Article

Decision Tree Analysis of Sustainable and Ethical Food Preferences of Undergraduate Students of Gastronomy and Culinary Arts

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Abstract: The increase in the world's population is driving consumption, leading to the rapid destruction of natural resources and thus raising concerns about the future state of resources. Agriculture and livestock activities, which can be considered under the heading of food, are one of the most significant factors having effects on sustainability. Animal welfare and ethical food selection have become important issues along with sustainability as people's awareness has increased. As restaurants are an important part of the food industry, chefs have the power to influence sustainability and ethical food choices and set trends with the choices they make. In this respect, it is important to predict the sustainable and ethical food preferences of gastronomy and culinary arts (GCA) undergraduate program students who have the potential to become the chefs of the future, and to evaluate to what extent they regard chefs as responsible for these issues. In this study, the data obtained from GCA undergraduate students were analysed with the decision tree method using lavaan and rpart packages in the R program. The main objectives of this research are to determine the importance of the independent variables in the decision tree classification and the effects of these independent variables. The analysis suggests that the most important factor in the decision tree classification of the independent variables is the attitude towards sustainable food choice. It is concluded that the independent variables are effective in classifying students as high and low in terms of behavioural intention. It is also seen that attitude towards sustainable food choice is more effective in predicting whether behavioural intention is high or low.

Keywords: ethical food choice; gastronomy; chef; R programme; sustainability; education; culinary; cooking schools

1. Introduction

The world population continues to grow rapidly and is expected to reach approximately 9 billion people by the mid-century [1]. The growth of population increases the demand for food, putting pressure on the entire supply chain, especially on food suppliers such as producers of processed foods, meat, milk, and fish. Suppliers are increasingly competing over the use of resources such as land, water, and energy [2]. These competing natural resources are used within the supply chain to produce food as well as transportation, packaging, and consumption, resulting in greenhouse gases [3]. Three of the greenhouse gases—carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)—which are among the main drivers of global warming and climate change, are associated with agricultural activities [4]. Greenhouse gas emissions from the agricultural sector account for about 22% of total global emissions. The percentages are equivalent to industrial production emissions and even higher than the transportation sector. Livestock production (including feed transportation) accounts for about 80% of sector emissions [5,6]. Greenhouse gases are not

the only negative output of food production. Packaging waste generated after processing and consuming food products is also a significant problem for the environment [7]. Thus, efforts to reduce the environmental damage caused by agriculture and livestock production have emerged as an important issue.

Today, the increasing awareness of people has led to some ethical concerns as well as environmental concerns on food-related issues. Consumers with ethical behaviours are more concerned with environmental issues, sustainability, labour rights, country of origin, fair trade, and animal welfare [8]. Crane and Matten (2004) define ethical consumerism as "making conscious and deliberate consumption choices based on personal and moral beliefs" [9]. Thereafter, ethical consumers make their consumption decisions to satisfy their moral values and environmental protection simultaneously.

Most of the time, it can be thought that changes made by an individual's life alone in terms of protecting the environment and prioritizing ethical values will be ineffective. However, simple changes in every individual lifestyle such as bicycling to work, making small changes in diet, or contributing to recycling will have a positive contribution to protecting the environment [10]. Although they are supposed to be making their own decisions, restaurant chefs have the potential to influence people. Chefs are intermediaries who create demand for new eating habits by offering new menus based on the cultural characteristics of foods, flavors, and biodiversity [11]. The rise of gastronomy, which is also described as "the art of living" [12], and the restaurant industry [13], which has shown significant development all over the world, has led to the need for well-trained professionals to work in these restaurants; thus, culinary training schools have been opened to supply qualified chefs [14]. The youngsters studying gastronomy and culinary arts at universities or other private institutions are the chefs of the near future, and they are the key stakeholders in changing consumer food preferences and positively transforming food processing systems [15]. However, these schools mainly provide training in culinary skills, and ethical issues are not sufficiently covered in the curricula [16]. It is important to provide training to support chefs in making decisions on sustainability and ethics because they often have to make ethical decisions regarding their work [17]. The growing interest in gastronomy and the increasing popularity of chefs have enabled them to influence public opinion, corporate interests, and government policies on issues such as nutrition and sustainability [18]. Chefs can change consumer behaviour by preparing delicious plates with sustainable choices [19]. Gourmet chefs are more engaged with food production systems and find it more valuable to purchase local food [20]. Moreover, recent research shows that consumers are willing to pay more for local products [21]. The increasing number of vegetarians direct public interest in animal welfare, which is also of growing interest as well as sustainability. In addition, since political and religious factors play an undeniable role in food preferences, it is considered that ethical food preferences ought to be studied in detail [22].

