion nor correlation coefficients make it possible to handle these two factors as one factor. Based on these, we differentiated two factors, which were given the names of emotional I. and emotional II. factors. According to this, the second identified factor (emotional I.) contains those variables in case of which a kind of negative emotion (anxiety, dispiritedness, loneliness) leads to eating as well as when eating provides solace. In this case all three variables correlate with the factors with very high loadings. The third identified factor (emotional II.) contains those variables which mean eating in response to anger, sadness and stress. In our research the fourth identified factor (cognitive control) is exactly the same as was identified in the literature. Here we can find variables related to deliberate control and restraint, based on which the aim is to avoid weight gain and to keep body weight in check.

In connection with Dutch Eating Behaviour Questionnaire 33 statements were examined. In this case the value of Cronbach alpha was 0.899, therefore our scale is consistent. The values of indicators proving the appropriateness of factor analysis are appropriate (KMO: 0.910, Bartlett: 6777.593, Sig. 0.000). Contrary to previous international publications, five factors can be distinguished in this research (Table 3)

Table 3: The results of factor analysis in case of Dutch Eating Behaviour Questionnaire

	Statement	Eigen value	Factor
1.	Desire to eat when you are emotionally upset.	0.862	emotional eating (29.57; 0.95)
2.	Desire to eat when you are irritated.	0.862	
3.	Desire to eat when something unpleasant to happen.	0.847	
4.	Desire to eat when you are depressed or discouraged.	0.843	
5.	Desire to eat when things are going against you or when things have gone wrong.	0.842	
6.	Desire to eat when you are disappointed.	0.837	
7.	Desire to eat when you are cross.	0.830	
8.	Desire to eat when you are feeling lonely.	0.820	
9.	Desire to eat when you are anxious, worried or tense.	0.814	
10.	Desire to eat when you are frightened.	0.771	
11.	Desire to eat when nothing to do.	0.650	
12.	Desire to eat when somebody lets you down.	0.475	
13.	Desire to eat when you are bored or restless.	0.473	

	Eigen value	Eigen value	Factor
14.	Eat less than usual the following days when you have eaten too much.	0.749	restrained eating (15.79; 0.868)
15.	Eat less than usually do if you put on weight.	0.739	
16.	Try to eat less at mealtimes than you would like to eat.	0.709	
17.	Try not to eat in the evening because you are watching your weight.	0.680	
18.	Refuse offered food or drink because you are concerned about your weight.	0.665	
19.	Take into account your weight with what you eat.	0.644	
20.	Deliberately eat foods that are slimming.	0.629	
21.	Watch exactly what you eat.	0.582	
22.	Try not to eat between meals because you are watching your weight.	0.569	
23.	Deliberately eat less in order not to become heavier.	0.509	
24.	If food tastes good to you, you eat more than usual.	0.798	effect of taste (8.75; 0.8)
25.	If you have something delicious to eat, you eat it straight away.	0.790	
26.	If food smells and looks good, you eat more than usual.	0.789	
27.	If you see or smell something delicious, you have a desire to eat it.	0.691	
28.	When preparing a meal you are inclined to eat something.	0.471	
29.	It is difficult to resist delicious food.	0.405	effect of smell (3.95; 0.62)
30.	If you walk past a snack bar or a cafe you have the desire to buy something delicious.	0.693	
31.	If you walk past the baker, you have the desire to buy something delicious.	0.571	effect of society (3.32; 0.62)
32.	Eat more than usual, when you see others eating.	0.776	
33.	If you see other eating, you also have the desire to eat.	0.573	

Source: own research, n = 404 respondents. Method: Main component analysis, Rotation: Varimax.

The first factor contains those variables which characterize negative emotions and the eating in response to them. In this case the findings of the present research perfectly fit to the findings described in literature, where we can also find the factor of emotional eating. The next factor includes those variables that examine the topic of deliberate control that is restrained eating. In this factor we can easily identify those responses that are related to fear from obese and to the deliberate control of body weight. The other three factors belong to one factor (external eating) based on the cited source; however, in this case we have three, clearly distinguishable background variables. Based on the results, the third factor contains those variables which analyse the effect of taste and its seduction during physical contact with food. Based on these, this is the so-called “effect of taste” factor. In case of the fourth factor past experience and smell are the main reasons for eating, since the view of a fast food restaurant or a bakery as well as smell as effects elicit stimulus from the respondents. The fifth factor contains the “effect of the society” as it includes those variables which comprise eating in company and eating as cohesive force.

