Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 5, 2518-2534
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i5.7515

The mediating effects of personal values on the factors that influence consumer leftovers food waste

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Abstract: The food consumption and its impact on environmental and ethical issues have attracted the attention of researchers from various disciplines. Therefore, the purpose of this study is to assess the direct and indirect influence of consumer personal values on the effect of the antecedents of food consumption causes, such as environmental attitudes, health risk concerns, and the use of a healthy diet. This paper has utilized knowledge from the theory of values, beliefs, and norms, which are considered important in the assessment of consumer behavior in food consumption. The main findings of this study suggest that personal values mediate the positive effect of consumer concerns about the environment, health risks, and healthy diets on food waste avoidance routines. This indicates that influencing individuals through education, business, and family programs can ensure positive future behavior toward consumer efforts to reduce food waste. This study aims to contribute new knowledge to support practitioners in designing and prioritizing behavioral interventions to reduce household food waste. To carry out this study, a questionnaire was conducted with 454 consumers regarding cooking or food security practices in their families. The data were collected face-to-face and processed with Structural Equation Modeling (SEM).

Keywords: *Environment, Food waste, Health risk, Healthy diet, Leftovers, Mediation, Personal values.*

1. Introduction

A large number of studies on food waste (FW) have been focused on aspects of the causes of food waste generation, prevention, solutions and policies to reduce FW. Recently, the focus of studies has shifted to investigating values, norms and beliefs in the context of FW reduction [1]. Consumer behavior towards FW is a complex phenomenon. This phenomenon is the product of the interaction of several aspects of behavior such as values, commitments and decisions [2].

Among the many factors that influence food consumption and waste, environmental approaches, consumer concern for healthy diet and consumer concern for food risk can also be identified. According to González-Santana, et al. [3] environmental issues are part of the factors influencing the development of consumer attitudes and behaviors towards FW. Consumers are increasingly linking health concerns and perceived health risks to the consumption of leftovers. As a result, consumers are producing more FW [4].

In recent years, there has been a growing appeal for healthy food consumption, encouraging consumers to consume more fruits and vegetables [5]. However, since healthier products such as fruits and vegetables have a shorter shelf life [6, 7] it seems that healthy diets and waste reduction are going in different directions. Therefore, the aim of this study is to examine the direct effect of environmental factors, health risk concerns and consumption of a healthy diet on reducing FW as well as the moderation effect of personal values in the impact that environmental factors, health risk concerns and consumption of a healthy diet have on reducing FW. The focus of this study is to assess the FW that comes from leftovers, as one of the main components of household FW [8].

History: Received: 13 March 2025; Revised: 6 May 2025; Accepted: 9 May 2025; Published: 24 May 2025
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To achieve this, the article uses knowledge from the theory of Value-Belief-Norm (VBN). The study of consumer behavior towards FW in the light of the VBN, has contributed to the conclusions for determining the reducers of food wasteful behavior.

The VBN theory emphasized negative consequences and the description of responsibility and intervenes in the psychological motivation of individuals through a series of moral and emotional mediating, thus promoting individual environmental behaviors [9-11]. The VBN theory has been used to examine the causes of environmental-related behaviors of the average consumer, whose behaviors affect the environment [9]. It has also been developed by assessing attitudinal factors related to an individual's norms, values, and beliefs as well as the habits or routines created by an individual [9].

To achieve the above objectives, the study was conducted in Albania. A total of 456 face-to-face questionnaires were conducted and the selected sample was random. This study applied Structural Equation Modelling (SEM) to analyze the data obtained.

The article is organized as follows: in section 2 a literature review regarding the relationship of the factors considered in the study was conducted to establish the conceptual framework of the study. Section 3 describes the materials and methods used. In section 4, an analysis of the results obtained is presented. Finally, section 5 discusses the findings and conclusions of the research.

2. Literature Review and Theoretical Framework

Attention to FW is related to the effective use of resources, environmental impacts, as well as the negative social impact on food security [12, 13]. The most massive FW occurs in households [14]. In low-income countries, FW is created due to poor food production and storage practices [15]. According to Quested, et al. [16] attitudes and values, motivations, habits, perceived social norms are individual factors necessary to prevent FW.

