ANALYZING THE BEHAVIOR OF YOUNG HUNGARIAN CONSUMERS TOWARD SUBOPTIMAL FOOD PRODUCTS

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Abstract

Food waste is one of the major global problems for sustainable development. Food waste is the highest at the household level, a major cause of consumer waste is the rejection of suboptimal food. The aim of the research is to understand young consumers' attitudes towards suboptimal foods and based on the results, to make recommendations to food businesses. The questionnaire was filled out by members of the younger generation Z from Hungary, the condition for inclusion in the sample was that the respondents belonged to the 18-25 age group. The methodologies used in the research analysis are descriptive statistics, cross tabulation analysis and correlation analysis. According to the results of the survey, the purchase of suboptimal food is primarily a financial consideration for young respondents but reducing food waste is also an important aspect. The research clearly showed a correlation between the preference for buying suboptimal food and respondents' feelings of guilt about food waste. Young people who prefer to buy suboptimal food are more concerned about the moral issues raised by food waste. This research provides marketing recommendations for food businesses and retailers, in this way, research contributes to increasing the competitiveness of companies, considering sustainability.

Key words: sustainability, sustainable food consumption, food waste, suboptimal food, moral norms

JEL Code: D12, M31, Q13

Introduction

Food waste is a global problem it does not affect only developed countries but also developing ones. Discarding of the uneaten portion of edible food (Smith & Landry, 2021) affects society, the environment and the economy, the three pillars of sustainability (Filimonau et al., 2020). The severity of the problem is shown by the fact that 1.3 billion tonnes of food can go to waste every year, with an estimated value of $1 trillion (Septianto et al., 2020), causing losses to national economies (Heidari et al., 2020). The current problem of 2022 is the food shortage caused by the war between Russia and Ukraine, however according to the latest Feedback EU

report (Feedback-EU, 2022) the EU imported 138 million tonnes of agricultural products in 2021, while wasting 153 million tonnes of food in the same year. Food waste is most prevalent at the retail and consumer stages of the supply chain (Aktas et al., 2018), which justifies more thorough research and thus understanding of consumer behaviour (Filimonau et al., 2020; Hebrok & Heidenstrøm, 2019; Szakos et al. 2021).

Adel et al. (2021) and Bolos et al. (2022) argue that food waste can be reduced by purchasing suboptimal foods, hence it is necessary to investigate consumer behaviour in relation to suboptimal foods. By Hartmann et al. (2021), capitalization of suboptimal foods can be even regarded as part of a food waste prevention strategy, hence it is not negligible from a social point of view either.

The aim of this research is twofold: First, to understand young consumers' attitudes towards suboptimal foods and, based on the results, to make recommendations to food businesses. Secondly, in the light of the results, the preparation and foundation of a nationally representative survey with a large number of elements. This paper focuses primarily on presenting the results of empirical research, and therefore the literature review only attempts to provide a brief description of suboptimal foods and their correlation to food waste.

1 Literature review

Empirical research aimed to investigating and understanding consumer behaviour related to suboptimal food is recent. Suboptimal foods include foods that are close to their expiry date, products with minor defects or unusual shapes, discolouration or minor damage (de Hooge et al., 2018) without intrinsic quality or safety concerns (Cao & Miao, 2021). According to Loebnitz et al. (2015), the high consumer demand and need for food with perfect appearance and texture contributes to the problem of food waste, while consuming still edible suboptimal foods can help to reduce food waste (Giménez et al., 2021). However, since these foods are generally available at a lower price, a favourable price may even increase the willingness to buy (Rohm et al., 2017). The main problem is that consumers may not perceive the price-quality relationship correctly for discounted or suboptimal foods, and therefore the refusal to buy these foods is increased by even misjudged risk. According to Tsalis (2020) price consciousness has a negative effect on buying suboptimal food as it is perceived as a substantially discounted, unattractive product. However, choosing a suboptimal, price-reduced food can be regarded as a smart economic action, a frugal or even an ethical choice (Aschemann-Witzel et al., 2020). Nevertheless, suboptimality have a negative impact on attitudes and emotional reactions and

cause a negative effect on purchase intentions because of the stronger perception of quality reduction (Giménez et al., 2021). Most of the studies primarily focus on a price-related scope while sustainability or authenticity can also occur as a positionable value in the case of suboptimal products (van Giesen & de Hooge, 2019).

