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THE ROLE OF MEDIA AND PROMOTION IN INCREASING CONSUMER AWARENESS TO REDUCE FOOD WASTE

Abstract

This paper investigates the role of media and promotional campaigns in driving household food waste reduction. Employing ordinal regression on 112 survey respondents, the research highlights the effectiveness of media headlines and motivational messaging in encouraging consumers to minimize food waste.

The research reveals that media and motivational headlines significantly impact consumer behavior. Strategically crafted messages can encourage individuals to consume all purchased food, minimizing waste. Social media and web portals become the primary sources of information on food waste, emphasizing the importance of utilizing these channels for awareness and action.

The findings emphasize the growing urgency of addressing food waste and the potential of media and promotion to drive meaningful change. By understanding the factors that motivate consumers and leveraging the power of digital platforms, impactful campaigns can be developed to encourage responsible food consumption and reduce waste across households.

Keywords: Food waste, Households, Consumer behavior, Media, Motivational campaigns

Jel classification: M30, M31, Q56

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Introduction

Reducing food waste has become one of the global sustainability challenges today fundamental to sustainable development (Sala and Castellani, 2019). Within the UN' Sustainable Development Goals (SDGs), SDG12 addresses food waste and losses, setting a target to "halve global food waste per capita at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses"(Flanagan et al., 2018). Previous studies underscore the need for more targeted research to elevate consumer awareness and understanding of the pertinent issues that would foster an environment conducive to long-term, sustainable behavioural changes (Wansink, 2018). Promoting pro-environmental behaviour amongst urban inhabitants needs to be a top priority, both for policy and for research (Clayton et al., 2016).

Consumer behaviour depends on external, but also on personal characteristics such as demographic factors (de Hooge et al., 2017). Consumers over 65 generally waste less food than the rest of the population and their perception is that food loss is wrong and synonymous with "waste" (Quested et al., 2013). Younger generations express an environmental concern while still wasting food.

Existing literature suggests that tackling food waste can benefit from integrated social marketing campaigns implemented by environmental experts (Pearson & Nefovski, 2019; Young, et al., 2017). Yamakawa, et al., (2017) define "campaign" as activities that aim to appeal to many people with various media, pointing that most important is to raise people's awareness, while a crucial goal of ,,face-to-face" approach is to promote behavioural changes.

A research gap exists in examining the relationship between social marketing communication strategies and their effectiveness in driving behavioural change regarding food waste.This paper examines the influence of media and promotional campaigns on consumer food waste attitudes.

1. Literature review

Clement et al. (2023) emphasizes that food waste among young consumers is a complex issue and implementing a combination of educational, technological, social and practical solutions can effectively promote sustainable food consumption habits. A separate study revealed that women between 20s - 30s exhibited a greater tendency to experience guilt over food waste and associate

it with social inequality compared to men. As they age, women increasingly associate food waste with financial irresponsibility (Cantaragiu, 2019).
A relevant effort to move to anti-waste behaviour is raising awareness of food waste issues (Stangherlin & de Barcellos, 2018). Linder et al. (2018) suggest that information-based campaigns are commonly used to promote behavioral change, to alter attitudes or enhance knowledge about environmental problems to improve behavior change. Using such information aims to increase knowledge about the consequences of unsustainable behaviour and how to change behaviour (Soma, Li & Maclaren, 2020).

In this perspective, it is possible to formulate the following hypothesis:

Hypothesis 1: Consumers' media consumption is associated with taking action to prevent household food waste.
In practice, these interventions employ various message slogans promoting food waste reduction, based on:

Guilt – Emotional appeals are an efficient approach in "green advertising" because they increase message attention in the complex media environment (Chang, 2012). Munsch (2021) suggests that emotive digital marketing and advertising communication can potentially capture the attention of Millennials and Generation Z.
While some research finds that food waste does not evoke high moral guilt feelings (Stancu, Haugaard, & Lähteenmäki, 2016), others suggest that guilt plays a crucial role in reducing food waste (Quested et al., 2013). This approach is manifested in campaigns "Love Food, Hate Waste", which gained international reach, adopted by hotel brands (ACCOR, 2019).

