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ORIGINAL ARTICLE

The Role of Consumption Ethics, Knowledge, and Understanding of Young Consumers in Their Responsible Behavior Toward Food Waste and the Environment

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ABSTRACT

The COVID-19 pandemic has revealed significant vulnerabilities in production and consumption systems. Its economic and social consequences have underscored the urgent need for more sustainable approaches to food production and consumption. Since young consumers are often described as innovators and environmentalists, the present research aims to identify the influence of consumption ethics, knowledge, and understanding among young people on their responsible behavior toward food waste in the environment. The statistical population consists of young people aged 18 to 35 in Tehran. The sample size was calculated using Cochran's formula, resulting in 400 participants, and a multi-stage cluster sampling method was employed. The results of hypothesis testing show a positive role for awareness of food waste in encouraging responsible behavior among young people, as well as in shaping their food waste ethics. Additionally, the impact of the COVID-19 crisis on food purchasing by young people has a positive influence on their responsible behavior and their understanding of the environmental impact of food waste. The findings indicate that the COVID-19 pandemic has led more people to adopt food waste reduction behaviors, and that awareness of the ethics and environmental consequences of food waste has increased among young people.

KEYWORDS

Consumption Ethics, Consumption Knowledge, Environment, Food Waste, Responsible Behavior.

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چکیده

همه‌گیری کووید-۱۹ آسیب‌پذیری‌های قابل‌توجهی را در سیستم‌های تولید و مصرف نشان داد و پیامدهای اقتصادی و اجتماعی این بیماری همه‌گیر نیاز فوری به شیوه‌های پایدارتر در تولید و مصرف مواد غذایی را برجسته‌تر نمود. ازآنجایی‌که مصرف‌کنندگان جوان اغلب به‌عنوان نوآوران و دغدغه‌مندان محیط‌زیست توصیف می‌شوند، بنابراین پژوهش حاضر به شناسایی تأثیر اخلاق مصرف، دانش و درک جوانان از رفتار مسئولانه آنها نسبت به پسماند غذایی در محیط‌زیست می‌پردازد. جامعه آماری، جوانان ۱۸ تا ۳۵ سال شهر تهران هستند. حجم نمونه آماری با استفاده از فرمول کوکران ۴۰۰ نفر محاسبه شد و از روش نمونه‌گیری خوشه‌ای چندمرحله‌ای استفاده گردید. نتایج آزمون فرضیه‌ها نقش مثبت آگاهی از پسماند مواد غذایی را در رفتار مسئولانه جوانان و بر اخلاق پسماند غذایی در بین جوانان نشان می‌دهد. همچنین تأثیر بحران کووید-۱۹ در خرید مواد غذایی جوانان، در رفتار مسئولانه جوانان و درک جوانان از پسماند مواد غذایی بر محیط‌زیست نقش مثبت دارد. یافته‌ها نشان می‌دهد که همه‌گیری کووید-۱۹ باعث شده است که افراد بیشتری رفتار کاهش پسماند غذایی را نشان دهند و آگاهی نسبت به اخلاق پسماند مواد غذایی و نسبت به پیامدهای زیست‌محیطی پسماند مواد غذایی در میان جوانان افزایش یابد.

واژه‌های کلیدی

اخلاق مصرف، رفتار مسئولانه، دانش مصرف، پسماند مواد غذایی، محیط‌زیست.

Introduction

The transforming world of today, which has been accompanied by the accumulation of awareness and human experiences throughout the millennia, has created a kind of disruption that has laid the groundwork for the emergence of a new order and transformation in the process of production and consumption of products.
In such a way that this order, following the creation of environmental problems and issues related to the field of health, has altered lifestyles and consumption behaviors, and has directed traditional consumption behavior toward sustainable and conscious consumption (Pourjamshidi et al., 2021).

In recent years, food waste and its related environmental, economic, and social consequences have turned into one of the sustainability issues across the world. The magnitude of this phenomenon has been widely discussed by researchers and international organizations, and shows high economic costs (amounting to billions of dollars annually; FAO, 2013) and environmental impacts (related to CO2 emissions, land degradation, and biodiversity loss; FAO, 2013).