It is important to research the attitudes and intentions of gastronomy and culinary arts students, who are currently considered to be insufficiently educated on food ethics and sustainability and who have the potential to influence society on sustainability and ethical food preferences in the upcoming future. For this reason, to take more deliberately planned steps, it is important to measure the attitudes and intentions of gastronomy and culinary arts students, as the chefs of the near future, towards sustainable and ethical food preferences and to research how they perceive the role and responsibilities of chefs.

2. Literature Review

2.1. Sustainable Nutrition

In recent years, the growing interest in sustainable food and sustainable consumption has been the subject of many studies [23–25]. The growth in the world population and a rise in prosperity level are expected to strongly increase the demand for food [26]. Production and consumption of food, like all human activities, contribute to certain environmental problems such as climate change, water pollution, water scarcity, soil degradation, and

biodiversity loss. Furthermore, food production is responsible for one-fifth of greenhouse gas emissions [23]. Therefore, to prevent future problems, the world must switch to a more sustainable nutrition system. Sustainable nutrition is defined by the Food and Agriculture Organization, FAO, (2010) as: "Sustainable diets are those diets with low environmental impacts which contribute to food and nutrition security and healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy, while optimizing natural and human resources" [27].

Food product supplies are one of the main sources reflecting the environmental impact of a restaurant [28]. In addition, restaurants are one of the places where food waste is inevitable, which is one of the sources of environmental problems [29]. The food service industry is known as the third largest source of food waste. One of the seven indicators of a sustainable restaurant is the menu offered [30]. Chefs can contribute to sustainable consumption with the choices they make and the products they use while creating their menus, and, at the same time, they can show their creativity while providing their customers an experiential pleasure. Creativity and the ability to create new dishes with carefully selected ingredients are essential components of gastronomy [19]. Restaurant chefs are important decision-makers in sustainable and ethical menu planning and reducing the negative environmental impacts of the restaurant, as they have a say in planning issues such as determining the menu and the selection of ingredients. Generation Y, also known as millennials who are born between 1981 and 2005 [31,32], is an important stakeholder in the restaurant industry due to their purchasing and influencing power [33]. Therefore, it is important to determine the attitudes and intentions of this generation, who both work in the sector and receive services from restaurants as customers, regarding sustainable and ethical food choices.

2.2. Ethical Food Preferences

The concept of the ethical consumerism approach, which has been on the rise in recent years, includes sustainability, environmental factors, fair trade, animal welfare, country of origin, health, and other concepts related to individual value judgments. Consumers with an ethical focus feel a responsibility towards both the environment and society and try to express the ethical values they stand for through their purchasing behaviour decisions [8]. Chefs have the power to influence society's ethical food preferences because they have a high potential to influence people both through their own purchasing behaviour decisions and the products they offer. To create an ethical food culture, chefs need to develop innovative and creative solutions by utilizing biodiversity [34]. Due to their increasing social status in society and their potential to influence others, it is important to increase chefs' ethical awareness [35]. A good example is British chef Jamie Oliver. Jamie Oliver and celebrity chefs like him are highly influential in raising ethical food awareness through the media [36].

For the reasons stated, it is important to measure the attitudes towards ethical food selection and intentions to act ethically in business life in the food selection of gastronomy and culinary arts students, who will be the chefs in the near future. Within the framework of the general purpose determined, the following research questions were sought to be answered:

1. What is the order of importance of independent variables in classifying the behavioural intentions of gastronomy and culinary arts undergraduate program students towards sustainable and ethical food choices?
2. What is the effect of the independent variables of sustainable food choice, ethical food choice, and perceived role and responsibility of chefs on the formation of behavioural intentions of gastronomy and culinary arts undergraduate program students towards sustainable and ethical food choice?