Previous empirical studies on various factors that influence consumer behavior towards food and FW focus on: a) consumer activity such as purchasing, cooking or storing food, [17-19] b) psychological factors of the consumer himself, c) socio-demographic factors of the consumer [20]. In this study, empirical research was conducted to investigate the direct effect and mediating effect of personal values on the prevention of FWB. As a result, a model is proposed to reduce FW. The variables in the model are based on the literature to understand consumers' values, attitudes and motivations regarding FW leftovers in households. Research objects for assessing FW behavior can also be assessed at the household level, food consumption in restaurants or takeaway, as well as food in canteens and schools.

2.1. Leftovers FW

We in our families often leftovers FW, which is the food that is produced during a meal. When this food then becomes surplus or leftovers from that meal, it is called food leftover [21].

Wasted food includes food leftovers from previously prepared meals [22, 23] and excess food ingredients that were not fully used in the preparation of the meal [22, 24]. This is reinforcing by Roe, et al. [25] and Krishna and Hagen [26] which underline the functionality, scope, and origin of products as characteristics to refer to leftovers FW. If these wastes are not stored and consumed later, they become a type of FW [27]. As noted, prepared food waste is defined as food that is "left unused or only partially used and then discarded".

In this paper, leftovers FW will be treated as food that is produced or purchased for a meal and that during various consumer activities becomes surplus or leftover from that meal. These include a) food prepared but not served on a plate; b) food served on a plate but not eaten; c) leftover ingredients that were intended to be cooked.

2.2. Consumer Concerns Toward Environment

FW and its relationship with the environment are a widely studied issue in the literature. The environmental impact of FW is now widely accepted. Consumer environmental concerns leading to the

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 5: 2518-2534, 2025
DOI: 10.55214/25768484.v9i5.7515

adoption of FW prevention behaviors continue to be of interest for study Le Borgne, et al. [28]. Many authors have agreed on the negative environmental impact of FW [29, 30]. Because FW in households accumulates at different stages of the food chain, FW represents a major environmental problem [31]. [32] found that consumers who exhibit a high level of environmental awareness are more likely to adopt pro-environmental behaviors, such as reducing FW [33]. They further consider environmental concerns as one of the motivators that change consumer habits [33]. It has also been found a positive relationship between consumer environmental concern and green food consumption [34].

Quested, et al. [35] argued that the relationship between FW and environmental impact has not been fully proven. This is further reinforced in the literature where contradictory results are found on the impact of environmental values on consumer behavior towards FW Amirudin and Gim [36]. Stancu, et al. [37] also find a weak relationship between consumer environmental awareness and FW. Furthermore, the fact that people are motivated to act in favor of the environment, even though it may be somewhat costly, comes because it makes them feel good about themselves as a strong personal norm [38].

The study assumes that this variable directly affects the intention to avoid leftovers FW variable. The assumption is as follows.

H_1: Consumer concerns toward environment will positively affect the consumer intention to avoid leftovers FW

2.3. Consumer Concerns Toward Health Risk

Consumer behavior towards food consumption is related to food safety concerns as much as to those related to FW issues [39, 40]. Consumer refusal to consume food due to concerns about health risks can be seen in two behaviors: 1) non-consumption of products due to their appearance (this creates waste in stores from non-purchase and waste at home from non-consumption), 2) non-consumption of FW. This concern is also reflected in the food supply chain which waste food without visual standards even though it has nutritional value [41]. According to Gustavsson, et al. [15] this practice is a contributor to food losses and waste. This relationship has been previously assessed by Canali, et al. [40] who claims that consumer demand for the aesthetic appearance of food represents a major influence on FW levels. Setti, et al. [42] showed for waste products the relationship between food storage practices and eating behavior as a variable to explain FW.

Health risk awareness refers to consumers' perception of the potential risks that FW may pose to their health and that of their family members [43]. It has been estimated by Qian, et al. [44] that when family members pay more attention to food safety and hygiene conditions, they consciously waste food, increasing the amount of household FW.

