



Contents lists available at ScienceDirect

# Food Quality and Preference

journal homepage: [www.elsevier.com/locate/foodqual](http://www.elsevier.com/locate/foodqual)

## Fostering local seasonality: An extended value-belief-norm model to understand sustainable food choices.

Raffaele Pasquariello<sup>1,\*</sup>, Marcella Bianchi<sup>2</sup>, Federica Mari<sup>3</sup>, Daniela Caso<sup>4</sup>

Università degli studi di Napoli Federico II, Department of Humanities, Italy

### ARTICLE INFO

#### Keywords:

Value-Belief-Norm  
Green self-identity  
Green eating self-efficacy  
University students  
Local seasonality  
Sustainable eating

### ABSTRACT

As the entire global food system accounts for a significant share of total global greenhouse gas emissions, shifting towards diets that are both environmentally sustainable and healthy has become crucial. By prioritizing local and seasonal foods individuals and communities can help to reduce the environmental impact of their food choices, while also supporting local producers and economies. Psychosocial literature has already shown that Value-Belief-Norm Theory (VBN) is a solid theoretical framework to understand and predict healthy and sustainable food choices. Moreover, other studies have taken into account the additional role of *green eating self-efficacy* (at home and university) and *green self-identity*. In light of this, the present study aimed at testing an extended VBN to understand university students' *intention* to consume local and seasonal food. 310 university students (age: 18–38; M = 24.18; SD = 3.83; 86.3% females) have completed a self-report questionnaire to assess the variables being studied. Results from a Structural Equation Modeling (SEM) confirmed the majority of proposed hypotheses. More specifically, intention was significantly predicted by *green eating self-efficacy* at home and moral norms, which, in turn, was directly impacted by *ascription of responsibilities*, *green self-identity* and *awareness of consequences*. Also the causal chain of VBN was confirmed, as well as the direct impact of biospheric values on *self-identity*. Overall, the abovementioned findings could inform future interventions aimed at promoting more sustainable food choices among university students.

### 1. Introduction

As of right now, the effects of climate change are already visible: extreme weather events such as heat waves, heavy rains, floods, and droughts (Masson-Delmotte et al., 2022) are becoming more frequent and intense. These events put human health, security, well-being, food and water supplies and infrastructure at risk. Sustainability have thus become a key matter in re-designing the development trajectories worldwide. In this context, the One Health approach has emerged as a crucial framework to address these challenges by recognizing the interconnectedness of human, animal, and ecosystem health (Zinsstag et al., 2020). By considering the broader implications of climate change on all forms of life, this approach broadens the definition of health, highlighting not only the need to include biological, psychological and social determinants in the understanding and promotion of individual

health in its complexity and totality, but also to recognize the impact of all those dimensions which, from a global and multilevel perspective, are the basis of the health of human beings, animals and ecosystems. In this scenario, dietary habits play a significant role in promoting not only human well-being but also environmental sustainability (Dixon, Michelsen, & Carpenter, 2023; Willett et al., 2019). The importance of advocating for a low environmental impact diet arises due to food production industry being a relevant contributor to climate change, accounting for 26% of greenhouse gas emissions (Poore & Nemecek, 2018; Vermeulen et al., 2012), 70% of freshwater use (Molden, 2013; Steffen et al., 2015) and using half of the habitable land for agriculture (one third being for crop and remaining two thirds for grazing; Roser, Ritchie, & Ortiz-Ospina, 2019).

The Food and Agriculture Organization of the United Nations (FAO), along with the World Health Organization (OMS), defines a sustainable

\* Corresponding author at: University of Naples Federico II, Department of Humanities, Via Porta di Massa, 1, 80138 Napoli, Italy.

E-mail addresses: [raffaele.pasquariello2@unina.it](mailto:raffaele.pasquariello2@unina.it) (R. Pasquariello), [marcella.bianchi@unina.it](mailto:marcella.bianchi@unina.it) (M. Bianchi), [caso@unina.it](mailto:caso@unina.it) (D. Caso).

<sup>1</sup> <https://orcid.org/0009-0000-2932-6467>

<sup>2</sup> <https://orcid.org/0000-0002-9417-7119>

<sup>3</sup> <https://orcid.org/0000-0003-4686-5184>

<sup>4</sup> <https://orcid.org/0000-0002-6579-963X>

<https://doi.org/10.1016/j.foodqual.2024.105248>

Received 30 January 2024; Received in revised form 27 May 2024; Accepted 13 June 2024

Available online 19 June 2024

0950-3293/© 2024 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

healthy diet as a dietary pattern that can combine all dimensions of sustainability and promote all facets of individuals' health (World Health Organization, 2019). A sustainable healthy diet should have a low environmental impact, promote people's well-being, and be economically accessible and culturally acceptable (World Health Organization, 2019). Finally, another essential feature defining such a diet is its ability to preserve biodiversity (World Health Organization, 2019). In this respect, territorial diets, such as the Mediterranean Diet (MD) are particularly suitable for emphasizing the link between cultural, social, economic, and environmental aspects of healthy, sustainable eating (World Health Organization, 2019).

One key aspect that makes the Mediterranean Diet healthy and sustainable is enhancing seasonal and local foods that help preserve biodiversity and reduce food production and distribution's environmental impact while sustaining the local economy (García et al., 2023; Ingrassia et al., 2023; Serra-Majem et al., 2020).