2 Methodology

Our target group was young adults aged between 18 and 25. The demographic distribution of the sample is shown in detail in Table 1. The questionnaire took 15-20 minutes to complete, and the sample size was 218. The survey was conducted in March 2022.

Tab. 1: Demographic distribution of the sample by main background variables (N=218)

Nomination	Distribution of the sample	
	No.	%
Gender		
Women	144	66.1
Men	74	33.9
Type of settlement		
Budapest (capital)	121	55.5
County seat	14	6.4
City (more than 100 000 inhabitants)	9	4.1
Medium-sized city (between 20 thousand and 100 thousand inhabitants)	18	8.3
Small-sized city (between 5 thousand and 20 thousand inhabitants)	31	14.2
Township (under 5 thousand inhabitants)	8	3.7
Village	17	7.8
Financial background		
We have to give up buying a lot of things to have enough money to maintain our daily lives	5	2.3
We have enough money for everyday life, but we can't afford to spend more	38	17.4
We have enough money for our expenses and we can even save a little	135	61.9
We are wealthy, we don't even have to save to buy bigger things	40	18.3

Source: Authors' own elaboration

SPSS 25.0 and Excel were used to process the questionnaires. Responses to the statements were first analysed using descriptive statistics, followed by frequency analysis and cross-tabulation. The correlations between the nominal and ordinal scale variables were statistically tested using the chi-square test. During the analysis, the level of statistical

significance of the correlation of the variables was tested using Pearson's χ^2 (Khi-square) statistic, and the strength of the relationship was tested using the Gamma (γ) coefficient because of the ordinal variables. For the variables evaluated, the conditions of the Khi-square test for expected and expected values were fulfilled, and significant relations within the cross-tabulations were tested on the basis of the corrected standardised residuals. A dimensionality reduction technique consisting of principal component analysis was applied to the statements examined in the questionnaire. Varimax rotation was performed to achieve the optimal clustering, and the performance of the principal component analysis was tested by checking the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test. (Malhotra, 2016).

3 Results

A principal component analysis was conducted for 14 statements using varimax rotation in order to reveal the intention to reduce food waste, the preference for suboptimal food, and the perception of guilt about food waste, which led to the following, appropriate results [KMO=0.852; Bartlett test: (χ^2=1847.049, df=91, p<0.001); total explained variance=68.21%]. The reliability of the scale, the internal consistency, was checked with a Cronbach's alpha index, with a minimum value of 0.7, values above 0.8 being considered good beyond any doubt.

Table 2 shows the factor loadings and descriptive statistics for the responses on the preference for suboptimal foods. In the principal component of consumer behaviour related to suboptimal foods, the loading of all variables exceeds the desired level of 0.7, α =0.842.

Tab. 2: Descriptive statistical values of the responses to the purchase of suboptimal food and the factor weights obtained during the exploratory analysis

Statement in the questionnaire	Factor Loading	Mean	Std. Dev	Skewn	Kurtosis
Buying suboptimal foods is a good idea, as they are reasonably priced.	.800	3.46	1.215	-.425	-.690
By buying suboptimal food, I reduce food waste.	.751	3.24	1.281	-.305	-.987
I usually buy suboptimal food.	.852	3.17	1.263	-.176	-.967
I am environmentally conscious, so I buy suboptimal food.	.814	2.71	1.213	.346	-.671

Source: Own edition, Note: 1= I do not agree at all; 2= I disagree; 3= both agree and disagree; 4= I agree; 5= I very much agree

Respondents mostly agreed with the statement that buying suboptimal food is a good idea from a financial point of view. Second among the claims was the aspect of reducing food waste. Concrete purchases of suboptimal food are not so typical. It is important to highlight the high relative standard deviation of these variables and the fact that the median and mode values are above the arithmetic mean due to negative skewness, with more data above the mean. The environmental awareness aspect is in the last place, also with a large relative standard deviation and right skewed data, in this case with more data below the average, showing how unimportant this aspect is to young respondents.