For this reason, food waste has been included in international sustainability strategies, including the United Nations Sustainable Development Goals (SDGs). According to the latest estimates by UNEP (2021), nearly 931 million tons of food produced for human consumption are either lost or wasted annually, which accounts for 17 percent of global food production. In addition, food waste from households (CNEPSS, 2021) makes up 61 percent of total global food waste, which is almost twice the figure recorded in 2011 (FAO, 2011). In recent years, several initiatives have been developed to support sustainable development goals and their objectives. Given what was mentioned, a sustainable food system was needed even before COVID-19, but this pandemic has increased awareness of the need for more resilience in this area (EU, 2020).

COVID-19, which began in China in 2019, led to more than 770 million infections and nearly 7 million deaths by September 16, 2023 (WHO, 2023). This pandemic not only affected social behaviors, but also consumption and spending patterns, especially in the field of food.

Changes in daily habits and the fear of food shortages led to panic behaviors such as excessive buying and storage (Borsellino et al., 2020). These changes put food security at risk and highlighted the issue of food waste. Food loss has extensive impacts on food security, the environment, and the global economy, and is recognized as a fundamental challenge for responsible behavior by individuals and businesses (Abiad & Meho, 2018; Grainger et al., 2018).

From another perspective, human behaviors are the main factor behind many environmental problems (Abbaszadeh, 2016). Youth, due to their role in shaping the future and the impact of their behaviors on the current environment, hold special importance (Salehi & Ghaemi Asl, 2013). However, the gap between attitude and behavior in the field of food waste is observed, even among environmentally concerned youth. In Iran, food loss is equivalent to the annual food needs of 18 million people, and annually, out of the country's 130 million tons of food production, 25 million tons are wasted. In addition, 60 percent of Tehran’s waste consists of food waste. This research examines the responsible behavior of Iranian youth regarding food waste and the factors influencing it, since, so far, there have not been sufficient studies in this field.

Studies show that although food waste is reducible, it cannot be eliminated.

Factors such as forgetting food in the refrigerator or purchasing unnecessary products under the influence of marketing strategies play important roles in creating waste (Quested et al., 2013; Bravi et al., 2020). Behaviors related to reducing food waste include planning, purchasing, storing, preparing, and consuming food, which require a responsible approach. Among the effective actions, one can mention proper understanding of food labels, reusing leftover food, and preparing a shopping list (Mondejar et al., 2016). Lack of awareness about the environmental and financial consequences of food waste, especially among youth, is one of the main reasons for its increase (Bio Intelligence Service, 2010).

Youth, due to limited experience in storing and preparing food, are often prone to irresponsible behaviors regarding waste (Nikolaus et al., 2018). Research has shown that many young people do not have a proper understanding of concepts such as “expiration

date" and "best before," and this leads to increased food waste (Principato et al., 2015; Parfitt et al., 2010).

While education in this field is necessary, it is not sufficient on its own for fundamental change, and must be accompanied by more comprehensive strategies that include all stakeholders in the food supply chain (Annunziata et al., 2020). From an ethical perspective, food waste means wasting resources that could be used to reduce global hunger. Moreover, this phenomenon has negative impacts on limited resources, biodiversity, and climate change (Hebrok & Boks, 2017).

Various religions have also condemned food waste and considered it undesirable. The COVID-19 crisis has also had significant effects on food purchasing behavior. Before this crisis, food shopping was an automatic process, but the pandemic caused behavioral changes, including impulsive buying, over-purchasing of certain items, and more careful meal planning. These changes, on the one hand, helped reduce food waste, such as through consuming stored food or better planning of meals, and on the other hand, they led to increased waste, including over-purchasing or long-term food storage in freezers (Borsellino et al., 2020).

The environmental impact of food waste. They represent a generation that intensifies efforts to align their behaviors with the needs of environmental protection and develop new solutions to mitigate the negative impacts of population habits on the environment. Therefore, the present study focuses on youth perceptions of the environmental impact of food waste.