Saving hungry people – Wasting food means more people are hungry and is bad for the environment (Pearson & Perera, 2018). Limited research explores using campaigns and appeals directly connecting food waste reduction to saving hungry people. The UN SDGs extensively address this issue by promoting SDG 2 ('Zero Hunger') in campaigns. For example, Feeding America is promoted under"Hungry to help" (Feeding America, 2017). Macedonian non-governmental organizations are promoting a new food distribution system and encouraging household food donation through"All Fed Up" campaign.

Saving money – Emphasizing savings is highly effective to motivate people to reduce food waste (Neff et al., 2015; Pearson & Nefovski, 2019). Saving money may be stronger motivator of individuals' actions than environmental concerns (Bravi et al., 2019). People are motivated by self-interest in their food waste behaviour and that they see it less as pro-environmental behavior (Stancu et al., 2016).

Save the planet – Environmental concern is recognized as a significant motivator for individuals to engage in behaviors that minimize their environmental impact (Steg & Vlek, 2009). For example, "Love the Earth" campaign of Slow Food - a global grassroots organization, promotes sustainable agriculture to ensure access to good, clean, and fair food for all.

According to the above, the **Hypothesis 2** is**:** Motivational slogans are significantly related to taking action to consume the food in the household, thus reducing food waste.

Over the past decade, awareness campaigns have gained a significant presence in mainstream media, establishing themselves as leading instrument for food waste education (Soma, Li & Maclaren, 2020). "Green" advertising or marketing (Nwabueze, 2007), explores how advertising principles are applied by environmental organizations to ensure environmentally sustainable achievement of marketing objectives. Several studies investigate the relationship between media, food waste reduction and consumer segments, although research simultaneously focusing on all three factors is limited. Information is becoming more accessible including the environmental problems, thus becoming aware of how to help the planet, and in this particular case, how to reduce food waste (Giurea, 2015).

Based on key findings from existing literature, the **Hypothesis 3** is: Exposure to information regarding food waste in media significantly correlates with increased action to consume household food and reduce waste.

This research aims to identify consumer behaviour patterns related to media consumption and motivational slogan perception and their potential to encourage food waste reduction.

2. Methodology

To investigate the impact of media and promotion on reducing food waste, this research applied a methodology and a descriptive approach to analyze the primary data collected through a survey. To assess the individual influence of media and motivational messages on consumer behaviour regarding food waste reduction, an ordinal regression analysis was conducted. The analysis involves grouping variables related to the key thematic areas and examining their impact on consumers' willingness to take action against household food waste. The purpose of ordinal regression is to predict the probability that an individual will fall into a particular category of the dependent variable based on one or more independent variables (Havranek & Winter, 2011).

A survey was distributed through questionnaires, available online (via Google Forms) and in printed format to 141 respondents. A 112 respondents completed the survey (79.4% response rate). The questionnaire is divided into seven sections. Section one explores consumer attitudes, habits, and awareness regarding food waste; section two comprises a single question inquiring about respondents' estimated percentage of food waste from purchases; section three investigates respondents' general media consumption patterns; section four explores the potential of various media as a data source for understanding food waste issues; section five investigates the influence of motivational slogans; section six investigates consumer media consumption habits and explores how media use relates to personal behaviour and broader social issues; section seven collects the demographic data. This research builds upon several prior studies examining the effects of media, motivational messages and consumer awareness on food waste reduction (Neff, et al., 2015; Chinie et al., 2021).

The demographic data of respondents is shown in Table 1, reveals a predominance of female respondents (70%), which corresponds to other research in this field (Bilska et al., 2019; Karunasena et al., 2021).