The definition of local and seasonal food is a debated topic as – at this time – no universal definition has been given (Vargas et al., 2021). Although often used as such, “local” and “seasonal” are not synonymous. According to a study by the United Kingdom's Department for Environment, Food and Rural Affairs (DEFRA, 2012), two definitions of seasonal food have been pinpointed: Global Seasonality and Local Seasonality. As if, in the first case, food is grown or raised during its natural season in one country or region, but it may not be consumed where it is produced, the Local Seasonality definition considers outdoor food production without additional high-energy consumption for storage or climate manipulation. Similar issues can be found when considering locality. Considering only one or the other characteristic of food, one dimension of sustainability is necessarily cut off. While seasonal food consumption positively impacts the environment by reducing energy costs deriving from the need to grow them in controlled environments and store them (e.g., extensive refrigeration), local food consumption also massively reduces greenhouse gas emissions related to transport (Guillaumie et al., 2024; Vargas et al., 2021). The concept of Local Seasonality offers a possible solution as it refers to a consumer-oriented approach that includes all the food produced outdoors, in its natural season, without additional energy, and consumed geographically close to its place of production (DEFRA, 2012). This approach could ensure greenhouse gas emissions mitigation associated with production and distribution.

Despite the substantial literature on the dietary habits of young adults (Mizia, Felińczak, Włodarek, & Syrkiewicz-Świtła, 2021; Reuter, Forster, & Brister, 2021), only a more limited number of studies examine this population's food choices through an environmentally conscious lens. In the realm of psychosocial literature, it is well-established that university students' lifestyles and dietary choices exhibit distinct characteristics that can make them not only more susceptible to health issues than the general population, but that do also have negative ramifications for the environment. More specifically, various studies (Bernardo et al., 2017; Choi, 2020) have highlighted their tendency to opt for cheaper and readily available food, a prevalence of high-fat and high-sugar foods (Ramón-Arbués et al., 2019), often increasing demand for processed food, especially when dealing with academic stress (Caso et al., 2020). These foods not only have a higher carbon footprint due to their manufacturing and transportation processes (Anastasiou, Baker, Hadjikakou, Hendrie, & Lawrence, 2022; García et al., 2023) but they also contribute to excessive waste generation due to their packaging (Kesse-Guyot et al., 2023). Furthermore, coherently with the One Health approach, the suboptimal consumption of fruits and vegetables appears problematic both for its impact on individuals' health and because it can indirectly affect the environment (Bede et al., 2020). A diet rich in plant-based foods, instead, is widely considered more sustainable as it requires less land, water, and energy compared to a diet high in animal-based foods (Xu et al., 2021). Therefore, this under-consumption does contribute to a higher environmental impact of their food habits.

Due to its benefits for both individuals and planet's wellbeing, the

current study presents a model in the context of local and seasonal food adoption intention, aiming at understanding the determinants of university students' eating choices towards a diet characterized by Local Seasonality which is paramount for designing interventions to promote such behaviour.

## 2. Theoretical background

The Value-Belief-Norm model (Stern, 2000, VBN) links the Value Theory developed by Schwartz (1992, 1994), environmental beliefs (Dunlap & Van Liere, 1978; NEP) and the Norm Activation Model (NAM) by Schwartz (1977) postulating a chain of cognitive preconditions that precede *behavioural intention*. The VBN model framework proposes that people are more likely to act environmentally friendly when they feel morally obligated to do so (*moral norms*). This is especially true when people believe that they are responsible for the environment (*ascription of responsibilities*) and are aware of the impact of their actions (*awareness of consequences*). In other words, the VBN model framework suggests that people's values, beliefs, and norms influence their pro-environmental behaviour. When people feel that they have a moral obligation to protect the environment and believe that they are responsible for the consequences of their actions, they are more likely to act in an environmentally friendly way. Although initially formulated to explain altruism, NAM has been frequently applied to the environmental context, focusing on the drivers influencing human intention when engaging in pro-environmental behaviours (De Groot & Steg, 2009; Han, 2015; Özekici, 2022). As for this model, *behavioural intention* is the result of a functional relationship involving *awareness of consequences* (AC), *ascription of responsibilities* (AR) and *moral norms* (MN; De Groot & Steg, 2009). AC is described as individuals' awareness of the positive effects of their pro-social and pro-environmental actions on others (Rezaei et al., 2019) and being cognizant of the negative consequences for other people when avoiding acting out a specific behaviour (Zhang et al., 2020). AR encompasses an individual's sense of responsibility for the beneficial outcomes of these behaviours on others (De Groot & Steg, 2009). Whenever these two psychological components arise, moral obligation (MN) to help others is prompted, and consequently, individuals engage or abstain from acting pro-environmental behaviours (Yazdanpanah et al., 2014). *Moral norm* is the most proximal antecedent of *behavioural intention*. As defined by Schwartz (1977), personal norms concern whether a person should engage in or refrain from an activity with unwanted consequences.

While the NAM theory emphasizes AC of events regarding only other individuals, VBN encompasses the necessity of considering whatever object can be the focus of the values that underlie the norm (Stern, 2000). As for pro-environmental behaviours, for example, threats to nonhuman species and the biosphere could be more relevant. *Biospheric values* encompass values that prioritize the environment and the biosphere, representing guiding principles in people's lives (Schwartz, 1992). As noted by Steg and De Groot (2012), people who have solid *biospheric values* tend to place an intrinsic value on nature and the environment, regardless of the usefulness it has for them. They stated that these individuals prefer to buy environment-friendly products, even when various barriers are perceived. In a similar study, Van Der Werff et al. (2013) found that buyers with strong *biospheric values* prefer green products, even when more expensive. Pro-environmental beliefs were measured in the first conceptualization of the VBN theory by the New Ecological Paradigm (NEP; Dunlap & Van Liere, 1978), which encompasses several aspects of environmental concern. In particular, it recognizes the limitations in humans' availability and utilization of natural resources. Secondly, it acknowledges the fragility of what is often called “natural balance”. Lastly, it emphasizes valuing natural resources for their intrinsic worth rather than solely for human purposes (Dunlap, Van Liere, Mertig, & Jones, 2000).