We analysed the scale of Three Factor Eating Questionnaire (TFEQ - R21) and its background variables with the previously mentioned methods, and we adapted them to the present research. In this case (compared to 'A' type) we also examined whether the respondents deliberately avoid having tempting foods around them; and we also examined the probability of that whether they deliberately eat less and how often they feel themselves hungry. The question in connection with food intake was removed from the scale due to researcher's consideration, thus factor analysis was conducted with 20 variables. The value of Cronbach alpha is appropriate here as well (0.775), and the indicators of factor analysis also showed good values (KMO: 0.886; Bartlett sphericity test: 3588.292, Sig, 0.000). Table 4 shows the identified factors.

Table 4: The results of factor analysis in case of Three Factor Eating Questionnaire

	Statement	Eigen value	Factor
1.	When I am stressed or upset, I often feel I must eat.	0.827	emotional eating (31.75; 0.912)
2.	I usually eat too much if I am sad.	0.815	
3.	When I feel anxious, I find myself eating.	0.799	
4.	When I feel blue, I often overeat.	0.796	
5.	When I am stressed, I eat.	0.760	
6.	When I feel lonely, I console myself by eating.	0.720	
7.	I am always hungry enough to eat at any time.	0.709	uncontrolled eating (12.79; 0.696)
8.	When I see a real delicacy, I often get so hungry that I have to eat right away.	0.709	
9.	I am always hungry so it is hard for me to stop eating before I finish the food on my plate.	0.697	
10.	When I see a delicious food or I can smell it, I find it very difficult to keep from eating, even if I have just finished a meal.	0.622	
11.	Do you go on eating binges though you are not hungry?	(-0.603)	
12.	I get so hungry that my stomach often seems like a bottomless pit.	0.579	
13.	Being with someone who is eating often makes me hungry enough to eat also.	0.530	
14.	Sometimes when I start eating, I just can't seem to stop.	0.528	cognitive control I. (7.77; 0.733)
15.	I consciously hold back at meals in order not to gain weight.	0.856	
16.	I do not eat some foods because they make me fat.	0.789	
17.	I deliberately take small helpings as a means of controlling my weight.	0.682	cognitive control II. (5.29; 0.163)
18.	How frequently do you avoid 'stocking up' on tempting foods?	0.811	
19.	How likely are you to consciously eat less than you want?	0.616	
20.	How often do you feel hungry?	(-0.422)	

Source: own research, n = 512 respondents. Method: Main component analysis, Rotation: Varimax.

Based on the results, we proved two factors (emotional eating and uncontrolled eating) which can be found in literature with minimal divergence. Emotional eating is fully justified. In connection with uncontrolled eating the 20th item of cognitive control 2 factor deviates in this research; however, the medium, but negative – due to scale items – value exceeding the limit classifies this scale question to this group. The items originally belonging to one factor (cognitive control) belongs to two factors in the present research. The first – cognitive control I. – factor contains those variables which are related to body weight control and fight against obesity. These variables are separated from those ones which deal with tempting foods, own efforts and the frequency of hunger. The value of consistency analysis of this factor is very low, thus this will be removed from further research methods.

THE FURTHER RESEARCH AND THE PRACTICAL SIGNIFICANCE OF THE RESEARCH

To continue the empirical research we perform the full processing of the available dataset, with the help of which we can get answers to more questions regarding eating behaviour. We look forward whether we find differences regarding eating behaviour among the subsamples defined by gender or age groups. From marketing viewpoint, it is important to map the different groups appropriately, and to identify the differences. Based on the factors of eating behaviour, consumer groups could be identified and described by their eating behaviour characterizing their food consumption by using cluster typology. We are looking for an answer to the question what influence psychological factors and reference group have on the eating behaviour of the different clusters and on the consumption of hedonistic products. The research findings could contribute to determine and elaborate in which ways marketing tools can improve the consumers' health behaviour and lifestyles. According to previous researches the perceived health of customers and other factors e.g. cultural activities influence also on the evaluation of subjective quality of life in young and elder generation.^[23]