3. Materials and Methods

The research was conducted in Antalya province, which is a very popular touristic destination in Türkiye. In December 2022, the number of tourists arriving was 13,299,307 [37]. There are nearly 1000 hotels and many restaurants in Antalya [38]. This makes the city attractive in terms of job potential for gastronomy and culinary arts students and graduates. Since the attitude of the chefs towards sustainable and ethical food selection is thought to have an effect on their consumption and purchasing behaviours in a touristic city with a high tourism potential, the study was carried out in Antalya.

The data were collected using a questionnaire form consisting of both demographics and dependent and independent variables of the study. The items were adapted from previous studies. The items capturing attitudes towards sustainable food preferences were adapted from Muresan et al. (2021) [39] (8 items), the items on attitudes towards ethical food preferences were adapted from Lindeman and Väänänen (2000) [22] (11 items), the items capturing the perceived role and responsibility of chefs were adapted from Bertoldo et al. (2021) [40] (6 items), and the items on behavioural intention were adapted from Aslan (2019) [41] (3 items). All studies were originally conducted in English except for the study in which the behavioural intention scale was taken. For this reason, the statements in the original scales were translated into Turkish by a linguist who has studied in the field of gastronomy and culinary arts. The Turkish statements were then translated into English by a second linguist to double-check the statements. The questionnaire form can be found in Appendix A.

The questionnaire form was designed to prevent common method bias, which has a high risk potential in the field of social sciences [42], so it was carried out online to the students of three different universities with gastronomy and culinary arts departments in Antalya. Online surveys are one of the most widely used data collection tools today due to their fast response rate and cost effectiveness [43]. Participation in the survey was entirely voluntary. Survey data were collected in August 2022. A total of 365 questionnaires were obtained. Based on the evaluation of the control question in the questionnaire, 32 invalid questionnaires were eliminated and a final sample size of 333 was reached.

The Likert type 5-point scale (1—Strongly disagree, 5—Strongly agree) was used. An index value is calculated by summing up item scores for each dimension, which means that the Likert type scale is transformed into a continuous scale. In this study, in order to determine the attitudes of gastronomy and culinary arts students towards sustainable and ethical foods and to evaluate the extent to which they perceive chefs as responsible for sustainability and ethical food selection, the effects of attitudes towards sustainable food selection, attitudes towards ethical food selection, and the perceived role and responsibility of chefs on behavioural intention were analysed by the decision tree method. Decision trees have several advantages over classical regression methods in terms of both speed and results. They are computationally efficient and can be parallelized. Additionally, decision trees can handle categorical input variables, whereas linear regression requires all input variables to be continuous.

3.1. Validity and Reliability

Attitudes towards sustainable food choice (SFC). In this study, eight items were included in the analysis, and the reliability coefficient of the scale was calculated as 0.889. Confirmatory factor analysis (CFA) was conducted to examine the factor structure of the 8-item-unidimensional factor structure, and the model fit indices calculated (χ^2/sd = 4.2, RMSEA = 0.098, CFI = 0.999, MFI = 0.937, $p < 0.001$) suggest strong evidence for the validity of the measurement tool [44] (See Table 1) (CFI (comparative fit indices), MFI = McDonald's fit index, RMSEA = root mean square error of approximation). "RMSEA is an absolute fit index, in that it assesses how far a hypothesized model is from a perfect model. On the contrary, CFI and TLI are incremental fit indices that compare the fit of a hypothesized model with that of a baseline model (i.e., a model with the worst fit)" [45]. MFI or McDonald's (1989) centrality index is an alternative measure of goodness-of-fit,

based like Akaike's on the noncentrality parameter. MFI typically lies within the zero-to-1 range; similar to the chi-square statistic, it favours complex models [46].

Table 1. Factor loadings for attitude towards sustainable food choices scale.

