

# Eating Behavior of Students at the Technical University of Moldova during the Isolation Period

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#### Abstract

Appetizing peculiarities are formed from childhood and can vary throughout life. Although they are conditioned by genetic factors, over time, the internal regulation of eating behaviors is reduced, being influenced by a complex interaction of various external factors. According to the Behavioral Susceptibility (BST) Theory of Obesity, Food Sensitivity in Response to Food Stimuli (such as Food Sight and Smell) and Satiety Responsiveness (i.e. the ability to adjust diet in response to internal feelings of satiety) contribute to individual differences in terms of energy intake and weight status. The present research intended to assess the eating patterns and behavior of Moldovan students, especially those from Technical University of Moldova during the social isolation imposed by the COVID-19 pandemic. The study was conducted, based on the questionnaires (AEBQ-Adult Eating Behavior Questionnaire), on a group of 602 students from Technical University of Moldova. Participation in the survey was entirely voluntary, did not involve any invasive procedure, nor did it induce changes in participants' food patterns. The obtained results could contribute to the formation of the database for the study of the behavioral phenotype associated with the risk of obesity, but also for the study of eating behavior in crises. The questionnaire was distributed, in the form of a link, on the corporate emails of all TUM students. Respondents completed the questionnaire on the Google platform between 13.10.2021 - 25.11.2021, and the final database has been downloaded as a Microsoft Excel file. It was established a positive correlation between, Emotional Over-Eating and Emotional Under-Eating. Nervousness and anger were the most incriminating emotions of students that would cause both overeating and under eating. The results of the AEBQ questionnaire appear to be largely in line with previous studies, and the collected data present interest, in particular to prevent the risk of obesity.

#### **Keywords**

Eating Behavior, Students, Emotional Eating, Hunger, Satiety

#### **1. Introduction**

Peculiarities of eating behavior are formed from childhood and can vary throughout life. Although it is known that the genetic factor conditions the risk of obesity, as we age, the internal regulation of eating behaviors decreases, being influenced by a complex interaction of different external factors [1] [2] [3]. Stress and anxiety also amplify each other's influence on emotional adjustment strategies and eating behaviors, increasing the risk of overeating in vulnerable people [4].

In addition to the high number of casualties, the COVID-19 pandemic is an unprecedented challenge, with profound social and economic consequences. As the chronology of the growing pandemic is uncertain, isolation has been exacerbated by panic, depression, insomnia, and mass anxiety [5] [6].

It has been shown that loss of normal routine and reduced social and physical contact with others often lead to boredom, frustration, and a sense of isolation from the rest of the world [7]. Chronic loneliness and boredom, if long enough, can have detrimental effects on physical and mental well-being, as well as eating habits and patterns [8]. Changes in food patterns have led to increased consumption of unhealthy foods [9] [10] [11] but also more time spent cooking [12]. Procurement of processed or semi-processed foods has been reduced by almost 50% [10]. Traffic limits within and between countries affect food-related logistics services and lead to disruption of food supply chains, affecting food availability [13]. And dietary restrictions can paradoxically make individuals more susceptible to unhealthy eating when their ability to self-regulate is threatened. Previous experiments have shown that in situations that cause low self-control and/or unhealthy cravings, participants with higher food retention eat more than those with lower retention [8] [14] [15].

Public health nutrition experts warn us about the importance of a balanced diet and maintaining an active lifestyle to promote proper eating habits during the isolation period. Students, although considered young adults, are at a critical juncture in terms of food choices and behaviors [16], and the restrictions imposed by the pandemic may exacerbate these choices.

According to the Behavioral Susceptibility (BST) Theory of Obesity, Food Sensitivity in Response to Food Stimuli (such as Food Sight and Smell) and Satiety Responsiveness (*i.e.* the ability to adjust diet in response to internal feelings of satiety) contribute to individual differences in terms of energy intake and weight status. Sensitivity to satiety, hunger, emotional eating, external responsiveness are aspects of appetite that have been shown to be associated with adiposity [1] [17].

Some researchers point out that the characteristics of the food approach (receptivity to food, emotional overeating and the pleasure of eating food) are positively correlated with patterns of overconsumption (more frequent consumption of food). On the other hand, receptivity to satiety, emotional sublimation, Food Fussiness, and Slowness in Eating are negatively correlated with the pattern of malnutrition [18]. At TUM, as at any other university, the restrictions imposed by the pandemic led to the realization of classes in online mode, as well as in hybrid mode [19] [20]. The consequences of the impact of isolation on physical and mental well-being, as well as eating habits and patterns, have not been explored.