Consumer's choice to approach sustainable food can have multiple motivations, such as seeking health benefits, supporting animal welfare,

considering environmental impact, or simply because they enjoy its taste. Literature on psychosocial antecedents of food choice showed how VBN variables can explain sustainable food choices. For example, Shin et al. (2018) found that *awareness of the consequences* (AC) led to higher *ascription of responsibilities* (AR), which in turn leads to a stronger personal norm towards preferring organic menus. Similarly, in another study, Shin and Hancer (2016) found that, while exploring consumers' intention to purchase local food products, the *moral norm* was their model's second largest determinant for local food purchase intention. Finally, it has been noted that college students who adhere to *biospheric values* are more likely to make environmentally conscious food choices. At the same time, *pro-environmental beliefs* and norms, being significant variables, positively impacted food choices for environmental reasons (Arya, Chaturvedi, & Bhati, 2024; Whitley et al., 2016).

### 2.1. Green self-identity

Deriving from the Identity Theory (Stryker, 1968), self-identity can be defined as a stable feature that helps individuals define their identity and self-perception in connection with a specific behaviour (Conner & Armitage, 1998). The importance of self-identity is to be sought in his power to generate an engagement in a certain behaviour by moving one's desire to remain consistent with the perception of one's identity (Stets & Burke, 2000). The strength of the relationship between self-identity and behaviours depends on the salience of the role identity: a more salient role identity (e.g., "I think of myself as a green eater") has more predictive power on the intention to engage in the selected behaviour (Charmg et al., 1988). In particular, *green self-identity* has been recognized as a stable construct that predicts intentions and pro-environmental behaviours (Becerra, Carrete, & Arroyo, 2023; Whitmarsh & O'Neill, 2010) and it refers to the extent to which individuals see themselves as someone who acts environmentally friendly (Van Der Werf et al., 2013). Those who have developed a green identity openly demonstrate their care for the environment through their ecological actions. For example, recycling behaviours are motivated by consumers' identification as recyclers (Mannetti et al., 2004). Similarly, the *intention* to purchase eco-products is influenced by individuals' perception of themselves as environmentally conscious (Sparks & Shepherd, 1992). Building upon these findings, Whitmarsh and O'Neill (2010) identified a behaviour-specific level of *green self-identity* related to the *intention* to purchase green products. Likewise, Barbarossa and De Pelsmacker (2016) have more recently proposed *green self-identity* as a self-oriented predictor of purchase intention for eco-friendly products and, more broadly, as a driver of environmentally friendly behaviours. Moreover, if on one side biospheric values have a positive impact on consumers' environmental self-identity (Gatersleben, Murtagh, & Abrahamse, 2014), on the other, several studies have proposed the idea that the more individuals perceive themselves as green consumers, the more they will perceive moral obligation in performing ethical actions (Xu, Zhang, & Liu, 2024), such as opting for ethical food products (Shaw & Shiu, 2003; Sparks & Shepherd, 2002).

### 2.2. Green eating self-efficacy

As conceptualized by Bandura (1977), self-efficacy refers to an individual's perceived ability or expectation of efficacy to perform a task. It mediates between performance on current tasks and future task performance. When self-efficacy increases, it leads to improved performance and vice versa. Therefore, a change in self-efficacy levels can predict lasting behavioural changes with sufficient incentives and skills. Self-efficacy measures may differ across various problem areas but are typically scored as a single sum across different situations. People vary in the specific domains in which they cultivate their efficacy and the levels to which they develop it within those domains. Thus, the efficacy belief system is not a global trait but a set of differentiated self-beliefs associated with specific realms of functioning (Bandura, 2006).

Situational self-efficacy reflects an individual's confidence level in engaging in new behaviours and maintaining those behaviours in challenging situations (Weller et al., 2014). Green eating has been defined as eating less meat, limiting processed food, or picking organic food but also focusing on eating locally and in-season food, reducing greenhouse gas emissions (Vargas et al., 2021). Although local and seasonal food is perceived as fresher, with a better taste and better looking by college students in the US (Wilkins et al., 2000), changes in consumer's dietary habits are still a challenge. Investigating university students' perceived ability to consume seasonal and local food could be a key aspect.

### 2.3. Research hypotheses

Drawing from the literature presented above, this study investigates psychosocial determinants of the *intention* to consume local and seasonal food among university students. Thus, we hypothesize the model depicted in Fig. 1. Specifically, we expect to confirm the direct effects as postulated within the causal chain of the VBN theoretical framework (H1), according to which *biospheric values* predict *pro-environmental beliefs* (H1a), which impacts *ascription of responsibilities* (H1b), impacting *awareness of consequences* (H1c) that, in turn, has an effect on *moral norms* (H1d), finally predicting Behavioural Intention (H1e). Moreover, as additional relationships among VBN variables (H2), we also hypothesize that *moral norms* are directly predicted by Pro-environmental Beliefs (H2a) and *awareness of consequences* (H2b). Furthermore, we also expect *green self-identity* to play a role in this extended model (H3), specifically being predicted by *biospheric values* (H3a) and by predicting *moral norm* (H3b). Furthermore, *green eating self-efficacy* is expected to significantly affect *intention* (H4) in both at home (H4a) and at university (H4b) contexts.

## 3. Methods

### 3.1. Data collection and survey

The current research was implemented following ethical approval by the Ethical Committee of Psychological Research of University of Naples - Federico II (prot. n° 33/2021). Using a medium-sized effect ( $\delta = 0.30$ , which indicates the smallest correlation between latent variables that the researcher aims to detect based on sample and model (Westland, 2010),  $\alpha = 0.05$ , power = 0.80, and taking into account the number of observed (28) and latent variables (9), an a priori power analysis for Structural Equation Models (Soper & Calculator, 2022) indicated that a minimum sample size of 184 would have been appropriate to achieve the specified effect.