							95% CI	
Factors	**Items**	**Abbrev.**	**Prediction**	**St. Err.**	**z-Value**	***p***	**Low**	**High**
	SFC1	$\lambda 11$	0.679	0.022	30.633	<0.001	0.635	0.722
	SFC2	$\lambda 12$	0.873	0.017	52.186	<0.001	0.840	0.906
	SFC3	$\lambda 13$	0.897	0.016	55.796	<0.001	0.865	0.928
	SFC4	$\lambda 14$	0.795	0.018	44.906	<0.001	0.760	0.830
Factor 1	SFC5	$\lambda 15$	0.800	0.017	47.704	<0.001	0.767	0.833
	SFC6	$\lambda 16$	0.678	0.021	32.794	<0.001	0.638	0.719
	SFC7	$\lambda 17$	0.796	0.018	43.064	<0.001	0.760	0.832
	SFC8	$\lambda 18$	0.818	0.019	44.133	<0.001	0.781	0.854

SFC: Sustainable food choice.

Attitudes towards ethical food choice (EFC). The EFC scale was composed of 11 items under 4 dimensions. The reliability coefficient was calculated as 0.918. Confirmatory factor analysis was conducted to test the factor structure of the scale. The model fit indices calculated (χ^2/sd = 5.42, RMSEA = 0.115, CFI = 1.000, TLI = 1.000, $p < 0.001$) suggest strong evidence for the validity of the results obtained from the measurement tool [44]. The four dimensions of the scale are animal welfare (AW), environmental protection (EP), political values (PV), and religion (R), as indicated in Table 2.

Table 2. Factor loadings of the scale for attitudes towards ethical food choice.

							95% CI	
Factors	**Items**	**Abbrev.**	**Prediction**	**Standard Error**	**z-Value**	***p***	**Low**	**High**
Factor 1	AW9	$\lambda 11$	0.969	0.007	136.921	<0.001	0.956	0.983
	AW10	$\lambda 12$	0.983	0.007	136.921	<0.001	0.969	0.997
	EP11	$\lambda 21$	0.996	0.005	195.58	<0.001	0.986	1.006
Factor 2	EP12	$\lambda 22$	0.964	0.005	183.348	<0.001	0.954	0.975
	EP13	$\lambda 23$	0.980	0.005	191.745	<0.001	0.970	0.990
	PV14	$\lambda 31$	0.837	0.013	64.536	<0.001	0.812	0.862
Factor 3	PV15	$\lambda 32$	0.920	0.012	77.315	<0.001	0.897	0.944
	PV16	$\lambda 33$	0.888	0.013	69.544	<0.001	0.863	0.913
	PV17	$\lambda 34$	0.703	0.017	41.084	<0.001	0.670	0.737
Factor 4	R18	$\lambda 41$	0.999	0.038	26.455	<0.001	0.925	1.073
	R19	$\lambda 42$	1.000	0.038	26.455	<0.001	0.926	1.074

AW: Animal welfare; EP: Environmental protection; PV: Political values; R: Religion.

Perceived Role and Responsibility of Chefs (RROC). RROC was captured by six items under two dimensions; the reliability coefficient of the scale was calculated as 0.930. Confirmatory factor analysis was conducted to test the factor structure of the scale. The model fit indices calculated (χ^2/sd = 6.1, RMSEA = 0.849, CFI = 0.999, TLI = -0.998) suggest strong evidence for the validity of the results obtained from the measurement tool [44]. As a result of the analysis, two factors were identified as the responsibility of the chefs (RES) and the role of the chefs (ROC), as tabulated in Table 3.