In line with the VBN theory, it seems to conclude that the intrinsic value associated with consumers' perception of risk when faced with FW transforms their attitudes and behavioral intentions [45]. According to Guo and Guo [43] awareness of health risks reflects his behavior towards FW as the consumer fears the potential harm that food consumption may cause to his health and that of his family members.

Savelli, et al. [46] have recognized the direct effect of consumer risk perception and their behavioral tendencies. There appears to be a direct interaction between health risk concerns and the willingness to throw away food. The impact of concern about health risks is also highlighted by Knezevic, et al. [47] according to which consumers are concerned about the short-term and long-term health risks of consuming leftovers. They seem unwilling to take risks by consuming leftover food [47]. The study assumes that this variable directly affects the intention to avoid leftovers food waste variable. The assumption is as follows.

H_2: Consumer concerns toward risk health will negatively affect the consumer intention to avoid leftovers FW

2.4. Consumer Concerns Toward Healthy Diet

For many consumers, dietary concerns have shifted from satiety to healthy eating [48]. This change in diet concept has raise the need to study how concerns about healthy eating can shift FW

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ISSN: 2576-8484
Vol. 9, No. 5: 2518-2534, 2025
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behavior. Regarding the relationship between healthy eating and FW, we found only few studies on this topic in the literature. Studies to date on FW are diverse but there is a notable lack of studies that measure the relationship between dietary concerns and FW. For consumers, a healthy diet is one rich in fruits and vegetables. According to Conrad, et al. [49] this is the category of products that is most difficult to conserve. Consumer awareness of healthy diets affects the frequency and quantity of purchased ingredients, which can affect FW as products are not consumed on time, expire or spoil [35]. The factors that determine the consumption of a healthy diet affect FW behavior in different ways. Thus, according to Cao and Li [50] increasing awareness of a healthy diet would increase dietary diversity and reduce FW. The effect of product pricing would also reduce the amount of FW. On the other hand, a perceived healthy diet with fruits and vegetables would increase FW. There seems to be still some uncertainty regarding the impact of consumer concern about diet on the tendency to avoid FW. This is also confirmed by Lisciani, et al. [51] who state that despite the confirmation of the effects of health literacy and nutrition education on healthy eating patterns, the effects of this knowledge on household FW production remain unclear. The study assumes that this variable directly affects the intention to avoid leftovers FW variable. The assumption is as follows.

H_8. Consumer concerns toward healthy diet will positively affect the consumer intention to avoid leftovers FW

2.5. Mediating Effect of Personal Values

Studies on food consumption have widely used theories such as Theory of Planned Behavior (TPB), Norm Activation Model (NAM) and VBN. TPB has the greatest popularity among all the other theories and models. In this study, the VBN theory was selected because the aim is to assess the impact of personal values on personal norms on consumers' willingness to avoid FW. Later on, the need to study factors such as consumer values and norms led researchers to rely on the Theory of Values, Beliefs well known as Schwartz [52] Model or VBN, and NAM. Schwartz's model describes ten distinct personal values that have been used to explain a wide variety of attitudes, behaviors, and subjective states [52]. According to Frese [53] there is a defined inside-outside distinction between values and norms. Values come from within the person, while norms come from outside him.

Based on the literature, values are classified into: (a) Egoistic values: based on the values of self-interest, social actors prioritize the maximization of personal interests, considering themselves as "economic beings". (b) Altruistic values: individuals tend to focus on the interests of other human beings and try to maximize the interests of the community. (c) Biosphere values: these values refer to the need for individuals to respect the interests of the human group, and not human. These three values can encourage individuals to pay attention to health and environmental issues as well as to implement FW prevention behaviors [54, 55].

Personal values are broad desirable goals that motivate people's actions and serve as guiding principles in their lives [56]. The most well-known definition of personal values is that given by Schwartz's theory, as broad motivating goals of varying importance that people want to pursue [52]. They have a strong influence on people's perception, cognition, and behavior over time and in different situations [57].

Personal values reflect what people think and declare about themselves. Personal values are subjective and their construction is central to many fields in the social sciences and humanities. The contribution of personal values in influencing an individual's actions has sometimes been questioned [58].