Table 1: Demographic data

Demography	Frequency	%
Gender		
Male	35	31,3
Female	77	68,8
Age		

18-29	9	8,0
30-39	37	33,0
40-49	43	38,4
50-59	17	15,2
60-69	3	2,7
70+	3	2,7
Living situation		
Single	21	18,8
Married / informal marriage	85	75,9
Divorced / widowed	6	5,4
Education		
High school	16	14,3
Bachelor degree	66	58,9
Master or PhD	30	26,8
Monthly Income / in MKD		
1-18.000	1	0,9
18.001-36.000	28	25,0
36.001-54.000	34	30,4
54.001-72.000	16	14,3
72.001>	17	15,2
Don't know / Don't want to answer	16	14,3

Source: Authors' calculations

The age group 40-49 had the highest, while the 60+ the lowest response rate. The majority (75.9%) of respondents identified as married or in informal marriage and 58.9% having completed higher education.The highest number falls into category that reports a monthly net income 36,001 - 54,000 denars.

2.1. Descriptive analysis

A descriptive analysis identify general trends in consumer attitudes towards different types of statements presented in the paper (see Table 2).

Table 2: Level of agreement with statements by category

Personal attitudes towards food waste	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean Rank
I take action to be sure that the food in my household gets eaten and does not end up as waste.	9,8	0,9	7,1	32,1	**50,0**	4,12
I am interested in reading examples and recommendations for reducing food waste.	10,7	0,9	5,4	31,3	**51,8**	4,13
Likelihood of noticing food waste reduction information by medium	Not at all likely	Somewhat unlikely	Neutral	Somewhat likely	Very likely	Mean Rank
Television	15,2	8,9	27,7	**25,9**	22,3	3,31
Radio	17,0	17,0	21,4	**33,0**	11,6	3,05
Daily, weekly or monthly newspaper/ magazine	**29,5**	22,3	17,9	25,0	5,4	2,54
Web portal	4,5	5,4	17,0	**37,5**	35,7	3,95
Social network (Facebook, Instagram, TikTok, Twitter etc)	7,1	7,1	12,5	25,9	**47,3**	3,99
Motivational headlines	Not at all effective	Slightly effective	Neutral	Very effective	Extremely effective	Mean Rank
Save Money	4,5	5,4	19,6	33,0	**37,5**	3,94
Save the planet	2,7	3,6	15,2	**41,1**	37,5	4,07
Save Hungry People	2,7	2,7	5,4	30,4	**58,9**	4,4

Save Guilt	5,4	14,3	**32,1**	28,6	19,6	3,43

Source: Authors' calculations

Respondents reported an average of approximately 14.19% of food purchased for home consumption over past three purchases ended as waste. Although the result is approximate, it presents a relatively precise calculation since none of the respondents chose "over 50%" option. This observed food waste (14.19%) is lower than what some previous studies have reported (Yu & Jaenicke, 2020; Sridhar et al., 2021).

The highest number agree that they take action so that food in households is eaten and does not end up as waste. They are interested in reading recommendations in the media to reduce food waste, more receptive to information on social networks/internet portals compared to printed media.

Analysis suggests that slogan "Take care of hungry people" resonates most strongly as potential motivator for reducing food waste. "Save guilt" emerged as a less influential factor, with average score (mean) of 3.43, indicating a neutral attitude. Such results generally differ from the existing research, where primary motive for reducing food waste is "saving money" (Matzembacher et al., 2020).

2.2. Regression analysis

For the analysis, grouped variables with arithmetic mean of three clusters of questions were created. One group contains answers related to the respondents' exposure to media influence. The individually reported agreement on how regularly a particular medium is used (conventional and new media). The second section analyzes data collected through questions exploring the influence of frequently used motivational messages (slogans) on consumer behaviour related to household food waste reduction. The final set of grouped variables focuses on respondents' exposure to media messages about social issues.

The proportional odds model is a multivariate extension of generalized linear models, which allows the modelling of the probabilities associated with each response category under the effects of exogenous variables (Lemos et al., 2015). This model is most commonly used for ordinal variables (Alaimo et al., 2020) and one of the main assumptions of the proportional odds model for ordinal logistic regression is that the effects of predictors on the odds of

transitioning to a higher (vs. lower) category of dependent variable are the same across categories. To determine whether our model meets the conditions for further application, we use the Test of Parallel lines, which indicates the existence of non-significance (p=1.0) in the differences. A non-significant test result suggests the assumption of proportional odds is met, meaning the effects of the independent variables on the cumulative probability of falling into a higher category does not vary across categories on the dependent variable.