3.2. Data Analysis

The data were first transferred to the Excel program and made readable by the R program. Then, lavaan and rpart packages were used for basic analysis. The lavaan package was developed to provide researchers with a free open-source package for latent variable modelling. Lavaan can be used to estimate a wide range of multivariate statistical models, including path analysis, confirmatory factor analysis, structural equation modeling,

and growth curve models. Rpart builds classification or regression models of a very general structure using a two-step procedure; the resulting models can be represented as binary trees. The package implements the ideas proposed by Breiman et al. (1983) [47], known as CART (classification and regression trees). These packages can be run through JASP in addition to the R statistical program. The decision tree method, one of the classification algorithms in JASP version 0.16.3 and the machine learning module, was preferred. As mentioned before, this analysis works with the scripts in the rpart package. The basic step in algorithms for building decision trees is the splitting step, where the decision is made on how to split the instance (or sub-sample for nodes below the root) into two disjoint subsets based on their covariate values. The splits below a node are represented as branches in the tree. Splitting continues recursively at each branch until a stopping rule is triggered. A node where a stopping rule is satisfied is called a leaf or terminal node. Taken together, terminal nodes define a disjoint part of the original sample; each observation belongs to exactly one terminal node, depending on its covariates. A prediction for the outcome of a new observation is made by determining which leaf it belongs to (based on the covariates of that observation) and then combining the results of existing observations in that leaf to obtain a predicted value.

Table 3. Factor loadings of the scale on the perceived role and responsibility of chefs.

Factors	Items	Abbrev.	Prediction	Standard Error	z-Value	p	95% CI	
							Low	High
	RES20	$\lambda 11$	0.957	0.012	77.282	<0.001	0.933	0.982
Factor 1	RES21	$\lambda 12$	0.959	0.012	77.001	<0.001	0.934	0.983
	RES22	$\lambda 13$	0.869	0.015	58.175	<0.001	0.840	0.899
	ROC23	$\lambda 21$	0.951	0.010	91.087	<0.001	0.930	0.971
Factor 2	ROC24	$\lambda 22$	0.971	0.010	93.287	<0.001	0.950	0.991
	ROC25	$\lambda 23$	0.903	0.011	83.208	<0.001	0.881	0.924

RES: Responsibility of chef; ROC: Role of chef.

3.3. Findings

3.3.1. Demographic Data

In total, 42.3% (n = 141) of the participants that answered the questionnaire form were female and 57.7% were male (n = 192). Another finding obtained in the research in terms of demographics was the participants' grade: 18.6% were first-year university students; 25.2% were second-year university students; 27.3% were third-year university students; and 28.8% were fourth-year university students. The research also showed that 27% of the participants allocated 25 dollars and below for food and beverage expenditures; 36.6% of the participants allocated 25–49 dollars for food and beverage expenditures; 19.8% of the participants allocated 50–74 dollars for food and beverage expenditures; 7.2% of the participants allocated 75–99 dollars for food and beverage expenditures; 4.2% of the participants allocated 100–124 dollars for food and beverage expenditures; and 5.1% of the participants allocated 125 dollars and above for food and beverage expenditures. The experience of the participants working in the kitchen was evaluated and it was found out that although the participants were university students, just 17.1% of the participants did not have any experience working in the kitchen. Additionally, 31.5% of them had 0–6-months of experience; 14.7% of them had 7–11 months of experience; 19.2% of them had 1–3 years of experience; and 17.4% had more than 3 years of experience in the kitchen. This finding is in parallel with the grade of the students.

3.3.2. Decision Tree Classification

In the decision tree analysis, 80% of the data was used for training and 20% for testing [48]. When the analysis findings are examined, it is seen that the test accuracy score of the model is 0.924. It is also seen that the data are classified as 267 (training) and 66 (test) observations.

When the "confusion matrix" is shown in Table 4, where the test accuracy score can be observed more clearly, it is seen that those whose behavioural intention is below the average score are predicted more accurately.

Table 4. Confusion matrix.

		Predicted	
		High	**Low**
Observed	High	26	2
	Low	3	35

Table 5 shows that the performance values are appropriate for the research. The evaluation metrics suggest that 66 cases are used for testing. The accuracy rate is calculated as 92.4%, F1 score as 0.924, Mathews correlation coefficient as 0.846, and area under curve (AUC) as 0.925, all suggesting acceptable values.

Table 5. Evaluation metrics.

	Average/Total
Support	66
Accuracy	0.924
F1 Score	0.924
Matthews Correlation Coefficient	0.846
Area Under Curve (AUC)	0.925
Sensivity	0.897
Spesivity	0.946

Considering the attribute importance values in Table 6, it is observed that SFC is the most important attribute in the model. This shows that an attitude towards sustainable food choice is more effective in predicting whether the behavioural intention is high or low.