According to Sagiv and Schwartz [57] if a person supports the value of personal security, including health security, he will attach importance to being physically, emotionally, and materially safe in every relationship and in all situations, including when consuming safe foods. From this we deduce that the broad application of personal values can be used to examine the influences on consumer behavior to avoid or not FW.

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The study assumes that this variable directly affects the intention to avoid leftovers FW variable as well as affects the relationship between the above variables with the intention to avoid leftovers FW. The assumptions are as follows.

H_4. Personal Values will positively affect the consumer intention to avoid leftovers FW

H_5. Personal Values will mediate the positive effect of consumer concerns towards the environment on the consumer intention to avoid leftovers FW.

H_6. Personal Values will mediate the positive effect of consumer concerns towards health risk on the consumer intention to avoid leftovers FW.

H_7. Personal Values will mediate the positive effect of consumer concerns towards healthy diet on the consumer intention to avoid leftovers FW

2.6. Avoiding Leftovers Food Waste

In this paper avoiding leftovers FW was measure as the consumer willingness to undertake careful actions to avoid wasting food. In align with this, they are prone or not to avoid leftovers FW.

Behavioral intentions are considered the best way to predict and explain individual behavior [59, 60]. In the case of FW, it is particularly important to increase consumers' willingness to avoid FW. For this reason, it is essential to examine consumers' decision-making processes regarding FW. Nowadays, people are aware that their behaviors directly or indirectly affect their health and the environment [11]. As a result of the analysis from the literature, Figure 1 brings a visual representation of the study hypotheses.

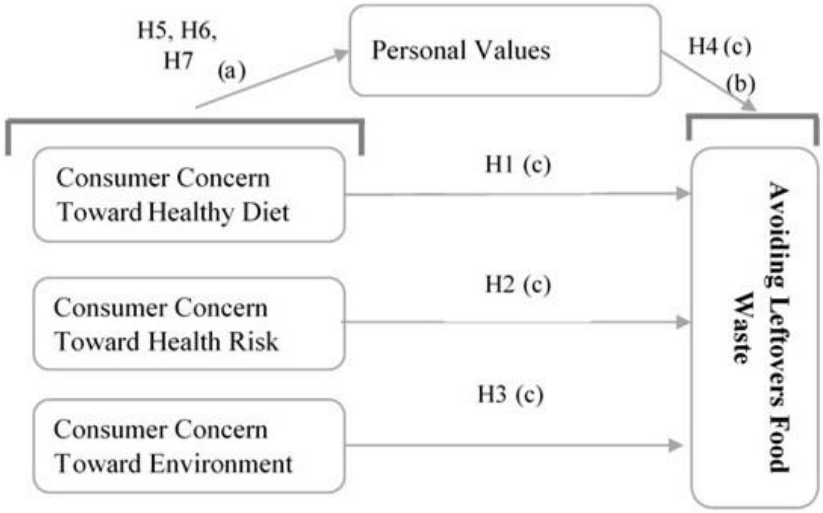

Figure 1.
Schematic presentation of the study hypotheses.

3. Materials and Methods

3.1. Data Collection and Sample Characteristic

The research data was collected in Albania, through a structured questionnaire. The sample consists of 454 consumers, randomly selected and interviewed. Data collection was carried out through a questionnaire structured in three main sections. The sample socio-demographic characteristics were collected in the first section, information on consumer knowledge on food waste was collected in the second section, and the third section assessed the factors affecting consumer food waste using five-point Likert scale questions, ranging from 1 (strongly disagree) to 5 (strongly agree).

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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Table 1 summarizes the socio-demographic characteristics of the sample. Since women in the family are more involved in buying food and cooking at home, 72.2% of the consumers interviewed are female. 38.1% of respondents are between the ages of 33-44. Meanwhile, 35.9% of consumers interviewed have a university degree, while 33.5% of them hold a master's degree. Regarding employment status, 72.2% of consumers are employed and only 11% of them are unemployed. Meanwhile, the family size of the consumers surveyed in this study varies from a minimum of 1 member to a maximum of 7 members, with a median of 4.