Table 3 shows the factor loadings and descriptive statistics for the answers to the moral questions. The charge of each variable in the moral principal component exceeds the desired level of 0.7, $\alpha=0.918$.

Tab. 3: Descriptive statistics of responses to questions on food waste guilt and factor weights obtained in the exploratory analysis

Statement in the questionnaire	Factor Loading	Mean	Std. Dev	Skewness	Kurtosis
Food waste makes me feel guilty for those who do not have enough food.	.754	3.59	1.268	-.636	-.544
Wasting food makes me feel guilty.	.868	3.44	1.199	-.369	-.793
Wasting food makes me feel guilty about the environment.	.788	3.37	1.169	-.277	-.744
I feel ashamed when I waste food, even if no one knows about it.	.796	3.30	1.284	-.283	-.987
Wasting food is against my principles.	.808	3.25	1.165	-.142	-.743
Wasting food is against my morals.	.845	3.17	1.163	-.061	-.749

Source: Own edition, Note: 1= I do not agree at all; 2= I disagree; 3= both agree and disagree; 4= I agree; 5= I very much agree

Investigating moral concerns about food waste, we found that respondents are most concerned about the guilt of starving hunger when they waste food. Remorse caused by food waste is in the second place. Respondents are also concerned about their environment. They agreed least with statements about principles and conscience. It is important to highlight that the high relative standard deviation of the responses and the fact that the negative skewness causes the median and mode values to exceed the arithmetic mean, so that the responses are not uniform but are skewed above the arithmetic mean.

Table 4 shows the factor loadings and descriptive statistics for consumer intention to avoid food waste. The charge of each variable in the principal component exceeds the desired level of 0.7, α=0.791.

Tab. 4: Descriptive statistics for responses to questions on intention to avoid food waste and factor weights obtained in the exploratory analysis

Statement in the questionnaire	Factor Loading	Mean	Std. Dev	Skewness	Kurtosis
My aim is to produce as little food waste as possible.	.712	4.28	.895	-1.243	1.372
I have no intention of throwing the food away.	.722	4.06	1.034	-1.103	.791
I intend to eat the rest of the food.	.726	3.74	1.056	-.668	-.059
I intend to use the food leftovers.	.804	3.64	1.226	-.564	-.684

Source: Own edition, note: 1= I do not agree at all; 2= I disagree; 3= both agree and disagree; 4= I agree; 5= I very much agree

On a Likert scale of 1 to 5, respondents gave an average score of 4.28 to the statement that they aim to reduce food waste. The relative standard deviation is low, showing that responses were consistent on this question. The statement that respondents do not intend to waste food also scored above the average of 4. In this respect, however, respondents' agreement with the statement was no longer uniform, just as in the case for the consumption and use of food waste. For these responses it is important to highlight the high relative standard deviation and negative skewness.

The Visual Binning function of SPSS was used to create three groups of factors starting from groups of equal number of elements. By the distribution is the three groups of respondents we have formed for each of the three factors: 'less agree/no preference': <= 0.30; 'average agree': 0.31 - 0.60; 'agree/preference': 0.61+.

First, a cross tabulation analysis was carried out on groups of respondents formed by their purchases of suboptimal food and their guilt about food waste. The result of the analysis proved to be significant (χ^2=33.029; df=4; p<0,001, γ=0.437; p<0,001). Asthe sign of Gamma value indicates, agreement with statements about buying suboptimal food varies with the level of guilt about food waste. The more the respondent is concerned about moral issues related to food waste, the more they prefer to buy suboptimal food. 60.9% (adj. res.=5.0) of respondents who prefer to buy suboptimal food belong to the group of consumers who feel most guilty about moral concerns about food waste. However, the number of respondents who do not deal with

suboptimal food is lower than expected in the group of respondents who feel really guilty about food waste (26.6%, adj. res.=-2.3).