By elaborating relevant literature, the following research purposes were defined. In the future it would be better to use the EMAQ scale suggested by Schembre et al.^[24] to measure emotional eating. Based on our empirical research findings, it can be seen that emotional eating has an important role in our everyday food consumption and lifestyle. From practical aspect it is of great importance to analyse which eating style leads to overweight and obesity. It would be

[23] Ercsey, Ida (2014a): *The Subjective quality of life and the cultural activities*. Contemporary Research on Organization Management and Administration, 2(2) 94–105.; Ercsey Ida (2014b): *Közös az értékteremtés a kulturális szektorban?* Marketing & Menedzsment, 48(3). 36–46.

[24] Schembre, S. M. – Geller, K. S. (2011): op. cit.

also useful to reveal which groups of consumers can be distinguished based on following a healthy lifestyle by applying SANOS segmentation technique. The final purpose is to elaborate a marketing program for each consumer group.

REFERENCES

- Anschutz, D. – Strien, T. – Ven, M. O. M. – Engels, R. C. M. E. (2009): *Eating styles and energy intake in young women*. *Appetite*, 53. 119–122.
- Bailly, N. – Maitre, I. – Amand, M. – Hervé, C. – Alaphilippe, D. (2012): *The Dutch Eating Behaviour Questionnaire (DEBQ): Assessment of eating Behavior in an aging French population*. *Appetite*, doi: <http://dx.doi.org/10.1016/j.appet.2012.08.029>
- Cebolla, A. – Barrada, J. R. – Strien, T. – Oliver, E. – Banos, R. (2014): *Validation of the Dutch Eating Behavior Questionnaire (DEBQ) in a sample of Spanish women*. *Appetite*, 73. 58–64.
- Czeglédi, E. – Bartha, E. – Urbán, R. (2011): *Az evési magatartás összefüggéseinek vizsgálata főiskolai hallgatóknél*. *Magyar Pszichológiai Szemle*, 66(2). 299–320.
- Czeglédi, E. – Urbán, R. (2010): *A háromfaktoros evési kérdőív (Three Factor Eating Questionnaire Revised 21-item) hazai adaptációja*. *Magyar Pszichológiai Szemle*, 65(3). 463–494.
- Ercsey Ida (2014a): *The Subjective quality of life and the cultural activities*. *Contemporary Research on Organization Management and Administration*, 2(2) 94–105.
- Ercsey Ida (2014b): *Közös az értéktérítés a kulturális szektorban?* *Marketing & Menedzsment*, 48(3). 36–46.
- Evers, C. – Stok, F. M. – Danner, U. N. – Salmon, S. J. – Ridder, D. T. D. – Adriaanse, M. A. (2011): *The shaping role of hunger on self-reported external eating status*. *Appetite*, 57. 318–320.
- Garner, D. M. – Garfinkel, P. E. (1979): *The Eating Attitudes Test: an index of the symptoms of anorexia nervosa*. *Psychological Medicine*, 9. 273–279.
- Herman, C. P. – Polivy, J. (1980): *Restrained eating*. In: Stunkard, A. J. (ed.): *Obesity*. Saunders, Philadelphia. 208–225.
- Huszka, Péter – Ercsey Ida (2014): *Fiatalok egészsége az életminőség és a fogyasztói magatartás tükrében*. *Táplálkozásmarketing*, 1(1-2) 87–95.
- Karlsson, J. – Persson, L. O. – Sjöström, L. – Sullivan, M. (2000): *Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study*. *International Journal of Obesity*, 24(12). 1715–1725.
- KSH (2013): *Az egészségügyi kiadások legfőbb jellemzői, 2007-2012*. Statisztikai Tükör, 98.
- KSH (2015): *Európai Lakossági Egészségfelmérés, 2014*. Statisztikai Tükör, 29.
- Malhotra, Naresh K. (2010): *Marketing Research: An Applied Orientation*. Prentice Hall.
- Nolan, L. J. – Halperin, L. B. – Gelibter, A. (2010): *Emotional Appetite Questionnaire. Construct validity and relationship with BMI*. *Appetite*, 54. 314–319.
- OECD (2014): *Health at a Glance: Europe 2014*. OECD Publishing OECD Obesity update 2014 June.
- Pudiel, V. – Metzendorf, M. – Oetting, M. (1975): *Zur Persönlichkeit Adiposier in psychologischen Tests unter Berficksichtigung latent Fettsichtiger*. *Zeitschrift für Psychosomatische Medizin*, 21. 345–361.
- Schembre, S. M. – Geller, K. S. (2011): *Psychometric Properties and Construct Validity of the Weight-Related Eating Questionnaire in a Diverse Population*. *Obesity*, 19(12). 2336–2344.