Table 3: Test of Parallel lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	224,453			
General	224,296[b]	,157[c]	9	1,000

Source: Authors' calculations

From SPSS data, the model shows improvement and fits with the value data, containing the independent variables represents a solid improvement in fit over the null model, LR $\chi^2(6) = 31.257$, $p<.050$.

Table 4: Model Fitting

Model	-2 Log Likelihood[a]	Chi-Square	df	Sig.
Intercept Only	262,066			
Final	230,809	31,257	3	,000

Source: Authors' calculations

This section presents the findings from the ordinal regression analysis.

Table 5: Parameter estimates

Parameters	Estimate	SD	Wald		Hypothesis Test			Exp (B)	Result:
			Lower	Upper	Wald X2	df	Sig.		
Media	1,341	0,3175	0,719	1,964	17,849	1	**0,000**	3,824	Accepted

Headlines	0,617	0,2933	0,042	1,192	4,421	1	**0,036**	1,853	Accepted
Engage (exposure)	-0,280	0,2983	-0,865	0,304	0,884	1	0,347	0,755	Rejected
(Scale)	1[a]								

Dependend Variable: I take action to be sure that the food in my household gets eaten and does not end up as waste.
Independend Variables: Media consumption, Motivational headlines, Engaging (exposure) with information about food waste
Source: Authors' calculations

Analysis shows that two hypotheses are statistically significant and reveals a significant positive association between frequency of exposure to media and motivational slogans and the respondents' willingness to reduce food waste in households. Exposure to information about food waste does not directly translate into a significant change in individual behavior regarding household food waste reduction.

The regression analysis indicates that for each increase in the "highest degree" unit, the chances of a person with higher degree falling to a higher category of willingness to take household actions to reduce food waste changes by a factor of 3.824. Since this number is higher than one, the chances of greater involvement in such activities are greater among those who agree that use the media (generally) and less among who use it less often. This indicates that individuals who receive regular media exposure are more likely to express willingness to engage in activities to reducing household food waste. Our analysis confirms that Hypothesis 1 holds true, with statistically significant results (P=0,000), consistent with previous research focusing on impact of social media on changing consumer behaviour regarding food waste, which found a significant correlation (Young et al., 2017). In contrast, research by Elhoushy (2022) suggests that increased television viewing of cooking shows might contribute to food waste.
As the influence of individual motivational slogans increases, the probabilities change by a factor of 0.617, or basically, the odds increase. The dependent variable will belong to a higher category, or in context of our research, the reported willingness in activities that would affect eating all the food will increase, respectively the percentage of generated food waste in households will decrease. The results obtained about motivational headlines confirm

Hypothesis 2 of the research (P<0,050). The findings align with prior research, which suggests that heightened awareness of food waste issues leads to a stronger resolve (seriousness) and a greater belief in one's ability (self-efficacy) to reduce food waste (Jang & Lee, 2022). Examining the influence of motivational messages, Khalil et al. (2021) discovered that specific numerical messages significantly impacted consumers' willingness to reduce food waste. Our analysis did not find a statistically significant result between the third group of variables and the outcome. The findings suggest that exposure to media messages concerning social issues does not directly influence individual actions to reduce household food waste. Accordingly, Hypothesis 3 is rejected as statistically not significant (P=0.347).

Conclusion

This paper investigates the potential of media and promotional campaigns to trigger household-level action on food waste reduction based on insights gained from a survey of 112 participants. The findings point to growing urgency to address this global challenge, highlighting the potential of strategic communication efforts.

The key contribution lies in the empirical findings, demonstrating that exposure to media and use of motivational slogans can influence consumers' willingness to reduce food waste. It underscores the power of strategically designed media campaigns to nudge consumer behaviour towards reducing food waste.

The research establishes that promotional campaigns through media can effectively motivate individuals to take action against food waste. Future research should prioritize investigating the sustained efficacy of media strategies. By scaling up these approaches to a broader societal level, we can generate tangible contributions towards a more sustainable food system.