Table 6. Feature importance.

	Relative Importance
SFC	38.300
RROC	32.875
EFC	28.825

SFC: Sustainable food choice; RROC: Role and responsibility of chef; EFC: Ethical food choice.

Based on the average of the scores calculated for behavioural intentions, behavioural intentions are divided into two categories: high and low. Figure 1 shows the model created using the training set.

When Figure 1 is examined, the branches to the right indicate the predictors of the low level and the branches to the left indicate the predictors of the high level. The first node divides responses to sustainable food selection with lower scores than <0.435 and equal and higher than ≥0.435; in the second level node, RROC scores lower than <0.312 and equal and higher than ≥0.312 divides the remaining 66 predicted respondents with high behavioural intention. Similarly, SFC scores higher than a standard deviation above ≥0.435 are divided into two branches based on RROC scores lower than 0.312, suggesting two groups are available to predict behavioural intention. In this node, RROC divides the respondent into two subbranches, with average scores of <0.152 and ≥0.152. If the scores of the respondents to the perceived role and responsibility of the chefs were above 0.152, it was successful in predicting the low behavioural intention group. If the standard deviation is below 0.152, the third node, attitude towards ethical food choice, divides the respondents into those with scores below 0.70 and successfully predicts the group with high behavioural intention.

In the same node, scores above 0.747 successfully predict the group with low behavioural intention. Based on the scores of their responses to attitudes toward sustainable food selection, those whose standard deviation was below 0.435 and whose responses to the perceived role and responsibility of chefs deviated from the average of 0.312 (n = 115) were successful in estimating the group with low behavioural intent. In the same node, those with a standard deviation of less than <−0.394 based on the attitude towards ethical food choice score were also successful in predicting the low behavioural intention group. Those with a standard deviation of more than ≥−0.394 on the attitude towards ethical food choice can be analysed in two branches. In this node, if the scores calculated for the perceived role and responsibility of the chefs are below <0.70 (n = 9), the respondents are predicted as a high behavioural intention group. In the same node, if those scores calculated for the perceived role and responsibility of the chefs are above ≥0.713 (n = 29), respondents are successfully predicted as the group with low behavioural intention.
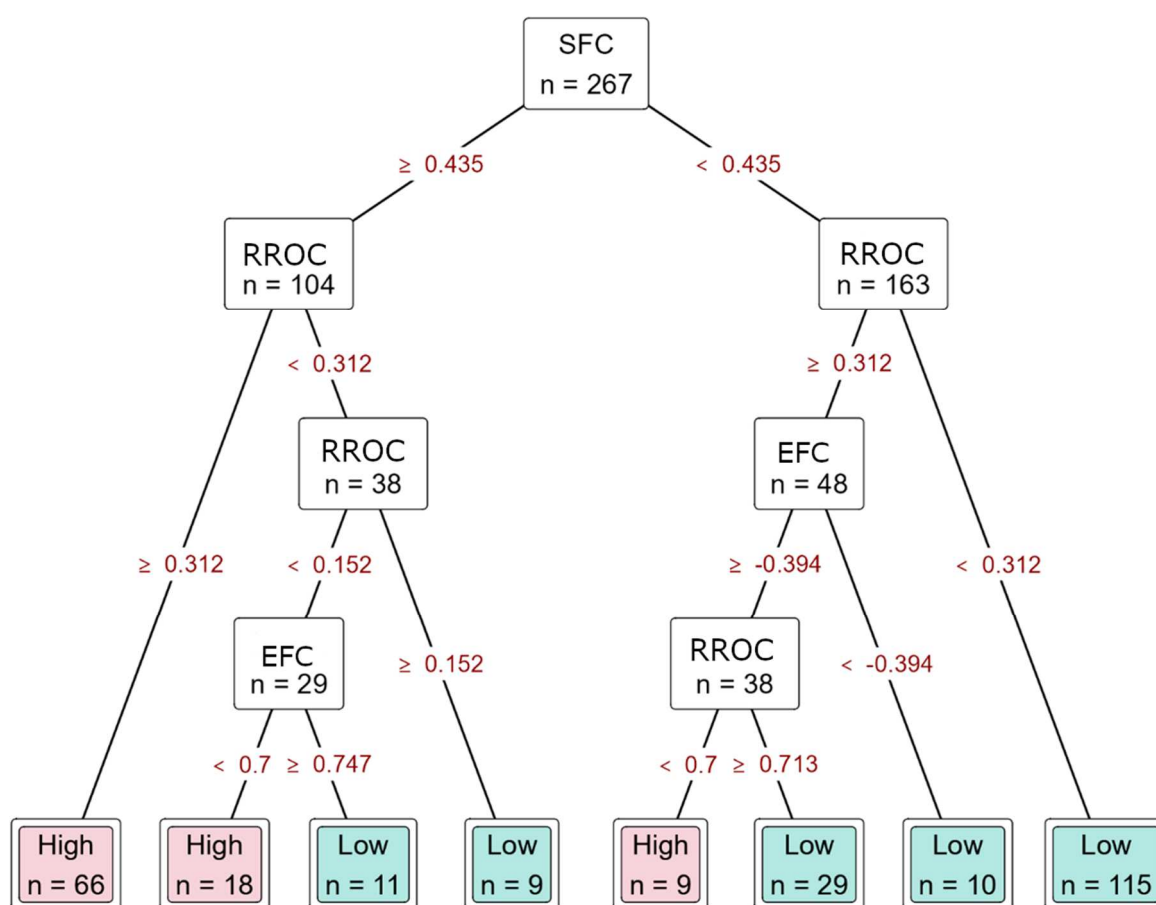
Figure 1. Estimating behavioural intent with the decision tree. SFC: Sustainable food choice; RROC: Role and responsibility of chef; EFC: Ethical food choice.