Table 1.
Socio-demographic characteristics of study sample.

Socio-Demographic Characteristics	Groups	Frequency	%
Gender	Male	126	27.8
	Female	328	72.2
Age (years)	<29	122	26.9
	33-44	173	38.1
	45-60	125	27.5
	>60	34	7.5
Education Level	Primary education	27	5.9
	Secondary education	112	24.7
	University	163	35.9
	Master Degree	152	33.5
Employment status	At university	50	11.0
	Unemployed	50	11.0
	Employed	328	72.2
	Retired	26	5.7

Given that almost 87% of consumers interviewed were familiar with the concept of food waste, 88.3% of them stated that avoiding food waste is very important or important in their household. The three main actions taken to avoid food waste from the shopping process are: 1) prepare a list before shopping, 2) buy after checking what is missing at home and 3) use the purchased product for different dishes. Meanwhile, the three main actions taken to avoid food waste from cooking are: 1) save cooked food for another meal, 2) use leftover food for another dish (meat or bone broth, etc.), and 3) cook small amounts of food. Consumers were also asked about the main causes of food waste, 28.6% of them identified damage, mold or spoilage of the product as the main cause.

3.2. Measurement and Construct Validation

Exploratory Factor Analysis (EFA), the results of which are shown in Table 2, revealed 5 factors that explain 84% of the total variation. Each construct has a Cronbach's α greater than 0.70, which is the threshold value [61] providing the constructs reliability, and all factor loadings have surpassed the recommended value of .40 [62] giving evidence of constructs convergent validity.

Edelweiss Applied Science and Technology
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Vol. 9, No. 5: 2518-2534, 2025
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Table 2.
Exploratory Factor Analysis.

Rotated Component Matrix	Component					
	Cronbach's Alpha	F1	F2	F3	F4	F5
Personal Values [63-66]	0.956					
I feel guilty when I buy useless products		0.839				
I have obligations to discourage companions from wasting food		0.857				
Many leftovers make me feel guilty		0.876				
I should pack the leftovers		0.890				
I have obligations to reduce food waste		0.890				
Throwing food away poses an ethical problem to me as regards my relatives		0.875				
I consciously buy less food in stock so that I have to throw away less		0.861				
Avoiding leftovers FW [63]	0.962					
I intend to reduce my leftovers food waste in the near future			0.864			
I intend to reuse all leftovers food waste			0.885			
In the coming weeks I intend to reduce leftovers food waste by paying attention to the amount I cook			0.908			
In the coming weeks I intend to reduce leftovers food waste by paying attention to my portions			0.917			
I intend to talk to my friends, family and neighbors about reducing their leftovers food waste			0.902			
I intend to reduce my leftovers food waste in the near future			0.908			
Consumer concern toward environment [65]	0.968					
I care about environmental impairments which arise when I discard food				0.926		
I care about effects of food waste regarding the global resource availability				0.948		
Food waste poses problems for waste management in cities				0.944		
Food waste has really harmful consequences for the planet				0.929		
Consumer concern toward health risks [2]	0.947					
I do not use cooked foods that have been stored for a long time because it can negatively affect my health					0.882	
I do not reuse leftover food in another dish because it can negatively affect my health					0.914	
I do not consume leftover food from cooking because it negatively affects my health					0.913	
I do not use foods that have been opened for a long time even if they are within the expiration date					0.899	
Consumer concern toward food diet [66]	0.928					
Choosing healthy foods is important to me						0.879
Choosing low-fat foods is important to me						0.890
Choosing foods without preservatives is important to me						0.881
Choosing foods without potentially dangerous ingredients is important to me						0.880

Note: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Meanwhile, Confirmatory Factor Analysis (CFA) was conducted in AMOS, indicated a good level of model fit (Chi-square = 414.473; df = 261; p = .000; CMIN/DF = 1.588; CFI = 0.987, RMSEA = 0.036; TLI = 0.985).

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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We used Composite Reliability (CR) to analyze the reliability. The minimum CR value recommended by Bagozzi, et al. [67] should be 0.6.