In the empirical literature review section, the following studies were examined:

Wakefield and Axon (2020), in a study aimed at identifying the enablers and barriers to sustainable food waste practices, concluded that introducing the topic of food waste into school curricula can increase youth awareness of unsustainable food practices. School administrators should also ensure that children and young people are not exposed to food waste at school. Specific factors such as limited budgets and a lack of motivation among service providers can lead to food waste in school cafeterias, which negatively impacts young people's behavior.

Principato et al. (2021) surveyed the COVID-19 quarantine to determine whether Italian youths who adopted good food management practices were able to significantly reduce food waste through actions such as preparing shopping lists, continuously monitoring food supply and storage, and improving meal planning. It is evident that changes in food consumption behavior have affected both the quantity and variety of food, and consequently altered the environmental impact of food waste. The results showed that the quarantine period had a positive effect on youth behavior and led to reduced environmental impacts in large cities and areas generally perceived as unclean.

Aydin and Yildirim (2021), through a study, found that ethical attitudes have a direct impact on food waste behavior, food habits, shopping habits, and knowledge about food preservation. Shopping habits mediate the relationship between ethical attitudes and food waste behavior, and food preservation knowledge mediates the relationship between ethical attitudes and shopping habits. Letukonas et al. (2020) analyzed four dimensions of ethical work in relation to food waste reduction practices: moral principles (unsustainable consumption practices and the feelings they generate); subjectivation practices (observing behavior and family or others' education; awareness of food scarcity among people; environmental considerations); self-improvement activities (modifying consumption behavior to eliminate habits leading to food waste, and changing attitudes toward food through strategies suggested by friends, family, or online); and final purpose (establishing a balanced relationship with self, others, and the environment).

Nikolaus et al. (2018), based on focus group studies of American youths, concluded that students' perceptions, beliefs, and behaviors regarding food waste vary depending on subjective aspects as well as their type of residence. These factors alter youths' understanding of the interdependence between wasteful behavior and environmental quality. Stancu et al. (2016), using a sample of 1,062 respondents including students, analyzed the factors influencing food waste. One finding of the study was that moral norms do not significantly contribute to food waste behavior. However, the authors expressed skepticism about this result and recommended that

researchers approach the topic from different perspectives.

Graham-Rowe et al. (2014), in a study involving interviews with students and non-students, identified one of the key motivations for minimizing food waste as "doing the right thing." Interviewees described food waste as wrong from various perspectives, including traditional views where waste was not acceptable, or views instilled by family and friends. A newer perspective emerged from awareness of the negative impact of food waste on the environment and resource depletion.

Gholbaz et al. (2022), in a study titled "The Role of Environmental Education in Promoting Environmentally Responsible Behavior among Students at the University of Tehran's Faculty of Agriculture and Natural Resources," concluded that to improve responsible environmental behavior in society—particularly among agricultural students who will have a close relationship with nature in the future—emphasis should be placed on environmental education. They recommend including relevant courses in students' curricula to promote environmentally responsible behavior.

Eskandarzadeh et al. (2021) assessed the factors affecting positive environmental attitudes and behaviors among citizens in Birjand. They examined three indicators: environmental awareness, environmental attitude, and environmental behavior. The results showed that although people are interested in education and nature, due to a lack of cultural promotion and the use of engaging and modern teaching methods, individuals often become disconnected from nature and sometimes even harm it. Older age, greater proximity to nature, place of birth, socioeconomic status, education level, and environmental awareness were all found to contribute to the formation of an unconscious environmental culture.

Moradi (2017), in a study titled "Assessing Environmental Awareness, Attitudes, and Responsible Behavior of Payame Noor University Students in Kermanshah Province," found that students' environmental attitudes were moderately to strongly influential on behavior, and their positive attitudes leaned toward eco-centric thinking. Students' skills and environmentally responsible behaviors were also rated positively.

Salehi and Ghaemi (2013) examined the role of environmental education in promoting environmental protection behavior among school students. The study found that while students had high awareness of general environmental issues, they had low awareness of specific problems. There was a significant difference in environmental behavior across different educational levels, but no difference among academic disciplines. Although modern environmental attitudes positively influenced protection behavior, environmental knowledge and education did not significantly impact environmental behavior.