Between May and October 2022, 310 Italian students aged between 18 and 38 years old ( $M = 24.18$ ;  $SD = 3.83$ ) gave their informed consent to participate and anonymously completed the online self-report questionnaire created with Google Forms, via informal channels (e.g., Facebook groups). To be eligible for participation, they needed (1) to be of legal age ( $> 18$ ), (2) to be residents of Italy, and (3) to be matriculated in a university degree course.

Most participants (86.3%) identify themselves as women, 12.4% identify as male, and 1% as non-binary, while 0.3% prefer not to specify their gender. The majority of participants (45.4%) resided in Campania (South Italy) at the time of filling in the questionnaire, and the remaining 54.6% lived in all other Italian regions (8.9% Lombardia; 7.3% Veneto; 5.4% Piemonte; 4.1% Toscana). 51.7% of our participants lived in a city, 27.9% in a small town, and 20.3% in a metropolitan area. Regarding education, 54.9% of subjects had a bachelor's degree, 28.6% had a high school graduation, 13.7% had a master's degree, and 2.9% had a postgraduate degree. 32.7% declared to be student workers and 39% to be offsite students. When asked about their economic situation, 48.9% declared to belong to a medium-low economic range, 39.4% to a medium-high one, and 8.3% declared to belong to a low and 3.5% high

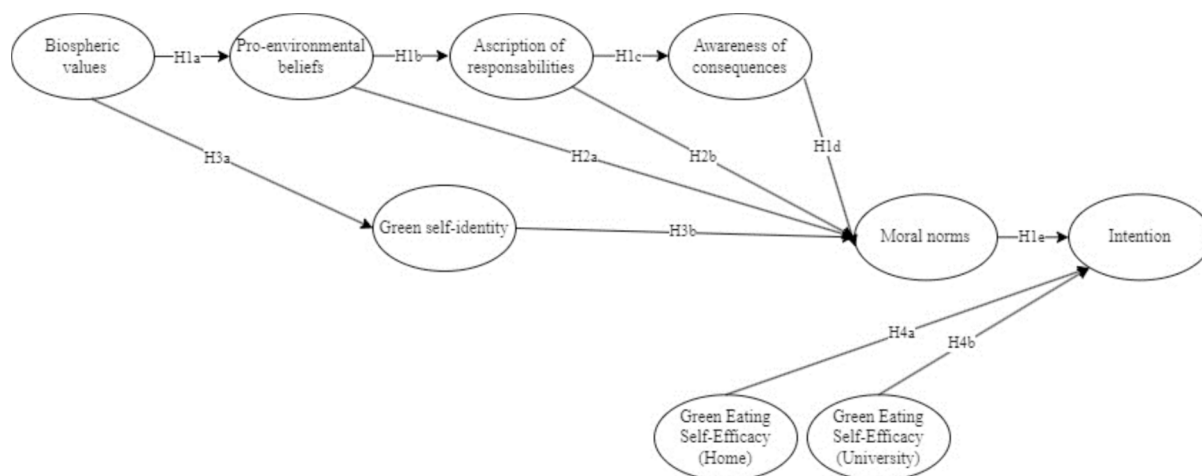


Fig. 1. Hypothesized Model.

range. Concerning their habits, 53.3% reported practising amatorial sports, and 41% reported not practising any sport, while 71.4% reported being an omnivore, 14% vegetarian, 6.3% vegan, 4.4% flexitarian.

### 3.2. Measures

The questionnaire administered was developed to assess all psychological variables of interest. The first section presented all VBN constructs related to the *intention* of consuming local and seasonal foods. Then, it comprised measures for additional variables (namely, *green self-identity* and *green self-efficacy*) and some non-psychological and demographic information. Measures are detailed below.

*Biospheric values* were measured with 4 items (e.g., “It is important for me to respect nature”; De Groot & Steg, 2008) on a 7-point Likert scale.

*Pro-environmental beliefs* were recorded with 3 items (e.g., “Human progress can only be achieved by maintaining an environmental balance”; Carfora et al., 2021).

Both *awareness of consequences* (e.g., “Consuming local and seasonal products improves the environment; Teisl, Noblet, & Rubin, 2009) and *ascription of responsibilities* (e.g., “Every citizen must take responsibility for the environment”; Gärling et al., 2003) were evaluated with 3 items on a 7-point Likert scale.

*Moral norms* were assessed with 3 items (“I feel I should consume local and seasonal products for the sake of the environment”; Teisl, Noblet, & Rubin, 2009) on a 5-point Likert scale.

*Intention* to consume local and seasonal products was measured with 3 items (“I intend to consume local and seasonal food; Ajzen, 1991) on a 5-point Likert scale.

*Green self-identity* was assessed with 3 items (e.g., “I think of myself as a “green consumer”; Carfora et al., 2019) on a 7-point Likert scale.

*Green eating self-efficacy* was measured for two contexts: at home and university. For both, 3 items were used (“When I am with my family” and “When I eat in the dining halls or cafeterias”; Weller et al., 2014).

For all the employed items, scales ranged from “Completely disagree” to “Completely agree”. The only exception was for *green eating self-efficacy*, which ranged from “Not confident at all” to “Extremely confident”, as participants were asked how confident they felt in consuming local and seasonal food in different scenarios of the considered contexts.

As for socio-demographic information, participants were asked about their age, gender, geographic area of residence, whether or not they were working students, being or not non-resident students, socio-economic status, and dietary regime. Finally, participants answered a set of questions on if and how often they took care of food purchases on a 4-point scale (0 = “No, never”, 4 = “Yes, always”) and how often they

bought food in the following places on a scale from 0 (“Never”) to 4 (“Always”): supermarket, local market, local stores, direct purchase from the manufacturer, self-production.