The limited sample size necessitates further research with larger sample and more balanced distribution of respondents across gender and age groups. The research is focused on self-reported intentions, so future research could benefit from incorporating objective measurement alongside actual food waste behaviour.

The findings still point towards significant potential of media and promotional efforts in tackling the food waste issue. Leveraging the power of strategic communication and engaging diverse populations can propel us towards a more sustainable future where food is valued and waste is significantly reduced.

References

1. ACCOR. (2019). OUR 9 COMMIMENTS BY END 2020 - for healthy and sustainable food, https://group.accor.com/-/media/Corporate/Commitment/PDF-for-pages/Planet-21/Alimentation/2019_Food-Charter.pdf
2. Alaimo, L. S., Fiore, M., & Galati, A. (2020). How the COVID-19 pandemic is changing online food shopping human behaviour in Italy. Sustainability, 12(22), 9594.
3. Aschemann-Witzel, J., de Hooge, I., Amani, P., Bech-Larsen, T., & Oostindjer, M. (2015). Consumer-related food waste: Causes and potential for action. Sustainability (Switzerland).
4. Bilska, B., Tomaszewska, M., & Kołożyn-Krajewska, D. (2019). Analysis of the behaviors of polish consumers in relation to food waste. Sustainability, 12(1), 304.
5. Bravi, L., Murmura, F., Savelli, E., & Viganò, E. (2019). Motivations and actions to prevent food waste among young Italian consumers. Sustainability (Switzerland), 11(4), 1–23.
6. Cantaragiu, R. (2019). The impact of gender on food waste at the consumer level. Studia Universitatis Vasile Goldiş, Arad-Seria Ştiinţe Economice, 29(4), 41-57.
7. Chang, C. T. (2012). Are guilt appeals a panacea in green advertising? The right formula of issue proximity and environmental consciousness. International Journal of Advertising.
8. Chinie, C., Biclesanu, I., & Bellini, F. (2021). The impact of awareness campaigns on combating the food wasting behavior of consumers. Sustainability, 13(20), 11423.
9. Clayton, S., Devine-Wright, P., Swim, J., Bonnes, M., Steg, L., Whitmarsh, L., & Carrico, A. (2016). Expanding the role for psychology in addressing environmental challenges. American Psychologist.
10. Clement, J., Alenčikienė, G., Riipi, I., Starkutė, U., Čepytė, K., Buraitytė, A., ... & Šalaševičienė, A. (2023). Exploring causes and potential solutions for food waste among young consumers. Foods, 12(13), 2570.
11. de Hooge, I. E., Oostindjer, M., Aschemann-Witzel, J., Normann, A., Loose, S. M., & Almli, V. L. (2017). This apple is too ugly for me!: Consumer preferences for suboptimal food products in the supermarket and at home. Food Quality and Preference.
12. Elhoushy, S. (2022). To taste not to waste: Can exposure to TV cooking shows cultivate food waste reduction?. Journal of Consumer Behaviour, 21(4), 713-727.