Assessing the eating behavior of young TUM students would be a way to study the behavioral phenotype associated with the risk of obesity. And the strong link between nutrition and the immune system only increases the imperative of this study. At the same time, the study could help us to shape the reactions to the inevitable future pandemics [10].

#### 2. Materials and Methods

Survey methodology. A study was conducted, based on the questionnaires, on a group of TUM students (n = 602). Participation in the survey was entirely voluntary, did not involve any invasive procedure, nor did it induce changes in participants' food patterns, nor did it require the approval of an ethics committee. Participants were informed about the purpose of the research. The questionnaire was distributed, in the form of a link, on the corporate emails of all TUM students. Respondents completed the questionnaire on the Google platform between 13.10.2021 - 25.11.2021, and the final database has been downloaded as a Microsoft Excel file.

*Respondents.* Of the 602 young adults aged 18 - 26, 345 are men and 257 are girls.

The questionnaire included 2 general items (gender and age) and 35 items related to eating behavior. Eating behavior was assessed according to the Adult Eating Behavior Questionnaire (AEBQ) [21]. The 35 items of AEBQ are to provide information on 8 aspects: Enjoyment of food, Emotional over-eating, Emotional under-eating, Food fussiness, Food responsiveness, Slowness in eating, Hunger, Satiety responsiveness(**Appendix 1**).Answers were provided on a Likert scale from 1 to 5 points: strongly disagree (SD) = 1, disagree (D) = 2, Neither agree or disagree (NAD) = 3, agree (A) = 4, strongly agree(SA) = 5 (represented by the values 1 - 5 on the X axes in **Figures 1-8**). In order to facilitate the reinterpretation of the data, only the answers with a score of 4 and 5 were taken into account, and the answers with a score of 1 and 2, as well as 3 (as a neutral answer) were omitted.

*Data analysis.* The results of the survey were analyzed by descriptive statistics. The Cronbach's alpha coefficient was calculated to determine the full reliability of the questionnaire (Table 1).

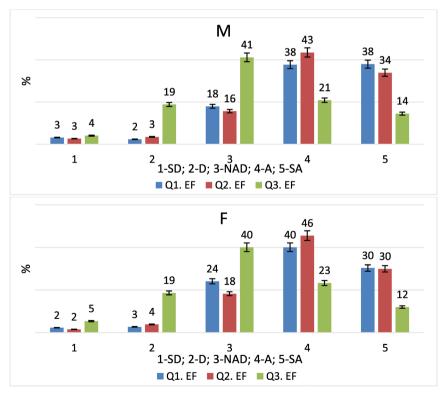
## 3. Results and Discussions

The answers to the 35 items were grouped into 8 groups, which in turn were divided by gender and represented in the form of diagrams.

**Enjoyment of food.** It is believed that the joy of eating should play an important role in our food consumption [22]. From the results of the survey, we notice that there are no big differences regarding the joy of food between genders: 76% of boys and 70% of girls love food, 76% - 77% like to eat and only 35% of young people look forward to mealtime (**Figure 1(M) & Figure 1(F)**).

Table 1. Descriptive statistics and Cronbach's alpha coefficient.

	Descri	Alpha		
Eating behavior	М	SD	0.94	
	2.92	1.15	- 0.84	



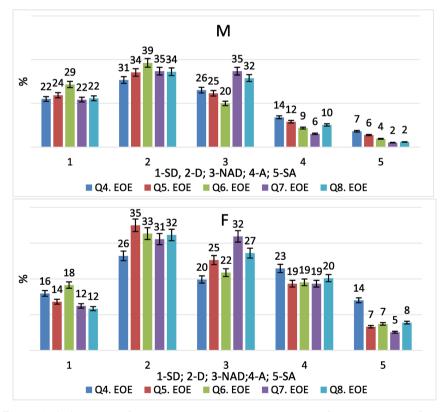
M-means, SD-standard deviation, Alpha (Cronbach's alpha coefficient).

**Figure 1.** (M) Enjoyment of food. *Q*1. *EF*—*I love food*; *Q*2. *EF*—*I enjoy eating*; *Q*3. *EF*—*I look forward to mealtimes*; M—male gender. (F) Enjoyment of food. *Q*1. *EF*—*I love food*; *Q*2. *EF*—*I enjoy eating*; *Q*3. *EF*—*I look forward to mealtimes*; F—female gender.