Based on the above, the following hypotheses are proposed:

H1: Knowledge of food waste among young people has a direct and positive effect on their responsible behavior toward food waste.

H2: Knowledge of food waste among young people has a direct and positive effect on their ethics of food waste.

H3: Ethics of food waste among young people has a direct and positive effect on their responsible behavior toward food waste.

H4: Knowledge of food waste among young people has a direct and positive effect on their perception of the environmental impact of food waste.

H5: Young people's perception of food waste has a positive effect on their responsible behavior toward food waste.

H6: The influence of the COVID-19 crisis on the food shopping of young people has a direct and positive effect on their responsible behavior toward food waste.

H7: The influence of the COVID-19 crisis on the food shopping of young people has a direct and positive effect on their ethics of food waste.

H8: The influence of the COVID-19 crisis on the food shopping of young people has a direct and positive effect on their perception of food waste's impact on the environment.

Research Methodology

This research is applied in terms of purpose and an analytical-survey based in terms of data collection method. The statistical population consists of young people aged 18 to 35 residing in Tehran. According to data from the Statistical Center of Iran, the population of young people aged 18–35 in Tehran is approximately

1,193,479. Based on Cochran's formula, the sample size was determined to be 384. In this study, 400 individuals were surveyed, and finally, 390 valid questionnaires were collected. Due to the structure of the statistical population, a multi-stage cluster sampling method was employed. Tehran was divided into five clusters: northwest, northeast, southeast, southwest, and center. One district was randomly selected from each cluster. Then, neighborhoods within each selected district were randomly chosen, and in each neighborhood, respondents were surveyed using a convenience sampling method.

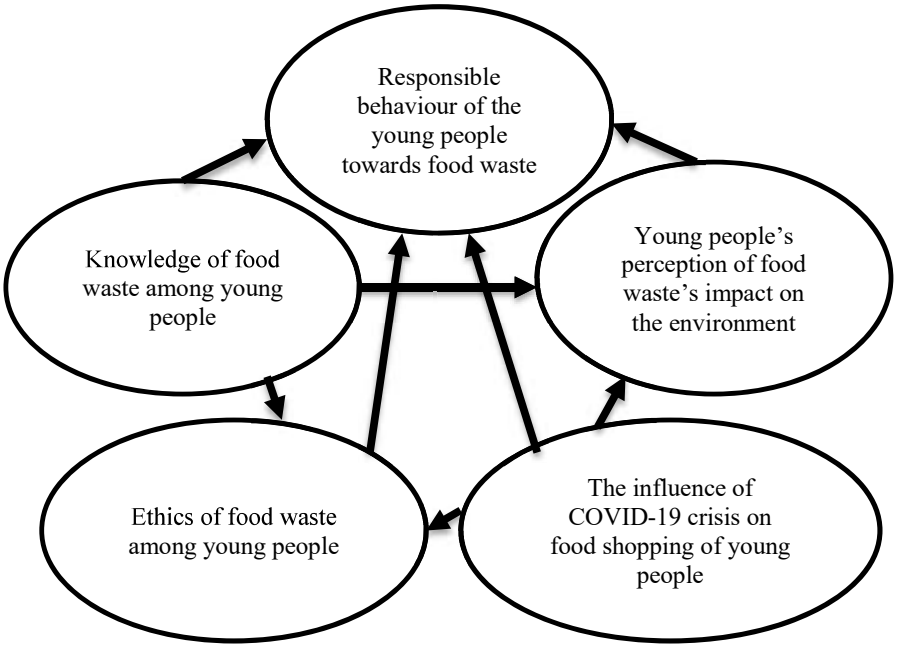

Figure 1. Conceptual Model of Research (Source: Burlea-Schiopoiu et al., 2021)

The data collection tool in this study was a questionnaire, which measured five main variables using a 5-point Likert scale (1 = strongly agree to 5 = strongly disagree). To this end, a standardized questionnaire adapted from relevant studies was used.