- Stunkard, A. J. – Messick, S. (1985): *The Three-factor Eating Questionnaire to Measure Dietary Restraint, Disinhibition and Hunger*. Journal of Psychosomatic Research, 40. 71–83.
- Szabó, S. – Szigeti, O. – Soós, M. – Szakály, Z. (2014): Az ételmiszerfogyasztás mögöttes dimenziói: étkezési és testi attitűdök kapcsolata. In: „Marketing megújulás”. Marketing Oktatók Klubja 20. Konferenciája. Szeged. 1–10.
- Tholin, S. – Rasmussen, F. – Tynelius, P. – Karlsson J. (2005): *Genetic and environmental influences on eating behavior: the Swedish Young Male Twins Study*. American Journal of Clinical Nutrition, 81. 564–569.
- Tolnay, Pál – Szabó S., András (2004): *Testtömeg-optimalás, a sikeres fogyókúra ismérvei*. Élelmezési Ipar, 58(2). 60–61.
- Van Strien, T. – Frijters, J. E. R. – Bergers, G. P. A. – Defares, P. B. (1986): *The Dutch Eating Behavior Questionnaire (DEBQ) for Assessment of Restrained, Emotional, and External Eating Behavior*. International Journal of Eating Disorders, 5(2). 295–315.
- Van Strien, T. – Koenders, P. G. (2012): *How do life style factors relate to general health and overweight?* Appetite, 58. 265–270.

HUNGARIAN SUMMARY

Az elhízás a fejlett országokat érintő népbetegség. A túlsúly és az elhízás mint rizikófaktor komoly anyagi terhet jelent egyéni, foglalkoztatói és állami szinten, mind a megelőzés, mind a kezelés fázisában. A nemzetközi és hazai szakirodalomban több kutatás foglalkozik az egészségmagatartás dimenzióinak vizsgálatával komplex megközelítésben, vagy egyes kiemelt területekre (pl. dohányzás, alkoholfogyasztás, testmozgás, élelmiszerfogyasztás) fókuszálva. Az élelmiszerfogyasztás vizsgálatához kifejlesztett tesztek, nevezetesen a háromfaktoros evési kérdőív (TFEQ) és a holland evési magatartás kérdőív (DEBQ) három evési stílust azonosított elhízott és normál testsúlyú célcsoportokra: (1) érzelmi evés, (2) visszafogott evés és (3) külső hatásokra történő evés.

A tanulmány célja az evési magatartással kapcsolatos skálák (TFEQ 16, DEBQ és a TFEQ 20) adaptálási lehetőségének bemutatása. Az empirikus kutatás keretében 1323 felnőtt egyént sikerült elérni: 407 ember válaszolt a TFEQ 16, 404 fő a DEBQ skálákra, míg 512 fő a TFEQ 20 attitűdállításaira. A kutatás eredménye nem teljes mértékben támasztotta alá az eredeti faktorstruktúrákat. A TFEQ 16 esetében az érzelmi evés két faktorba különül el. A DEBQ esetében a külső hatásokra történő evés három faktorba sorolható: az ízhatás, az illathatás és a szociális faktorokba. A TFEQ 20 esetében a kognitív kontroll faktor 3 tétele validálható. A kutatás jövőbeli iránya az összefüggések vizsgálata és a fogyasztók evési magatartása alapján történő szegmentálása, illetve a rájuk irányuló marketingprogramok kidolgozása.



Statue of Miklós Pálffy and Adolf von Schwarzenberg, the heroes who reoccupied Győr from Turks in 1598