### 3.3. Statistical analysis

The R statistical software was used for statistical analyses. We had no missing values, as the answer to each item in the questionnaire was mandatory to keep on the completion. For each scale, internal consistency was verified by computing Cronbach’s alpha, and scoring was assessed considering the average of single items’ scores. Descriptive statistics were calculated for each variable. Pearson’s correlations were calculated to measure the strength of the association among the pairs of variables. Moreover, the lavaan package (Rosseel, 2012) was used to test the hypothesized model (H1-4) with a full structural equation model (SEM; Jöreskog, 1970) based on maximum likelihood estimation with robust standard errors and a Satorra-Bentler scaled test statistic.

As part of preliminary analysis, effects of demographic and non-psychological variables on intention have been investigated (gender, age, being resident in a small town, being a student with a job, non-resident students, high socio-economic status, omnivorous diet, being responsible for food purchase, always buying food in supermarkets). Only those variables showing significant effects on the main dependent variable (intention) have been included as controlling factors in the main analysis: female gender ( $t = 3.45$ ,  $df = 308$ ,  $p < 0.001$ ) and how often participants take care of the purchase of food ( $t = -2.90$ ,  $df = 308$ ,  $p = 0.004$ ).

To evaluate to what extent observed data supported the hypothesized model, several fit indices were considered: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Adequate fit is defined by  $CFI$  and  $TLI \geq 0.90$ ,  $RMSEA \leq 0.06$ , and  $SRMR \leq 0.08$  (Hu & Bentler, 1999).

## 4. Results

### 4.1. Descriptive statistics

Descriptive analyses and Pearson’s correlations among variables are displayed in Table 1. Participants showed quite high levels of *intention* to consume local and seasonal foods, and, among considered variables, only *green eating self-efficacy* at university showed scores lower than the central value. In the correlation analysis, the *intention* was correlated with all the considered psychological variables. All variables were significantly correlated with each other, while only *moral norms* showed a significant correlation with age.



**Table 1**  
Latent constructs' descriptive statistics, Pearson's correlations, Cronbach's  $\alpha$  and AVE.

	Mean (SD)	Range	1	2	3	4	5	6	7	8	9
1. Intention	3.24 (0.71)	0–4	1								
2. Green Self-identity	2.86 (0.82)	0–4	0.41**	1							
3. Biospheric values	5.82 (1.23)	1–7	0.41**	0.59**	1						
4. Pro-environmental Beliefs	5.18 (1.03)	0–4	0.39**	0.50**	0.50**	1					
5. Moral Norms	3.01 (0.84)	0–4	0.46**	0.44**	0.43**	0.49**	1				
6. Awareness of Consequences	4.99 (0.90)	0–6	0.41**	0.39**	0.38**	0.49**	0.57**	1			
7. Ascription of Responsibilities	4.65 (1.14)	0–6	0.50**	0.47**	0.47**	0.56**	0.65**	0.65**	1		
8. Self-Efficacy University	1.81 (0.79)	0–4	0.29**	0.29**	0.29**	0.12*	0.26**	0.24**	0.35**	1	
9. Self-Efficacy Home	3.33 (0.69)	0–4	0.48**	0.42**	0.48**	0.43**	0.39**	0.35**	0.46**	0.35**	1
<b>Cronbach's <math>\alpha</math></b>			0.90	0.88	0.92	0.90	0.82	0.84	0.85	0.76	0.82
<b>AVE</b>			0.68	0.73	0.75	0.74	0.57	0.67	0.67	0.56	0.61

Note. \*\*  $p < 0.01$ , \*  $p < 0.05$ .

4.2. The measurement model

Table 2 depicts results of the measurement model, reporting each item descriptive statistics and standardized factor loadings. All latent constructs showed strong relationships with the related items, with all factor loadings > 0.5, except for a single item (GESEUni\_3), whose loading is still approaching that threshold (0.49). Reliability was also assessed through Cronbach's  $\alpha$  (Table 1), whose values are all > 0.7. Both convergent and discriminant validity are established, as all AVEs (reported in Table 1) are higher than 0.5 and the square root of the AVE of each construct is higher than its other correlation values (Fornell & Larcker, 1981).

4.3. The structural model

Overall, the analysis showed that the model suited the data sufficiently well, as all considered indexes pointed to a good fit of the global

model (CFI = 0.92, TLI = 0.91, RMSEA = 0.055), except for SRMR (0.127). Regarding structural relationships, almost all the hypotheses are confirmed (Fig. 2). The first hypothesis (H1) about the classical VBN model is confirmed, as Pro-Environmental Beliefs (H1a), *ascription of responsibilities* (H1b), *awareness of consequences* (H1c) and *moral norms* (H1d) are linked as a casual chain finally impacting the *intention* (H1e). The additional relationships hypothesized between the VBN variables (H2) are partially confirmed: while *ascription of responsibilities* is a significant direct predictor of *moral norms* (H2b), the direct impact of Pro-environmental beliefs was not significant ( $\beta = 0.11$ ) (H2a). Also, about additional variables, the role of *green self-identity* within the model was confirmed (H3), as *biospheric values* impact *green self-identity* (H3a), which, in turn, has an effect on *moral norms* (H3b). Finally, *green eating self-efficacy* (H4) significantly impacts the *intention* when the home context is considered (H4a), while it has no significant effect ( $\beta = 0.08$ ) when the University context is taken into account (H4b). Finally, as for the two control variables (female gender,  $\beta = 0.04$  and taking care of the