The following cross tabulation analysis examined the correlation between statements of intention to reduce food waste and respondent groups based on food waste guilt, which brought significant results (χ^2=38.633; df=4; p<0,001, γ=0.532; p<0,001). As indicated by the sign of the Gamma value, agreement with statements about the intention to reduce food waste varies with the level of guilt about food waste. The more the respondent is concerned about moral issues related to food waste, the more they intend to reduce their food waste.

58.8% (adj. res.=4.6) of respondents who feel most guilty about food waste belong to the group from whom food waste reduction is a priority. The value of the standardised residuals also shows that the number of respondents who do not make any effort at all to reduce food waste is much higher than expected (64%, adj. res.=5.4) among those who do not feel guilty about food waste at all.

The third cross tabulation analysis was used to examine the correlation between statements of intention to reduce food waste and respondent groups based on their preference to buy suboptimal food. Significant results (χ^2=43.641; df=4; p<0.001, γ=0.491; p<0.001) indicate that the respondents with the strongest intention to avoid food waste belong to a higher than expected proportion of the group that prefers to buy suboptimal food (55. 9%, adj. res.=5.2), while fewer than expected are among those who do not prefer to buy suboptimal food at all (25%, adj. res.=-2.3).

Conclusion

The present study examined young consumers' attitudes towards suboptimal foods. The investigated young people think it is a good idea to buy suboptimal food for financial reasons and thus avoid food waste. However, the specific purchase of these products is no longer typical for them. Environmental awareness was not an important consideration for them.

At the same time, the members of Generation Z are significantly remorseful by the guilt of the hungry when they waste food. They feel guilty about food waste and, as the cross-tabulation analysis has shown, this guilt and the level of agreement with claims about buying suboptimal food vary in the same direction. The more the respondent is concerned about moral issues related to food waste, the more they prefer to buy suboptimal food. Cross-sectional analysis also showed that young people who have the strongest intentions to avoid food waste

prefer to buy suboptimal food. The more concerned they are about moral issues related to food waste, the more they want to reduce food waste.

In the light of the results, the following suggestions are made to encourage the purchase preference of suboptimal foods for the young generation. First, it is extremely important to clearly communicate that suboptimal foods are not necessarily of lower quality. Secondly, a strong communication message is needed about how food waste can be reduced by buying suboptimal food. An appropriate marketing communication tool for this could be the placement of POS displays in stores, even with eye-catching images to reinforce existing moral concerns about food waste.

Acknowledgment

References

Adel, A. M., Dai, X., & Roshdy, R. S. (2021). Investigating consumers' behavioral intentions toward suboptimal produce: an extended theory of planned behavior–a cross-cultural study. *British Food Journal*, *124*(1), 99-139. doi: https://doi.org/10.1108/BFJ-03-2021-0211.

Aktas, E., Sahin, H., Topaloglu, Z., Oledinma, A., Huda, A. K. S., Irani, Z., Sharif, A. M., van't Wout, T., & Kamrava, M. (2018). A consumer behavioural approach to food waste. *Journal of Enterprise Information Management*. doi: https://doi.org/10.1108/JEIM-03-2018-0051

Aschemann-Witzel, J., Otterbring, T., de Hooge, I. E., Normann, A., Rohm, H., Almli, V. L., & Oostindjer, M. (2020, March). Consumer associations about other buyers of suboptimal food – And what it means for food waste avoidance actions. Food Quality and Preference, 80, 103808. https://doi.org/10.1016/j.foodqual.2019.103808

Bolos, L. A., Lagerkvist, C.-J., Edenbrant, A. K., & Nayga, R. M. (2022). Consumer preferences for visually sub-optimal food: Role of information framing and personal goals. *Resources, Conservation and Recycling*, *184*, 106426. doi: https://doi.org/10.1016/j.resconrec.2022.106426.