Average Variance Extracted (AVE) was used to analyze convergent validity. According to Hair, et al. [68] the suggested threshold value for AVE is 0.5. Also, Hair, et al. [68] suggests that the threshold values to prove discriminant validity are: a) AVE > MSV, b) AVE > ASV, c) square root of AVE greater than correlations inter-constructive.

The results presented in Table 3 show that all suggested threshold values have been achieved. In this way we reach the conclusion that reliability, convergent validity and discriminant validity are achieved.

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Table 3.
Validity/Reliability and factor correlation matrix with square root of the AVE on the diagonal.

	CR	AVE	MSV	MaxR(H)	PersValues	FoodDietCon	HealthCon	EnvironCon	AvLeftFW
PersValues	0.954	0.748	0.099	0.956	0.865				
FoodDietCon	0.928	0.763	0.076	0.929	0.229	0.873			
HealthCon	0.947	0.816	0.100	0.947	0.255	0.264	0.904		
EnvironCon	0.968	0.883	0.100	0.970	0.176	0.236	0.316	0.940	
AvLeftFW	0.962	0.808	0.099	0.966	0.315	0.276	0.170	0.103	0.899

Note: CR - Composite Reliability, AVE - Average Variance Extracted, MSV - Maximum Shared Variance, MaxR - Maximum Reliability.

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4. Results

Since we have a good fit of the structural model, (Chi-square = 414.473; df = 261; p=.000; CMIN/DF = 1.588; CFI = 0.987, RMSEA = 0.036; TLI = 0.985), the hypotheses were assessed through the inspection of the estimated structural coefficients presented in Table 4.

Table 4.
Structural model results.

Hypothesis (H)		Estimate	Std-Estimate	S.E.	C.R.	P	Results
H1	Intention to avoid leftovers food waste ← Healthy Diet Consumers Concern	.213	.205	.052	4.131	***	√
H2	Intention to avoid leftovers food waste ← Health Risk Consumers Concern	.052	.053	.049	1.056	.291	×
H3	Intention to avoid leftovers food waste ← Environmental Consumers Concern	-.007	-.007	.048	-.144	.886	×
H4	Intention to avoid leftovers food waste ← Personal Values	.268	.256	.052	5.195	***	√

Note: *** significant at p < .001, √ - Supported, × - Not Supported.

According to the results in Table 4, the hypothesis (H1) on consumer concern about food diet is supported, so consumer concern about food diet has a significant positive effect on consumers' willingness to reduce leftovers food waste. Hypotheses two (H2) and three (H3) on consumer concerns about health risk and consumer concerns about the environment are not supported, these factors have an insignificant effect on consumers' willingness to reduce leftovers food waste. Also, according to the results of Table 4, Hypothesis Four (H4) is supported, consumer personal norms have a significant positive effect on consumer's willingness to reduce food waste.

4.1. Mediation

Table 5.
Mediation effects through bootstrapping.

Hypothesis (H)	Mediation Path	Indirect Effect	P	Type of mediation
H5	Healthy Diet Consumers Concern → Personal Values → Intention to avoid leftovers food waste	.062	< .001	Complementary
H6	Health Risk Consumers Concern → Personal Values → Intention to avoid leftovers food waste	.065	< .001	Indirect-only
H7	Environmental Consumers Concern → Personal norms → Intention to avoid leftovers food waste	.046	< .001	

Note: The type of mediation as classified by Zhao, et al. [69]. Indirect effects are not standardized.

From Table 5, we see that personal norms mediate the positive effect of consumer concern about food diet on consumer willingness to reduce food waste. Referring to Zhao, et al. [69] the type of this mediation is complementary mediation since the indirect effect (*a x b*) and the direct effect (*c*) are significant, and *a x b x c* is positive.

Meanwhile, from Table 5, we see that personal norms mediate the positive effect of consumer health concern and consumer environmental concern on consumer willingness to reduce food waste. Referring again to the mediation classification by Zhao, et al. [69] we will have indirect-only mediation since the indirect effect (*a x b*) is significant, but the direct effect (*c*) is not.