**Table 2**  
Items descriptive statistics and standardized factor loadings.

Item	M (SD)	$\lambda$										
			INT	GE SELF-ID	BIO VAL	PE BELIFS	Moral Norms	AW OF CONS	ASC OF RESP	GESE UNI	GESE HOME	
Int_1	3.32 (0.77)	0.92										
Int_2	3.05 (0.79)	0.80										
Int_3	3.36 (0.77)	0.86										
Selfid_1	2.64 (0.88)		0.69									
Selfid_2	3.00 (0.91)		0.93									
Selfid_3	2.95 (0.95)		0.91									
BioVal_1	5.75 (1.35)			0.94								
BioVal_2	5.79 (1.40)			0.97								
BioVal_3	6.08 (1.22)			0.87								
BioVal_4	5.66 (1.48)			0.70								
ProEB_1	4.99 (1.21)				0.83							
ProEB_2	5.29 (1.10)				0.83							
ProEB_3	5.26 (1.09)				0.93							
MorNorm_1	3.31 (0.84)					0.85						
MorNorm_2	2.46 (1.16)					0.66						
MorNorm_3	3.25 (0.90)					0.86						
AoC_1	4.74 (1.13)						0.54					
AoC_2	5.12 (0.98)						0.96					
AoC_3	5.13 (1.00)						0.96					
AoR_1	4.67 (1.19)							0.81				
AoR_2	4.79 (1.30)							0.80				
AoR_3	4.49 (1.37)							0.84				
GESEUni_1	2.03 (1.12)								0.83			
GESEUni_2	2.13 (1.16)								0.85			
GESEUni_3	1.83 (1.09)								0.49			
GESEHome_1	3.34 (0.74)									0.88		
GESEHome_2	3.32 (0.82)									0.78		
GESEHome_3	3.34 (0.85)									0.69		

Note. INT = Intention; GE SELF-ID = Green Self-Identity; BIO VAL = Biospheric Values; AW OF CONS = Awareness of Consequences; ASC OF RESP = Ascription of Responsibilities; GESE UNI = Green Eating Self-Efficacy at University; GESE HOME = Green Eating Self-Efficacy at Home. All standardized factor loadings are statistically significant ( $p < 0.001$ ).



Fig. 2. Structural model with standardised regression coefficients. Note. \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . The dotted lines indicate non-significant paths.

food purchasing,  $\beta = 0.04$ ) no statistically significant impact on intention was found.

Finally, the variables considered in the proposed extended model explained a satisfactory amount of the variance in the outcome, namely the intention to consume local and seasonal food ( $R^2 = 37\%$ ).

## 5. Discussion

The current study proposed an integrated psychosocial model combining VBN variables, *green self-identity* and *green eating self-efficacy*, both at home and university, to assess Italian students' *intention* to consume local and seasonal products. This study also examined and tested the direct relationships between *pro-environmental beliefs* and *moral norms*, *awareness of consequences* and *moral norms* and *biospheric values* and *green self-identity*. Our results are mostly in line with the proposed hypothesis and, consequentially, could inform psychosocial literature about the *intention* to consume local and seasonal food among younger people.

First and foremost, our findings confirmed the direct effects of the postulated causal chain of the VBN (NEP, AC, AR, MN) as a significant and positive predictor of *behavioural intention* for consuming local and seasonal food among university students. Consequently, it is possible to assume that students who feel a strong moral obligation to act in an environment-friendly manner will show a higher intention to approach more sustainable foods. Although VBN theory has been tested in the context of several pro-environmental topics, lesser interest has been directed to younger people. However, the observed outcomes are consistent with previous literature that explores green food purchase behaviour using the same theoretical framework (Yang et al., 2023; Carfora et al., 2021; Chen, 2020; Whitley et al., 2016). Moreover, our outcomes suggest that building blocks for environmentally conscious food consumption can be traced back to *biospheric values*, the initial trigger to all other relationships, endorsing not only ecological world-views but also an environmental identity: the stronger an individual's environmental values are, the greater the likelihood they are more inclined to consistently feel morally obliged to act in an environmentally responsible manner across various situations (Lee, Kim, & Roh, 2023; Steg, Bolderdijk, Keizer, & Perlaviciute, 2014). However, a non-significant relationship between *green eating self-efficacy* at university and *intention* has been found. Situational self-efficacy is defined as an individual's confidence level when it comes to adopting a new behaviour and sustaining it, especially in the face of difficult situations (Velicer et al., 1990). Given the discrepancy with the home context, these results suggest that university students' confidence in sustaining a

more sustainable diet can greatly vary depending on their context, as practical barriers could come into place. For example, in a study by AL-Otaibi (2013), it was discovered that the primary obstacles to the consumption of fruits and vegetables for students were, among others, the unavailability of fruits and vegetables in the university cafeteria. Other than availability, pricing could be a major factor: a study carried out in a public university revealed that the nutritional quality of the items sold in the on-campus food environment was generally low, with the healthiest choices being the most costly. Consequently, limited availability and higher prices did not encourage healthy food selections within the university setting (Pulz et al., 2017).

University students are a peculiar and interesting population as they find themselves in a transitional phase in their lifetime. As they move from late adolescence to adulthood, their values and beliefs are not crystalized yet, constantly changing (Magolda & Astin, 1993; Sheldon, 2005). Therefore, this may make them more open to approach sustainable behaviours, such as eating in an eco-friendly way. Starting from our results, educating students about the environmental impacts of their food choices should not only go through moulding *moral norms*, which would create short-term achievements but working on green values could prove more effective. If norms derive from values, reshaping them could inform norm construction. Higher education should draw upon the VBN theory and the findings from this research. For behavior modification to be successful, it is our recommendation that students should internalize the link between their behavior and their value system.

Universities could enhance students' awareness of the adverse consequences of environmental degradation, make them realize their responsibility and persuade them to endorse biospheric values that eventually facilitate the formation of a *green self-identity*. There are still issues regarding practical barriers to approaching local and seasonal food when students are at university and the consequent necessity to make them more available and more accessible from an economic perspective. In this regard, campuses could approach by lobbying a caterer that would grant to adopt more sustainable food practices while they have an ongoing contract.