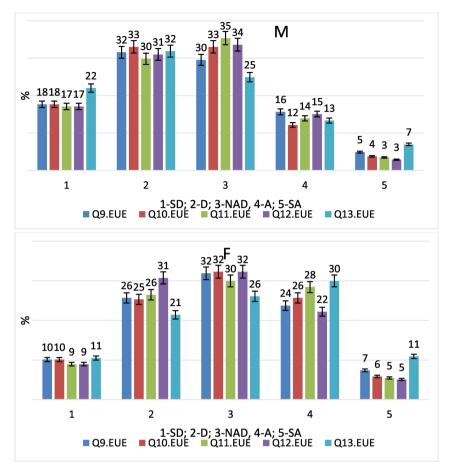
*Emotional over-eating & under-eating.* Emotional overeating (EOE) has been associated with an increased risk of obesity, while emotional underfeeding (EUE) may be protective [23]. Research on adults has shown that some people tend to consume more in stressful situations (so-called emotional overeating, [EOE]), while others experience a decrease in appetite when stressed and eat less (so-called emotional overeating). emotional malnutrition, [EUE] [24]. Regarding our study, in general, there is a positive correlation between, EOE and EUE.

In the case of emotional over-eating, the results showed that most young people are not subjected to overeating due to emotions. The vulnerability in this aspect is higher for girls, compared to boys, at least during this pandemic period (when the survey was conducted). Thus, 21% of boys and 37% of girls eat more when they are annoyed, 18% (M) and 26% (F)—eat more when they are worried, 13% (M) and 26% (F)—when are upset, 8% (M) and 24% (F)—when they feel anxious and 12% (M) and 28% (F)—when they are angry (**Figure 2(M) & Figure 2(F)**).

**Emotional under-eating.** There is a positive correlation between responses to emotional over-eating and emotional under-eating: a very high positive correlation for boys (r = 0.87) and a high correlation for girls (r = 0.78) (Figure 3(M) &



**Figure 2.** (M) Emotional over-eating. *Q4. EOE—I eat more when I am annoyed*, *Q5. EOE—I eat more when I am worried*, *Q6. EOE—I eat more when I am upset*, *Q7. EOE—I eat more when I m anxious*, *Q8. EOE—I eat more when I am angry.* (F) Emotional over-eating. *Q4. EOE—I eat more when I am annoyed*, *Q5. EOE—I eat more when I am worried*, *Q6. EOE—I eat more when I am upset*, *Q7. EOE—I eat more when I am anxious*, *Q8. EOE—I eat more when I am angry.* (F) Emotional over-eating. *Q4. EOE—I eat more when I am upset*, *Q7. EOE—I eat more when I am worried*, *Q6. EOE—I eat more when I am upset*, *Q7. EOE—I eat more when I m anxious*, *Q8. EOE—I eat more when I am angry.* 

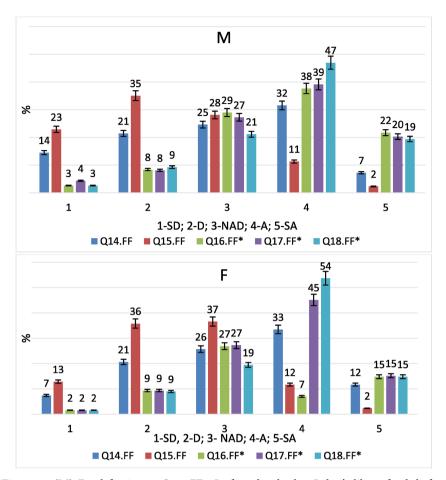


**Figure 3.** (M) Emotional under-eating. *Q9. EUE—I eat less when I'm worried*; *Q10. EUE—I eat less when I'm angry*; *Q11. EUE—I eat less when I'm upset*; *Q12. EUE—I eat less when I'm annoyed*; *Q13. EUE—I eat less when I'm anxious.* (F) Emotional under-eating. *Q9. EUE—I eat less when I'm worried*; *Q10. EUE—I eat less when I'm angry*; *Q11. EUE—I eat less when I'm upset*; *Q12. EUE—I eat less when I'm annoyed*; *Q13. EUE—I eat less when I'm annoyed*; *Q13. EUE—I eat less when I'm annoyed*; *Q13. EUE—I eat less when I'm upset*; *Q12. EUE—I eat less when I'm annoyed*; *Q13. EUE—I eat less when I'm upset*; *Q12. EUE—I eat less when I'm annoyed*; *Q13. EUE*—I *eat less when I'm annoyed*; *Q13. EUE*—I *eat less when I'm annoyed*; *Q13. EUE*—I *eat less when I'm annoyed*; *Q14. EUE*—I *eat* 

**Figure 3(F)**). Emotional over-eating correlated positively with hunger (r = 0.83 (B) and r = 0.86 (F), correlations confirmed by previous research on this topic) [25].