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5. Discussion

The factors studied can be considered as internal or psychological consumer factors that guide their behavior towards FW [70]. Leftovers FW constitutes a very important category of food that is thrown away by consumers. FW occurs for several reasons, especially the lack of space to store food [71-74]. The lack of consumer knowledge about their storage is also seen as a path that produces a lot of FW [71, 75]. These circumstances affect the production of FW that can lead to foodborne illnesses [76]. But the presence of internal factors influenced by personal values makes it so that even if adequate storage conditions are not enough to avoid throwing away food. According to [79] even if these conditions are maintained, families are not always motivated to consume waste [77].

5.1. The direct effect of factors on avoiding leftovers FW

From the data processing in our study, it results that consumer concern about diet has a positive impact on taking actions and routines to avoid leftovers FW. According to Food and Agriculture Organization of the United Nations (FAO) & World Health Organization (WHO) [78] sustainable healthy diets are defined as dietary patterns that promote consumer health and well-being aspects as well as the cultural dimension. The internal and unconscious nature of food decisions [79] influence dietary change [80]. According to Cao and Li [50] awareness of a family's healthy diet represents an endogenous or internal factor. The internal aspect of this factor can be influenced by the culture and habits that the family has. A positive link between healthy diet and FW issues has been suggested by Healy, et al. [81] who states that increased awareness of the importance of sustainable diets is largely related to the degree of food processing and consumer attitudes towards its consumption. The availability of more information and increased health education regarding sustainable diets can support pro-waste avoidance behavior. In this context [81] suggests that consumers should be encouraged through advice that improves purchasing choices, less food, and correct cooking to avoid its waste. Our findings that the impact of concern for a healthy diet on taking actions that reduce FW is reinforced by Cao and Li [50] who claims that a healthy diet and household FW are linked and influence each other.

Another factor that was investigated to be positively directly related with avoidance of leftovers FW behavior is consumer's personal values. Our analysis shows that personal values towards avoiding food waste positively influence inhibitory consumer behavior. According to Schwartz [52] theory of VBN, personal values are defined as motivators. The positive influence of personal values on the adoption of actions that reduce FW comes not only because individuals avoid experiencing negative emotions but also because a behavior in line with their values makes them feel proud [82]. This makes consumers increase their self-confidence towards contributing to food management issues. Not only does this create positive feelings, but there is also a relationship between the degree of manifestation of personal norms and the likelihood that consumers tend to avoid FW [63].

Health concerns related to food waste can be found in the literature in contradictory results. Thus De Hooge, et al. [83] has pointed out that there are contradictory behaviors regarding approaches to the use of leftover products. Also, since the study was conducted in developing countries with clearly lower incomes than developed countries where most studies on FW are based, such a result may seem expected. Also, according to Deliberador, et al. [20] the acceptance of consumption may be high especially for consumers with low incomes. This brings to mind the different effects found in different countries. This is also confirmed by Aschemann-Witzel, et al. [6] who claims that the choice for suboptimal food may occur in different countries. This is reinforced by several researches who states that consumers belonging to the low income bracket show a limited attitude to waste when compared to the lower income bracket [42, 84].

Another objective of the study was to measure the impact of consumer concern for the environment on consumer engagement in avoiding FW. The study results show that this factor does not have an impact on consumer behavior to avoid FW. Where the conclusion seems to be in line with the contradictory conclusions offered by the literature. As explained above, different authors bring different arguments regarding the impact of the environmental factor on consumer perception. According to

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ISSN: 2576-8484
Vol. 9, No. 5: 2518-2534, 2025
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[66] environmental issues seem to be more abstract for the consumer and it seems that he finds less connection with his efforts to influence them. Various authors also emphasize that consumers still lack adequate knowledge about the environmental impact of their food-related choices or knowledge on issues of environmental sustainability [85].

5.2. The Indirect Effect of Factors Through Personal Values on Avoiding FW

VBN theory includes values that defined by Schwartz [52] refer to desirable goals that guide individual and societal behavior. According to Schwartz theory of human values lie in a long list of definitions with divisions and subdivisions. In this view, human values can be assessed towards security and this includes safety and security as well as universalism which includes welfare of people and nature. In VBN theory, an individual's awareness of the environment is influenced by the value of altruism, emphasizing the well-being of others, the common good, and nature [86, 87]. On the other side health is included in value lists [88-90] where the goals are to establish the link between current behaviors to core values.