Table 1. The Number of Questions Related to each Variable and its References

Variable	Number of questions	Refrence
Responsible behaviour of young people towards food waste	7	Stefan et al. 2013; Mondejar-Jimenez et al.2016
Knowledge of food waste among young people	8	Principato et al. 2015
Ethics of food waste among young people	4	Visschers et al.2016; Aydın & Yildirim,2021
Young people's perception of food waste's impact on the environment	5	Stancu et al.2016
The influence of the COVID-19 crisis on the food shopping of young people	10	Burlea-Schiopoiu et al.2021

The content validity of the present study was confirmed through expert opinions, and revisions were made to the questionnaire accordingly. Reliability testing was conducted using SPSS version 24. As shown in Table 3, the Cronbach's alpha coefficients indicate good reliability, as all coefficients are above 0.70. For confirmatory factor analysis and path analysis, the partial least squares (PLS) method was applied using the SmartPLS 2 software.

Research Findings

Table 2 presents the demographic characteristics of the statistical sample.

Table 2. Demographic Characteristics of the Statistical Sample

Index	Specifics	Frequency	Relative frequency%	Total
Sex	Female	179	46	390
	Male	211	54	
Degree	Bachelor	261	67	390
	Master	112	29	
	Ph.D	17	4	
Age	18-24 years old	159	41	390
	24-30 years old	137	35	
	30-35 years old	94	24	

The measurement model test includes the assessment of reliability (internal consistency) and the construct validity of the research instruments. Table 3 shows that the constructs exhibit acceptable levels of reliability.

Table 3. Examining the Research Measurement Model

Acceptable Values (Davari & Rezazadeh., 2013)	AVE >0.5	CR > 0.7	α >0.7
Variable			
Knowledge of food waste among young people	0.590	0.711	0.723
Ethics of food waste among young people	0.585	0.798	0.780
Responsible behaviour of young people towards food waste	0.514	0.736	0.781
The influence of the COVID-19 crisis on the food shopping of young people	0.532	0.762	0.786
Young people's perception of food waste on the environment	0.557	0.782	0.721

Another important criterion that indicates discriminant validity is the extent to which a construct correlates more strongly with its own indicators than with other constructs. Acceptable discriminant validity in a model implies that each construct interacts more with its own indicators than with those of other constructs. Discriminant validity is considered acceptable when the square root of the AVE for each construct is greater than the shared variance (i.e., the squared correlation coefficients) between that construct and others. Table 4 presents the square roots of the AVE values for each construct alongside inter-construct correlation coefficients.

Table 4. The Results of the Divergent Validity Assessment by the Fornell and Larcker Method

Variables	1	2	3	4	5
Ethics of food waste among young people	0.621				
The influence of the COVID-19 crisis on the food shopping of young people	0.322	0.538			
Knowledge of food waste among young people	0.572	0.475	0.561		
Young people's perception of food waste on the environment	0.323	0.391	0.435	0.576	
Responsible behaviour of young people towards food waste	0.350	0.482	0.624	0.427	0.597

Next, the research hypotheses were tested based on path coefficients. The results of the path coefficients are shown in Figure 2, and the significance coefficients are presented in Figure 3. In fact, the path coefficient indicates the existence of a linear causal relationship, as well as the strength and direction of that relationship between two latent variables. It is essentially equivalent to the standardized regression coefficient observed in simpler regression

models such as simple or multiple regression. This coefficient ranges between -1 and +1, where a value of zero indicates the absence of a linear causal relationship between the two latent variables.