**Food fussiness.** Food fussiness is considered to be a concept related to both genetic and environmental etiologies. It is also thought to be associated with traits such as anxiety and shyness [26]. Boys (60%) like to taste food more than girls (22%). 59% of young people are interested in tasting new foods and over 66% of young people like a wide variety of foods. Respondents (39% (M) and 44% (F)) often decide that they do not like a food even before consuming it. Only a small proportion of young people (13% - 14%) refuse to taste new foods (**Figure 4(M) & Figure 4(F)**).

*Food responsiveness.* Appearance and olfactory sensations are the stimuli that most often lead to the desire to eat food. The relationships between taste receptivity and pleasure are dependent on the product, but also on the individual receptivity to basic tastes [27].

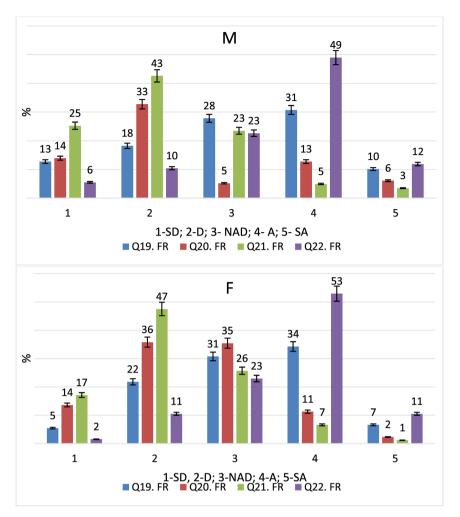


**Figure 4.** (M) Food fussiness. Q14. FF—I often decide that I don't like a food, before tasting it, Q15. FF -I refuse new foods at first, Q16. FF\*—I enjoy tasting new foods, Q17.FF\*—I am interested in tasting new food I haven't tasted before, Q18. FF\*—I enjoy a wide variety of foods. (F) Food fussiness. Q14. FF—I often decide that I don't like a food, before tasting it, Q15. FF—I refuse new foods at first, Q16. FF\*—I enjoy tasting new foods, Q17. FF\*—I am interested in tasting new food I haven't tasted before, Q18. FF\*—I enjoy a wide variety of foods.

Over 41% of respondents want to eat when they are in the presence of someone who eats, and 23% of boys and 13% of girls would most often prefer to eat. Appearance and olfactory sensations are the stimuli that most often lead to the desire to eat food—over 61% of respondents confirmed this fact (**Figure 5(M)** & **Figure 5(F)**).

According to BST theory, body weight is influenced, at least in part, by genetic factors, through their effect on appetite. Schather reported that obese people have two instinctive characteristics in regulating their appetite that lead to overeating: excessive receptivity to very tasty foods (wanting to eat a lot at sight, smell and taste of tasty foods) and lack of response to internal mechanisms of satiety [2] [28].

*Slowness in eating.* There is research that shows that eating a small amount of food slowly and eating a large amount of food quickly are just as effective in causing satiety, and the rate of eating does not affect the feeling of hunger and



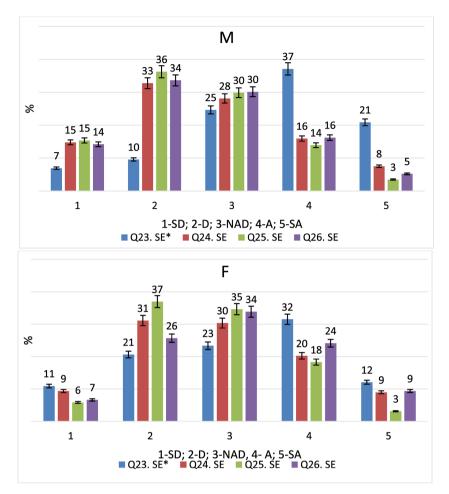
**Figure 5.** (M) Food responsiveness. Q19. FR—I often feel hungry when I am with someone who is eating, Q20. FR—Given the choice, I would eat most of the time Q21. FR—I am always thinking about food, Q22. FR—When I see or smell food that I like, it makes me want to eat. (F) Food responsiveness. Q19. FR—I often feel hungry when I am with someone who is eating, Q20. FR—Given the choice, I would eat most of the time Q21. FR—I am always thinking about food; Q22. FR—When I see or smell food that I like, it makes me want to eat.

satiety after eating [24].