Allicock, et al. [91] studied how the value of "health" influenced having a healthy diet. He concluded that knowing a person's core values provides insight into how values can act as drivers for change in behavior [93]. Our study, tried to measure personal values as mediators of factors such as consumer concern for health, diet, and the environment on consumer propensity to avoid leftovers FW. From the data analysis it results that the indirect effect of factors on consumers' intention to avoid FW is different for different factors.

From processed data result that in addition to the direct influence of the factor "consumer concern about healthy diet" on the intention to avoid FW there is also an indirect influence through personal values. As suggested by Allicock, et al. [91] knowing a person's core values offers a high potential for understanding how they influence their behavior. Also, following a good diet has a strong connection with healthy living. The consumer health values as a fundamental value, turning it into a behavioral guideline. The data processing results those personal values mediate the effect of consumer health concerns on food waste. The analysis shows that the health concern factor itself seems to not have a direct effect on consumer intention to avoid FW, but it is conformed that there is indirect effect of health concern through personal values in the consumer's intention to avoid leftovers of FW. It has already been agreed that there are several types of mediation such as complementary, competitive, only indirect mediation, direct-only no mediation, no-effect no mediation [69]. According to Zhao, et al. [69] when we have only an indirect effect without the presence of a direct effect, it means that in this model there are no other mediating variables omitted. In our study, it seems that personal values mediate and are the only mediators in the relationship "health concern" and "intention to avoid food waste" as well as concern for the environment and "intention to avoid food waste".

In the case of the factor consumer's concern for healthy diet, the existence of both, direct and indirect effect with complementary mediation indicates the possible existence of a second omitted mediator. The sign of this direct effect provides guidance for the sign of an indirect path not taken into account in the analysis.

6. Conclusion

FW issues with a consumer focus constitute an economic, social and psychological challenge. Personal values guide and motivate consumer behavior, even in terms of routines that aim to avoid FW. Our study results in the following: The three main actions taken to avoid FW from the shopping process are preparing a list before shopping, buying after checking what is missing at home and using the purchased product for different dishes. Meanwhile, the three main actions taken to avoid FW from cooking are saving cooked food for another meal, using leftover food for another dish (meat or bone broth, etc.), and cooking small amounts of food. The foods taken into analysis were leftovers.

The vast majority of consumers declare that the main causes of FW, is the food damage, mold or spoiled. Consumers are quite familiar with the concept of FW and seem to have an interest in taking

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 5: 2518-2534, 2025
DOI: 10.55214/25768484.v9i5.7515

actions that reduce the amount of food wasted. The analysis shows that consumer concern about diet has a significant impact on the adoption of routines that avoid FW. This makes them careful about the quantity and quality of food they choose. Factors such as concern for health and environment seem to have an effect under the mediation of personal values. When there is the presence of consolidated personal values of the consumer, they influence the intention to take actions that avoid FW. These conclusions indicate that among the most important implications may be those related to awareness and the emphasis of education on the creation of personal values that serve as motivation for future consumer behavior.

Values can influence consumer decisions, interactions with other people, and the way you relate to the rest of the world. The literature shows that people who have encountered awareness campaigns in their daily lives tend to take action to reduce the amount of food they waste. This suggests that organizations, companies, and public institutions should focus on practical examples, tools, and techniques for reducing food waste.

Regardless of the study's findings, its limitations are related to the fact that the results are based on self-assessment questions. Although a difficult undertaking, future research could focus on designing educational campaigns to build preventive behavior around food waste.

Funding:
This study has been funded by the Albanian National Agency for Scientific Research and Innovation (NASRI) and Agricultural University of Tirana (AUT), through the project "Challenges for a sustainable agro-food sector with a focus on food losses and waste" with reference number XXXXX

Transparency:
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 5: 2518-2534, 2025
DOI: 10.55214/25768484.v9i5.7515