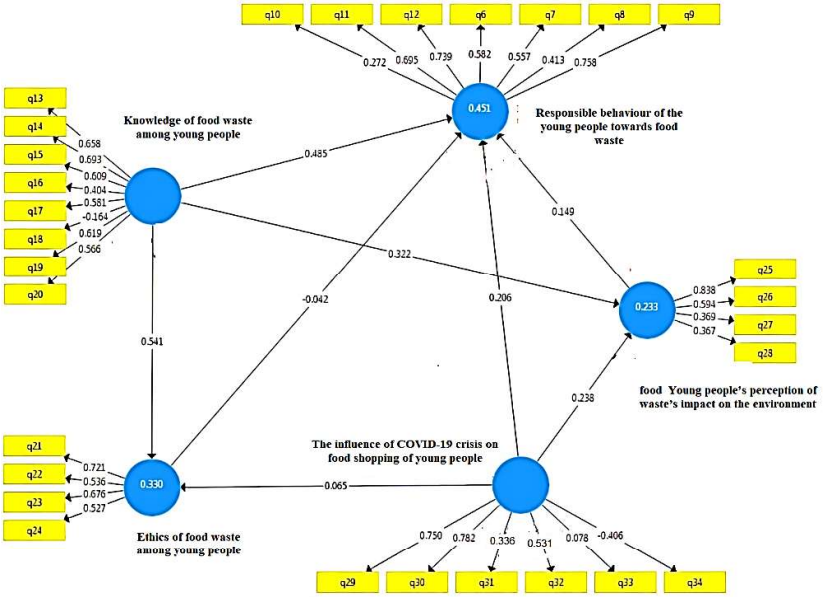

Figure 2. Path Coefficients between Variables

If the t-values exceed 1.96, it indicates a significant relationship between the constructs and, consequently, supports the research hypotheses at the 95% confidence level. As shown in Figure 3, all t-values—except for the direct path between the responsible behaviour of the young people towards food waste and the ethics of food waste among young people—are greater than 1.96. This confirms the significance of these relationships at the 95% confidence level.

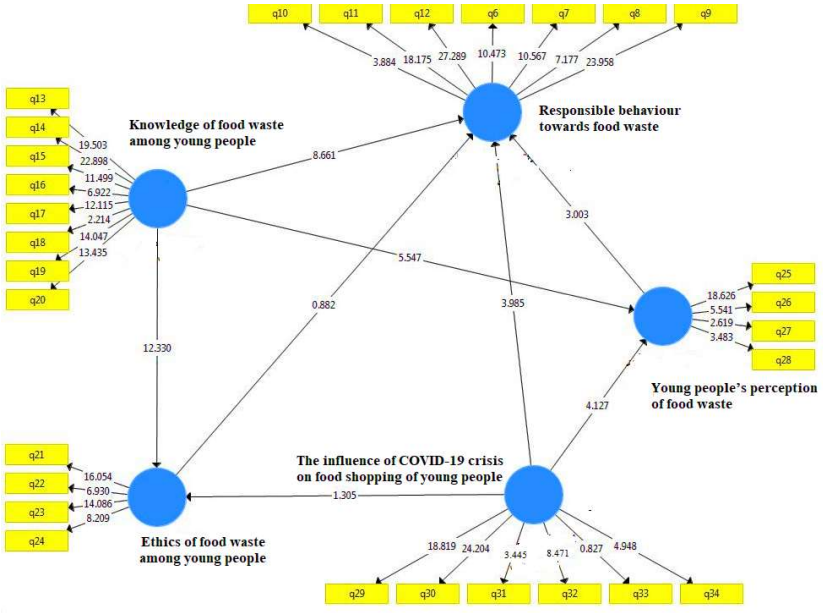

Figure 3. Model in a Meaningful State

Table 5. Hypothesis Test Results

Independent variable	Dependent variable	Path coefficient	Significance coefficient	Test result
Knowledge of food waste	Responsible behavior of young people towards food waste	0.485	8.661	approved
Knowledge of food waste	Ethics of food waste among young people	0.541	12.330	approved
Ethics of food waste among young people, awareness of food waste	Responsible behavior of young people towards food waste	0.042-	0.882	Not approved
Knowledge of food waste	Young people's perception of food waste on the environment	0.222	5.547	approved
Young people's perception of food waste on the environment	Responsible behavior of young people towards food waste	0.149	3.003	approved
Impact of the COVID-19 crisis on the purchase of food by young people	Responsible behavior of young people towards food waste	0.206	3.985	approved
Impact of the COVID-19 crisis on the purchase of food by young people	Ethics of food waste among young people	0.065	1.305	Not approved
Impact of the COVID-19 crisis on the purchase of food by young people	Young people's perception of food waste on the environment	0.238	4.127	approved

The goodness-of-fit (GOF) of the research model was assessed using the index introduced by Tenenhaus, Amato, and Esposito Vinzi. This index enables researchers to evaluate the overall model fit after examining the measurement model and the structural model separately (Davari & Rezazadeh, 2013).

$$GOF = \sqrt{Communalities * \bar{R}^2}$$

Wetzels and colleagues have introduced three values, 0.01, 0.25, and 0.36, as weak, moderate, and strong values for GOF. The overall model fit based on the GOF index was found to be 0.38, which, when compared to the baseline values, indicates a strong fit of the model with the collected data.