With the statement "I am often last at finishing a meal", 58% (M) and 44% (F) agreed, which probably could not always be associated with slow food consumption. The results of the survey showed that the speed of food consumption during the meal is decreasing more and more (24% (M) and 29% (F), and 21% (M) and 33% (F) quickly finish eating (Figure 6(M) & Figure 6(F)).

Fast eating is associated with high BMI and an increased risk of obesity [25].

**Hunger.** Hunger is supposed to cause overeating, but there is no firm evidence that the intensity of hunger is related to being overweight. 34% of boys and 45% of girls often have a strong feeling of hunger that they should eat something immediately. About 14% of boys and 29% of girls said they had dizziness due to late meals (Figure 7(M) & Figure 7(F)).

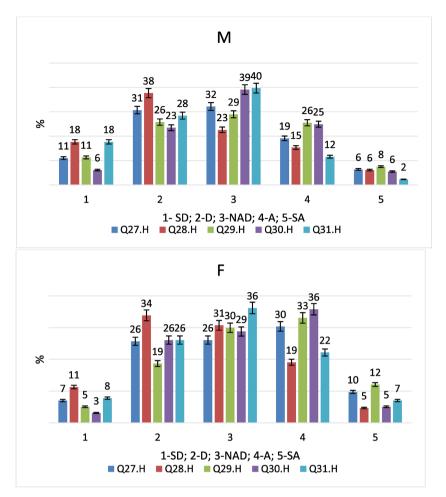


**Figure 6.** (M) Slowness in eating. *Q.23.SE—I am often last at finishing a meal*, *Q24. SE—I eat more and more slowly during the course of a meal*, *Q25. SE I eat slowly*, *Q26. SE\*—I often finish my meals quickly (I am often last at finishing a meal).* (F) Slowness in eating. *Q.23. SE—I am often last at finishing a meal*, *Q24. SE—I eat more and more slowly during the course of a meal*, *Q25. SE I eat slowly*, *Q26. SE\*—I often finish my meals quickly (I am often last at slowly*, *Q26. SE\*—I often finish my meals quickly (I am often last at slowly*, *Q26. SE\*—I often finish my meals quickly (I am often last at finishing a meal).* 

**Satiety-responsiveness' (SR)** examines ability to regulate intake of food in relation to satiety [29]. It is considered that people prone to weaker satiety signals, in response, are more prone to overeating [2]. In this regard, we can conclude that the females reach the feeling of satiety more easily, often leaving food on the plate, which is not characteristic for males. 27% of boys and 38% of girls feel full until the end of the meal, and 18% and 29% respectively say that they are easily saturated (**Figure 8(M) & Figure 8(F)**). Satiety-responsiveness' is a negative association with the quantitative consumption of food, therefore, with higher energy excesses. SR is also associated with the frequency of meals.

#### Limitations

The results of the survey were evaluated on a sample of 602 people, which is only a small part of the total number of 9520 TUM students and, respectively, the data obtained may be unrepresentative and may limit the generalization of the data.

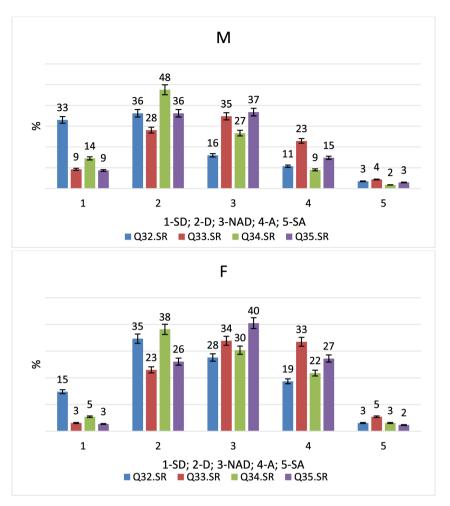


**Figure 7.** (M) Hunger Sensation. Q27.H—I often notice my stomach rumbling, Q28. H—If I miss a meal I get irritable, Q29. H—I often feel so hungry that I have to eat something right away, Q30. H—I often feel hungry, Q31. H—If my meals are delayed I get lightheaded. (F) Hunger Sensation. Q27. H—I often notice my stomach rumbling, Q28. H—If I miss a meal I get irritable, Q29. H—I often feel so hungry that I have to eat something right away, Q30. H—I often feel hungry, Q31. H—If my meals are delayed I get lightheaded.