4. Conclusions

Commercial concerns are an important factor in determining the menus of businesses. However, chefs have the potential to influence customer preferences, and therefore restaurant menus, by presenting delicious and visually appealing products using sustainable ingredients. It is shown that using healthier and more sustainable ingredients can provide a competitive advantage, especially in fast food and fine dining restaurants [49]. Marketing and gaining competitiveness through sustainable menus can enable the reduction of commercial concerns. In addition, as chefs are able to be more flexible, especially in independent restaurants, they can include more local and sustainable products in their menus. Telling the stories of products can also create a competitive advantage in another way by

influencing customers and positively affecting their intention to revisit [50]. By incorporating underutilized and traditional products into their dishes, chefs can help show how important diversity is in creating a more sustainable and equitable food system [51]. Recently, chefs have been involved in sustainable, ethical, and socially beneficial projects [52]. Moreover, important organizations such as the United Nations are collaborating with chefs to achieve sustainable development goals through food [53].

This suggests that chefs have the potential to influence society and choices about sustainable and ethical food. The fact that gastronomy has become an increasingly popular concept leads to the increasing popularity and prestige of the culinary profession [54]. This popularity leads to more media coverage of chefs. TV shows and celebrity chefs can inform, educate, and inspire their audience to make more environmentally friendly and sustainable food choices. They can provide guidance on how to produce less food waste or how to utilize leftovers and waste products [55]. Chefs reach many people through their social media accounts and can influence people and raise awareness on various issues through their posts. It is thought that the awareness of sustainable and ethical nutrition in society will affect consumer preferences over time and chefs will plan restaurant menus accordingly. For this reason, it is important that gastronomy and culinary arts students, who will be part of the food system in the future and have the potential to influence society with their choices, have sufficient knowledge and skills about sustainable and ethical food. Currently, the concepts of sustainable and ethical food are underrepresented in the curricula. It is important to determine the intentions of gastronomy and culinary arts undergraduate program students, who will be in decision-making positions in the future food system, regarding sustainable and ethical food and to understand to what extent they find chefs responsible and effective in this regard. Indeed, some studies show that young people attach great importance to concepts such as organic food, local food, ethical, environmental, and social impacts of food choices, decision-making ability, and creativity, which are very important for a chef [56,57].