Conclusion

Hypothesis 1: Knowledge of food waste among young people has a direct and positive effect on their responsible behavior towards food waste, and this was confirmed. Food waste cannot be completely avoided, but the more young people are aware of food waste, the more inclined they are to change their behavior and pay more attention to the manifestations of this phenomenon. An important condition for responsible consumer behavior is awareness and organization. Considering that young people and students still live with their parents or have just recently separated from their families, they may not understand some of the food-related routines, but they can also mirror their family's food habits. Through information, communication, and awareness, they can be guided toward responsible behavior regarding food waste. If topics related to food waste principles are included in the ethical studies that students follow during their school years, and cultural institutions highlight the ethical values of this behavior in the minds of students, it can help increase responsible behavior towards food waste. Also, sources of information and knowledge among young people are diverse (family discussions, observing family behavior, and also university). When young people take control of their budgeting and grocery shopping, their understanding of food waste changes (unlike eating in a university dining hall where food preparation and management are done by others). Therefore, another source of knowledge formation comes from experience and trial and error.

Hypothesis 2: Knowledge of food waste among young people has a direct and positive

effect on the ethics of food waste among young people, and this was confirmed. Increasing awareness, changing values, and enhancing capabilities are essential for behavior change, developing competence, and engaging young people in environmental preservation to create favorable conditions for solidarity and coordination between students and the environment. As emphasized in other studies, fostering environmentally responsible behavior depends on raising awareness, continuous education, and the development of a shared cultural discourse in society (Zarepour Nasirabadi et al., 2024).

In the present era, where the environment is one of the main components of global policy, and many other components are under its influence, education is often cited as a tool for changing human behavior. The higher education institution is expected to provide appropriate education to equip students with the necessary knowledge to change their attitudes and behaviors in support of the environment. Golbaz and colleagues (2022) also confirmed the positive relationship between education and responsible behavior in their research. Knowledge and awareness directly and indirectly affect young people’s responsible behavior towards food waste. Increasing knowledge about young people’s responsible behavior towards food waste establishes a positive connection with ethical norms and environmental concerns, which leads to less food waste.

Hypothesis 3: The ethics of food waste among young people has a direct and positive effect on their responsible behavior towards food waste, but this was not confirmed. To explain the rejection of this hypothesis, it can be said that responsible environmental behaviors are a set of actions individuals take toward the environment, which encompass a wide spectrum of emotions, inclinations, and specific readiness to act toward the environment. Individuals in each society have different attitudes toward the environment based on their specific social and cultural conditions. Therefore, to facilitate a particular social action (in this case, responsible behavior towards food waste), the relationships among individuals, groups, and communities must be expanded. With the expansion of civil associations and active membership in them, as well as the establishment of mechanisms to promote institutional trust (citizens' trust in institutions), it can be expected that people's behavior toward the environment will become more responsible.

Hypothesis 4: Knowledge of food waste among young people has a direct and positive effect on their perception of the impact of food waste on the environment, and this was confirmed. The more young people know about food waste, the more they understand that it not only affects their budget but also has a negative impact on the environment. Two things are essential: what knowledge is acquired and how it is conveyed. In this regard, various training courses can be implemented, including nutrition courses, responsible consumption courses, financial education, environmental ethics, environmental protection, and so on. A solution exists for integrating responsible consumption courses with financial education courses. In this way, the development of financial knowledge is suitably blended with knowledge related to sustainable consumption, and these two ways of thinking ultimately reinforce each other. Saving is an essential part of financial education, which includes eliminating any waste, including food waste. The financial value of a savings program requires creative solutions for doing more with less, including food purchase and consumption programs. On the other hand, as confirmed by the research of Principato and colleagues (2020), the COVID-19 pandemic has led to an increase in the individual responsibility of young people for maintaining a clean and healthy environment. Recognizing the causes of environmental degradation, as well as identifying food waste that contributes to environmental destruction, can create higher levels of awareness among young people. Knowledge and awareness directly and indirectly affect young people's responsible behavior toward food waste. Parfit and colleagues (2010) concluded that young people who care about the environment and their community are less likely to waste food.