An instruction of the respondents for the correct interpretation of the questions would also be suggested. Additional reliable and feasible research on eating behavior, quality of life, and physical activity is needed to improve understanding of the correlations between eating behaviors, energy metabolism, and health.

### 4. Conclusions

Parameters such as Enjoyment of food, Emotional over-eating, Emotional under-eating, Food fussiness, Food responsiveness, Slowness in eating, Hunger, Satiety responsiveness and their gender-dependent oscillations were analyzed. Some relationships have been established between certain emotional states and emotional eating. Emotional states such as nervousness and anxiety are the ones that cause over-eating or under-eating among all students, the girls being the most sensitive to this aspect. Regarding the feeling of hunger, it was associated



**Figure 8.** (M) Satiety responsiveness. Q32. SR—I often leave food on my plate at the end of a meal; Q33. SR—I often get full before my meal is finished; Q34. SR—I cannot eat a meal if I have had a snack just before; Q35. SR—I get full up easily. (F) Satiety responsiveness. Q32. SR—I often leave food on my plate at the end of a meal; Q33. SR—I often get full before my meal is finished; Q34.SR—I cannot eat a meal if I have had a snack just before; Q35. SR—I cannot eat a meal if I have had a snack just before; Q35. SR—I cannot eat a meal if I have had a snack just before; Q35. SR—I get full up easily.

with the appearance of stomach noises and dizziness and with the parity of irritation. At the same time, girls more easily achieve the feeling of satiety than in the case of boys.

It appears that the results of the AEBQ questionnaire are largely in line with previous studies, and the data collected are of interest, in particular to prevent the risk of obesity. Also, the obtained results could contribute to the formation of the database for the study of the behavioral phenotype associated with the risk of obesity [30], but also for the study of eating behavior in crisis situations.

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#### **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

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n.o.		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
	Enjoyment of food	1	2	3	4	5
Q1. EF	I love food					
Q.2. EF	I enjoy eating					
Q.3. EF	I look forward to mealtimes					
	Emotional over-eating					
Q.4. EOE	I eat more when I'm annoyed					
Q.5. EOE	I eat more when I'm worried					
Q.6. EOE	I eat more when I'm upset					
Q.7. EOE	I eat more when I'm anxious					
Q.8. EOE	I eat more when I'm angry					
	Emotional under-eating					
Q.9. EUE	I eat less when I'm worried					
Q.10. EUE	I eat less when I'm angry					
Q.11. EUE	I eat less when I'm upset					
Q.12. EUE	I eat less when I'm annoyed					
Q.13. EUE	I eat less when I'm anxious					
	Food fussiness					
Q.14. FF	I often decide that I don't like a food, before tasting it					
Q.15. FF	I refuse new foods at first					
Q.16. FF*	I enjoy tasting new foods					
Q.17. FF*	I am interested in tasting new food I haven't tasted before					
Q.18. FF*	I enjoy a wide variety of foods					
	Food responsiveness					
Q.19. FR	I often feel hungry when I am with someone who is eating					
Q.20. FR	Given the choice, I would eat most of the time					
Q.21. FR	I am always thinking about food					
Q.22. FR	When I see or smell food that I like, it makes me want to eat					
	Slowness in eating					
Q.23. SE*	I am often last at finishing a meal					
Q.24. SE	I eat more and more slowly during the course of a meal					
Q.25. SE	I eat slowly					
Q.26. SE	I often finish my meals quickly					

# Appendix 1. Adult Eating Behaviour Questionnaire—Scoring Information

Continued	
	Hunger
Q.27. H	I often notice my stomach rumbling
Q.28. H	If I miss a meal I get irritable
Q.29. H	I often feel so hungry that I have to eat something right away
Q.30. H	I often feel hungry
Q.31. H	If my meals are delayed I get lightheaded
	Satiety responsiveness
Q.32. SR	I often leave food on my plate at the end of a meal
Q.33. SR	I often get full before my meal is finished
Q.34. SR	I cannot eat a meal if I have had a snack just before
Q.35. SR	I get full up easily