13. Flanagan, K., Clowes, A., Lipinski, B., Goodwin, L., & Swannell, R. (2018). SDG Target 12.3 on food loss and waste: 2018 progress report. An annual update on behalf of Champions 12.3. Champions 12.3.
14. Giurea, A. M. (2015). Proximity Market, the New Trend Approved by the Consumer's Behavior. International Journal of Economic Practices & Theories, 5(5).
15. Havranek, T. A., & Winter, S. J. (2011). Estimating ordinal regression models with latent variables: A comparison of three approaches. Political Analysis, 19(1), 1-22.
16. Jang, H. W., & Lee, S. B. (2022). Protection Motivation and Food Waste Reduction Strategies. Sustainability, 14(3), 1861.
17. Karunasena, G. G., Ananda, J., & Pearson, D. (2021). Generational differences in food management skills and their impact on food waste in households. Resources, Conservation and Recycling, 175, 105890.
18. Khalil, M., Septianto, F., Lang, B., & Northey, G. (2021). The interactive effect of numerical precision and message framing in increasing consumer awareness of food waste issues. Journal of Retailing and Consumer Services, 60, 102470.
19. Lee, S., & Jung, K. (2017). Exploring effective incentive design to reduce food waste: A natural experiment of policy change from community based charge to RFID based weight charge. Sustainability (Switzerland).
20. Lemos, T. D. O., Rodrigues, M. D. C. P., De Lara, I. A. R., De Araújo, A. M. S., De Lemos, T. L. G., Pereira, A. L. F., & De Paula, L. V. T. (2015). Modeling the acceptability of cashew apple nectar brands using the proportional odds model. Journal of Sensory Studies, 30(2), 136-144.
21. Linder, N., Lindahl, T., & Borgström, S. (2018). Using behavioural insights to promote food waste recycling in urban households-evidence from a longitudinal field experiment. Frontiers in Psychology, 9(MAR).
22. Matzembacher, D. E., Brancoli, P., Maia, L. M., & Eriksson, M. (2020). Consumer's food waste in different restaurants configuration: A comparison between different levels of incentive and interaction. Waste Management, 114, 263-273.
23. Munsch, A. (2021). Millennial and generation Z digital marketing communication and advertising effectiveness: A qualitative exploration. Journal of Global Scholars of Marketing Science, 31(1), 10-29.
24. Neff, R. A., Spiker, M. L., & Truant, P. L. (2015). Wasted food: U.S. consumers' reported awareness, attitudes, and behaviors. PLoS ONE, 10(6), 1–16.
25. Nwabueze, C. (2007). Environmental communication: Perspectives on

green communication and information management. Enugu: Daisy.
26. Pearson, D., & Nefovski, S. (2019). Food waste reduction message appeals and media sources for consumers in Australia: an exploratory study. International Food Marketing Research Symposium. Sippy Downs: Institute of Food Products marketing.
27. Pearson, D., & Perera, A. (2018). Reducing Food Waste: A Practitioner Guide Identifying Requirements for an Integrated Social Marketing Communication Campaign. Social Marketing Quarterly.
28. Quested, T. E., Marsh, E., Stunell, D., & Parry, A. D. (2013). Spaghetti soup: The complex world of food waste behaviours. Resources, Conservation and Recycling, 79, 43-51.
29. Sala, S., Castellani, V. (2019). The consumer footprint: Monitoring sustainable development goal 12 with process-based life cycle assessment. Journal of Cleaner Production.
30. Soma, T., Li, B., & Maclaren, V. (2020). Food waste reduction: A test of three consumer awareness interventions. Sustainability, 12(3), 907.
31. Sridhar, A., Kapoor, A., Kumar, P. S., Ponnuchamy, M., Balasubramanian, S., & Prabhakar, S. (2021). Conversion of food waste to energy: A focus on sustainability and life cycle assessment. Fuel, 302, 121069.
32. Stancu, V., Haugaard, P., & Lähteenmäki, L. (2016). Determinants of consumer food waste behaviour: Two routes to food waste. Appetite.
33. Stangherlin, I. do C., & de Barcellos, M. D. (2018). Drivers and barriers to food waste reduction. British Food Journal.
34. Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. Journal of Environmental Psychology.
35. Wansink, B. (2018). Household Food Waste Solutions for Behavioral Economists and Marketers. Journal of Food Products Marketing.
36. Yamakawa, H., Williams, I., Shaw, P., & Watanabe, K. (2017). Food Waste Prevention: Lessons From the Love Food, Hate Waste Campaign in the Uk. (December 2018). Sardinia: Sixteenth International Waste Management and Landfill Symposium.
37. Young, W., Russell, S. V., Robinson, C. A., & Barkemeyer, R. (2017). Can social media be a tool for reducing consumers' food waste? A behaviour change experiment by a UK retailer. Resources, Conservation and Recycling, 117, 195–203.
38. Yu, Y., & Jaenicke, E. C. (2020). Estimating food waste as household production inefficiency. American Journal of Agricultural Economics, 102(2), 525-547.