Hypothesis 5: Young people's perception of the impact of food waste on the environment has a positive effect on their responsible behavior toward food waste, and this was confirmed. In this regard, the important role and influence of key social institutions such as the government, family, and religion in controlling and changing the perception of human and

social actions can be helpful. Responsible behaviors of young people can be directed so that, by expanding their responsibility and commitment to society, they become environmentally friendly and always, in thought and action, support and protect the interests of the environment. Also, since young people are engaged with online activities and respond well to calls from influential leaders (such as environmental activists), efforts should be made to expand the relationships among individuals, groups, and communities. Furthermore, considering the consequences of the relationship between environmental quality and food waste habits, raising young people's awareness of the need for selective waste collection and promoting food packaging solutions that allow for long-term storage is one of the most reliable ways to increase responsible behaviors. The findings of this research align with those of Stanko and colleagues (2016).

Hypothesis 6: The impact of the COVID-19 crisis on young people's food shopping has a direct and positive effect on their responsible behavior toward food waste, and this was confirmed. The COVID-19 pandemic led to changes in young people's consumption behavior, as fear and concern about the future, along with income insecurity, led to more appropriate allocation of resources in all areas, including food. The result of this hypothesis aligns with the study of Principato and colleagues (2020), which states that an individual's level of concern about the economic consequences of food waste directly impacts their food-wasting behavior. Given that during the pandemic, many people found themselves losing jobs and facing difficult economic conditions, concerns about reducing food waste intensified and contributed to its reduction.

Hypothesis 7: The COVID-19 crisis has a direct and positive effect on young people's food shopping habits on the ethics of food waste among young people, and this was not confirmed. To explain the rejection of this hypothesis, the philosophy of environmental ethics education should be considered, which asserts that every individual is obligated to become aware of and understand the relationship between humans and the environment for the survival of humankind and the improvement of their quality of life, and to cultivate values and perspectives for environmental protection. Unfortunately, in our country, Iran, environmental sustainability indicators, sustainable development indicators, and quality of life indicators are always at the bottom of global tables, which becomes more evident during crises like COVID-19. Therefore, by investing in increasing awareness and responsibility and understanding the human role on Earth, the ethics of the buying and consuming process can be strengthened.

Hypothesis 8: The impact of the COVID-19 crisis on young people's food shopping has a direct and positive effect on young people's perception of the impact of food waste on the environment, and this was confirmed. Although the impact of COVID-19 on economic activity and society was generally negative, it was beneficial for the natural environment and biodiversity. COVID-19 raised increasing concern among consumers, including young people, about environmental issues. Young people understood that their actions affect the environment, which led to a reduction in food waste behavior and more responsible actions. Therefore, initiatives are necessary to strengthen this attitude among young people. Policymakers should use strategies that benefit from new information and knowledge to be accepted by young people. Awareness of the causes, forms, and consequences of food waste is the foundation for any responsible attitude and behavior among young people toward food waste. Formal and informal knowledge transferred to young people through various channels can help increase awareness of food waste, create attitudes, and shape sustainable behaviors.

This research had some limitations, including the restriction of the statistical population to young people in Tehran, which makes it difficult to generalize the results to other cities due to differences in educational and welfare facilities, data collection being solely through questionnaires (which may not be valid due to respondent bias to hide real behavior), and the lack of complementary methods like observation and interviews. Also, intervening variables such as socioeconomic status were not controlled. Given the limitations of the available studies in Iran, this research highlights the necessity for further research. In the future, the concept of responsible behavior toward food waste among young people can be

analyzed in different cities, age groups, or new models, and the proposed model can be expanded by adding variables such as health consequences or the impact of urban cleanliness. Also, examining the sustainability of young people's behavioral changes in the long term and evaluating the effectiveness of social marketing campaigns related to food waste reduction after COVID-19 is recommended.

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