The first sub-problem of this research aims to investigate the effects of the independent variables on the behavioural intentions of gastronomy and culinary arts undergraduate program students towards sustainable and ethical food preferences, to determine the importance levels of the independent variables in the decision tree classification. Results of the research suggest that the order of importance is the attitude towards sustainable food choice, the perceived role and responsibility of chefs, and the attitude towards ethical food choice. According to this result, it is seen that attitude towards sustainable food choice is more effective in predicting behavioural intention as high or low. Since chefs have an influencing power over both producers and consumers, they have the potential to affect the entire food system by making sustainable food choices [19]. For this reason, sustainability should be included more in the curriculum of gastronomy and culinary arts students, who will be the chefs of the future, in order to increase their awareness of this issue in terms of their future food choices. The second question of the study aims to determine the effects of the independent variables. It was found that the independent variables of sustainable food choice, ethical food choice, and perceived role and responsibility of chefs had a significant effect on behavioural intention toward sustainable and ethical food choice. It is concluded that these three independent variables are effective in classifying students as high and low in terms of behavioural intention.

This study examines the important role of future chefs in the evolvement of sustainable food systems, who will be responsible to choose sustainable and ethical food when they enter the profession, which is the contribution of this paper to the current literature considering the small number of studies on this subject. Based on the findings of the Turkish sample, it is suggested that providing more courses on sustainable and ethical food choices in undergraduate schools or integrating related topics into existing courses will make significant contributions to the evolvement of sustainable food systems and help the sustainability of both humanity and the environment. Therefore, both educators and policymakers must consider sustainability and ethical issues when designing the education

system. As Ko and Lu (2020) indicate, the rules that governments will bring on issues such as sustainability, waste management, packaging, food production, and supply will also support this system [58].

Although this research is universal in terms of subject matter, it has some limitations because it deals with the data in the Turkish sample. Therefore, it may be useful to repeat the research with data obtained from different countries to compare the results. It may also be appropriate to test the subject with different analysis methods.

Appendix A

Sustainable Food Choices

SFC 1. It is good to support domestic agriculture by buying regional products.
SFC 2. Health issues play an important role for me when I plan my menus.
SFC 3. It is important to me to support local farmers when making purchase.
SFC 4. I try to avoid food waste.
SFC 5. I buy mainly local products.
SFC 6. Genetically engineered food products are dangerous for human beings.
SFC 7. I pay attention to fair trade labels.
SFC 8. I would be willing to pay a higher price to support small growers from third-world countries.

Ethical Food Choices

It is important that the food I eat on a typical day
AW 9. Has been produced in a way that animals have not experienced pain
AW 10. Has been produced in a way that animals' rights have been respected
EP 11. Has been prepared in an environmentally friendly way
EP 12. Has been produced in a way which has not shaken the balance of nature
EP 13. Is packaged in an environmentally friendly way
PV 14. Comes from a country I approve of politically
PV 15. Comes from a country in which human rights are not violated
PV 16. Has the country of origin clearly marked
PV 17. Has been prepared in a way that does not conflict with my political values
R 18. Is not forbidden in my religion
R 19. Is in harmony with my religious views
AW: Animal welfare
EP: Environmental Protection
PV: Political Values
R: Religion

Role and Responsibility of Chefs

RES 20. Chefs have a responsibility to support sustainability through the products they purchase and the menus they prepare.

RES 21. Chefs need to use ethical and sustainable food products.

RES 22. Chefs have a responsibility to act ethically when purchasing food.

ROC 23. Chefs have a role in disseminating sustainability awareness with the products they purchase and the menus they prepare.

ROC 24. Chefs have a role in disseminating awareness of ethical food choice with the products they buy and the menus they prepare.

ROC 25. Chefs set an example to the society with the products they buy and the menus they prepare.

Behavioural Intention

BI 26. I will try to buy regularly ethical and sustainable food when I enter the profession.

BI 27. I plan to regularly purchase ethical and sustainable food when I enter the profession.

BI 28. I will endeavour to regularly purchase ethical and sustainable food when I enter the profession.

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