Cao, Y., & Miao, L. (2021). Consumer responses to suboptimal food products. Appetite, 163, 105205. https://doi.org/10.1016/j.appet.2021.105205

Feedback-EU. (2022). *No time to waste: Why the EU needs to adopt ambitious legally binding food waste reduction targets*. https://feedbackglobal.org/wp-content/uploads/2022/09/Feedback-EU-2022-No-Time-To-Waste-report-1.pdf

Filimonau, V., Matute, J., Kubal-Czerwińska, M., Krzesiwo, K., & Mika, M. (2020). The determinants of consumer engagement in restaurant food waste mitigation in Poland: An exploratory study. *Journal of Cleaner Production*, *247*, 119105. doi: https://doi.org/10.1016/j.jclepro.2019.119105.

Giménez, A., Aschemann-Witzel, J., & Ares, G. (2021). Exploring barriers to consuming suboptimal foods: A consumer perspective. Food research international (Ottawa, Ont.), 141, 110106. https://doi.org/10.1016/j.foodres.2021.110106

Hartmann, T., Jahnke, B., & Hamm, U. (2021, June). Making ugly food beautiful: Consumer barriers to purchase and marketing options for Suboptimal Food at retail level – A systematic review. Food Quality and Preference, 90, 104179. https://doi.org/10.1016/j.foodqual.2021.104179

Hebrok, M., & Heidenstrøm, N. (2019). Contextualising food waste prevention-Decisive moments within everyday practices. *Journal of Cleaner Production*, *210*, 1435-1448. doi: https://doi.org/10.1016/j.jclepro.2018.11.141.

Heidari, A., Mirzaii, F., Rahnama, M., & Alidoost, F. (2020). A theoretical framework for explaining the determinants of food waste reduction in residential households: a case study of Mashhad, Iran. *Environmental Science and Pollution Research*, *27*(7), 6774-6784. doi: https://doi.org/10.1007/s11356-019-06518-8.

de Hooge, I. E., van Dulm, E., & van Trijp, H. C. M. (2018). Cosmetic specifications in the food waste issue: Supply chain considerations and practices concerning suboptimal food products. Journal of Cleaner Production, 183, 698–709. doi: https://doi.org/10.1016/j.jclepro.2018.02.132

Loebnitz, N., Schuitema, G., & Grunert, K. G. (2015). Who buys oddly shaped food and why? Impacts of food shape abnormality and organic labeling on purchase intentions. *Psychology & Marketing*, *32*(4), 408-421. doi: https://doi.org/10.1002/mar.20788.

Malhotra, N. K. (2016). *Marketing research: An applied orientation, 7Th Edition*. Pearson.

Rohm, H., Oostindjer, M., Aschemann-Witzel, J., Symmank, C., L. Almli, V., De Hooge, I. E., Normann, A., & Karantininis, K. (2017). Consumers in a sustainable food supply chain (COSUS): Understanding consumer behavior to encourage food waste reduction. *Foods*, *6*(12), 104. doi: https://doi.org/10.3390/foods6120104.

Septianto, F., Kemper, J. A., & Northey, G. (2020). Thanks, but no thanks: The influence of gratitude on consumer awareness of food waste. *Journal of Cleaner Production*, *258*, 120591. doi: https://doi.org/10.1016/j.jclepro.2020.120591.

Smith, T. A., & Landry, C. E. (2021). Household food waste and inefficiencies in food production. *American Journal of Agricultural Economics*, *103*(1), 4-21. doi: https://doi.org/10.1111/ajae.12145.

Szakos, D., Szabó-Bódi, B., & Kasza, G. (2021). Consumer awareness campaign to reduce household food waste based on structural equation behavior modeling in Hungary. Environmental Science and Pollution Research, 28(19), 24580-24589. https://doi.org/10.1007/s11356-020-09047-x

Tsalis, G. (2020, January). What's the deal? Consumer price involvement and the intention to purchase suboptimal foods. A cross-national study. Food Quality and Preference, 79, 103747. https://doi.org/10.1016/j.foodqual.2019.103747

van Giesen, R. I., & de Hooge, I. E. (2019, July). Too ugly, but I love its shape: Reducing food waste of suboptimal products with authenticity (and sustainability) positioning. Food Quality and Preference, 75, 249–259. https://doi.org/10.1016/j.foodqual.2019.02.020

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