### 5.1. Conclusions

This study offers a distinctive contribution by bridging the VBN framework and the unique characteristics of our study population, highlighting its significance and relevance in the realm of higher education sustainability research, but not without flaws. First and foremost, given the gap between the intention to engage in a certain behaviour and

the actual acting out of the behaviour itself, the lack of a behaviour measurement is to be acknowledged as the most pressing limitation of the study. Moreover, our convenience sample was not representative, and mainly composed of participants identifying as women and residents in the Campania region (Italy) and, therefore, not generalizable to the overall population. Furthermore, although university students' value system, pro-environmental beliefs and moral norms, as we have seen, have a positive effect on their consuming intention of local and seasonal food, other possible influential factors were not included in this study. While still focusing on university students, future researchers could not only test the predictivity of this model on other and more balanced population, but also consider other impact factors of consuming local and seasonal food, such as such as local identity (Ren & Fusté-Forné, 2024; Wallnoefer, Riefler, & Meixner, 2021), trust in producers (Lee et al., 2020).

### Ethical statement

This study was performed in accordance with the Declaration of Helsinki and was approved by the Ethical Committee of Psychological Research of the Department of Humanities of the University of Naples Federico II (n. 33/2021). The data is analyzed anonymously. Before starting the questionnaire, participants were informed about the anonymity of data collection and signed the informed consent form, declaring that they were at least 18 years old.

### Fundings

This study was part of ONFOODS Project, funded under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.3 – Call for proposals No. 341 of 15 March 2022 of Italian Ministry of University and Research funded by the European Union – NextGenerationEU.

### CRedit authorship contribution statement

**R. Pasquariello:** Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Formal analysis, Data curation, Conceptualization. **M. Bianchi:** Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Formal analysis, Data curation, Conceptualization. **F. Mari:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **D. Caso:** Writing – review & editing, Supervision, Project administration, Funding acquisition, Conceptualization.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

The data supporting the findings of the current study are available on request from the corresponding author.

### References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), Art. 2. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
- AL-Otaibi, H. H. (2013). The Pattern of Fruit and Vegetable Consumption among Saudi University Students. *Global Journal of Health Science*, 6(2), Art. 2. <https://doi.org/10.5539/gjhs.v6n2p155>.
- Anastasiou, K., Baker, P., Hadjikakou, M., Hendrie, G. A., & Lawrence, M. (2022). A conceptual framework for understanding the environmental impacts of ultra-processed foods and implications for sustainable food systems. *Journal of Cleaner Production*, 368, 133155. <https://doi.org/10.1016/j.jclepro.2022.133155>

- Arya, B., Chaturvedi, S., & Bhati, N. S. (2024). Extending the theory of planned behaviour to predict sustainable food consumption. *Environment, Development and Sustainability*, 1–24. <https://doi.org/10.1007/s10668-024-04466-z>
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2). <https://doi.org/10.1037/0033-295X.84.2.191>
- Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents*, 5(1), 307–337. <https://doi.org/10.12691/jpar-2-1-2>
- Barbarossa, C., & De Pelsmacker, P. (2016). Positive and negative antecedents of purchasing eco-friendly products: A comparison between green and non-green consumers. *Journal of Business Ethics*, 134(2), Art. 2. <https://doi.org/10.1007/s10551-014-2425-z>
- Becerra, E. P., Carrete, L., & Arroyo, P. (2023). A study of the antecedents and effects of green self-identity on green behavioral intentions of young adults. *Journal of Business Research*, 155, 113380. <https://doi.org/10.1016/j.jbusres.2022.113380>
- Bede, F., Cumber, S. N., Nkfusai, C. N., Venyuy, M. A., Ijang, Y. P., Wepngong, E. N., & Nguti Kien, A. T. (2020). Dietary habits and nutritional status of medical school students: The case of three state universities in Cameroon. *The Pan African Medical Journal*, 35, 15. <https://doi.org/10.11604/pamj.2020.35.15.18818>
- Bernardo, G., Jomori, M., Fernandes, A. C., & Proenca, R. (2017). Food intake of university students. *Revista de Nutrição*, 30, 847–865. <https://doi.org/10.1590/1678-98652017000600016>
- Carfora, V., Cavallo, C., Caso, D., Del Giudice, T., De Devitiis, B., Viscecchia, R., Nardone, G., & Cicia, G. (2019). Explaining consumer purchase behavior for organic milk: Including trust and green self-identity within the theory of planned behavior. *Food Quality and Preference*, 76, 1–9. <https://doi.org/10.1016/j.foodqual.2019.03.006>
- Carfora, V., Cavallo, C., Catellani, P., Del Giudice, T., & Cicia, G. (2021). Why do consumers intend to purchase natural food? Integrating theory of planned behavior, value-belief-norm theory, and trust. *Nutrients*, 13(6), Art. 6. <https://doi.org/10.3390/nu13061904>
- Caso, D., Miriam, C., Rosa, F., & Mark, C. (2020). Unhealthy eating and academic stress: The moderating effect of eating style and BMI. *Health Psychology Open*, 7(2). <https://doi.org/10.1177/2055102920975274>
- Charng, H.-W., Piliavin, J. A., & Callero, P. L. (1988). Role identity and reasoned action in the prediction of repeated behavior. *Social Psychology Quarterly*, 51(4), Art. 4. <https://doi.org/10.2307/2786758>
- Chen, M. F. (2020). Selecting environmental psychology theories to predict people's consumption intention of locally produced organic foods. *International Journal of Consumer Studies*, 44(5), 455–468. <https://doi.org/10.1111/ijcs.12578>
- Choi, J. (2020). Impact of stress levels on eating behaviors among college students. *Nutrients*, 12(5). <https://doi.org/10.3390/nu12051241>. Art. 5.
- Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology*, 28(15), Art. 15. <https://doi.org/10.1111/j.1559-1816.1998.tb01685.x>
- De Groot, J. I. M., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: how to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior*, 40(3), Art. 3. <https://doi.org/10.1177/0013916506297831>
- De Groot, J. I. M., & Steg, L. (2009). Morality and prosocial behavior: The role of awareness, responsibility, and norms in the norm activation model. *The Journal of Social Psychology*, 149(4), Art. 4. <https://doi.org/10.3200/SOCP.149.4.425-449>
- DEFRA. Understanding the Environmental Impacts of Consuming Foods That Are Produced Locally in Season; DEFRA: London, UK, 2012.
- Dixon, K. A., Michelsen, M. K., & Carpenter, C. L. (2023). Modern diets and the health of our planet: An investigation into the environmental impacts of food choices. *Nutrients*, 15(3), 692. <https://doi.org/10.3390/nu15030692>
- Dunlap, R. E., & Van Liere, K. D. (1978). The "new environmental paradigm". *The Journal of Environmental Education*, 9(4), Art. 4. <https://doi.org/10.1080/00958964.1978.10801875>
- Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). New trends in measuring environmental attitudes: measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), Art. 3. <https://doi.org/10.1111/0022-4537.00176>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.2307/3151312>
- García, S., Bouzas, C., Mateos, D., Pastor, R., Álvarez, L., Rubín, M., & Tur, J. A. (2023). Carbon dioxide (CO<sub>2</sub>) emissions and adherence to Mediterranean diet in an adult population: The Mediterranean diet index as a pollution level index. *Environmental Health*, 22(1), 1. <https://doi.org/10.1186/s12940-022-00956-7>. PMID: 36600281; PMCID: PMC9814202.
- Gärting, T., Fujii, S., Gärling, A., & Jakobsson, C. (2003). Moderating effects of social value orientation on determinants of proenvironmental behavior intention. *Journal of Environmental Psychology*, 23(1). [https://doi.org/10.1016/S0272-4944\(02\)00081-6](https://doi.org/10.1016/S0272-4944(02)00081-6). Art. 1.
- Gatersleben, B., Murtagh, N., & Abrahamse, W. (2014). Values, identity and pro-environmental behaviour. *Contemp. Soc. Sci.*, 9(4), 374–392. <https://doi.org/10.1080/21582041.2012.682086>
- Guillaumie, L., Vézina-Im, L. A., Boiral, O., Prescott, J., Bergeron, A., & Yuriev, A. (2024). Promoting local food products for sustainability: Developing a taxonomy of best practices. *Sustainable Development*, 32(1), 635–646. <https://doi.org/10.1002/sd.2697>
- Han, H. (2015). Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior. *Tourism Management*, 47, 164–177. <https://doi.org/10.1016/j.tourman.2014.09.014>



- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Ingrassia, M., Altamora, L., Columba, P., Raffermati, S., Lo Grasso, G., Bacarella, S., & Chironi, S. (2023). Mediterranean diet, sustainability, and tourism—A study of the market's demand and knowledge. *Foods*, 12(13), 2463. <https://doi.org/10.3390/foods12132463>
- Jöreskog, K. G. (1970). A General method for estimating a linear structural equation system\*. *ETS Research Bulletin Series*, 1970(2), Art. 2. <https://doi.org/10.1002/j.2333-8504.1970.tb00783.x>
- Kesse-Guyot, E., Allès, B., Brunin, J., Fouillet, H., Dussiot, A., Berthy, F., & Touvier, M. (2023). Environmental impacts along the value chain from the consumption of ultra-processed foods. *Nature Sustainability*, 6(2), 192–202. <https://doi.org/10.1038/s41893-022-01013-4>
- Lee, S. S., Kim, Y., & Roh, T. (2023). Pro-environmental behavior on electric vehicle use intention: Integrating value-belief-norm theory and theory of planned behavior. *Journal of Cleaner Production*, 418, 138211. <https://doi.org/10.1016/j.jclepro.2023.138211>
- Lee, T. H., Fu, C.-J., & Chen, Y. Y. (2020). Trust factors for organic foods: Consumer buying behavior. *British Food Journal*, 122(2), 414–431. <https://doi.org/10.1108/BFJ-03-2019-0195>
- Magolda, M., & Astin, A. (1993). What matters in college: Four critical years revisited. *Educational Researcher*, 22. <https://doi.org/10.2307/1176821>
- Mannetti, L., Pierro, A., & Livi, S. (2004). Recycling: Planned and self-expressive behaviour. *Journal of Environmental Psychology*, 24(2). <https://doi.org/10.1016/j.jenvp.2004.01.002>. Art. 2.
- Masson-Delmotte, V., Zhai, P., Pörtner, H. O., Roberts, D., Skea, J., & Shukla, P. R. (2022). *Global Warming of 1.5 C: IPCC special report on impacts of global warming of 1.5 C above pre-industrial levels in context of strengthening response to climate change, sustainable development, and efforts to eradicate poverty*. Cambridge University Press. <https://doi.org/10.1017/9781009157940>
- Mizia, S., Felińczak, A., Włodarek, D., & Syrkiewicz-Światała, M. (2021). Evaluation of eating habits and their impact on health among adolescents and young adults: A cross-sectional study. *International Journal of Environmental Research and Public Health*, 18(8), 3996. <https://doi.org/10.3390/ijerph18083996>
- Molden, D. (2013). *Water for food water for life: A comprehensive assessment of water management in agriculture*. Routledge. <https://doi.org/10.4324/9781849773799>
- ÖZEKİCİ, Y. K. (2022). Extending value-belief and norm theory with social identity for preventing food waste at restaurants. *Turizm Akademik Dergisi*, 9(1), 273–291.
- Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. *Science (New York, N.Y.)*, 360, 987–992. <https://doi.org/10.1126/science.aag0216>
- Pulz, I. S., Martins, P. A., Feldman, C., & Veiros, M. B. (2017). Are campus food environments healthy? A novel perspective for qualitatively evaluating the nutritional quality of food sold at foodservice facilities at a Brazilian university. *Perspectives in Public Health*, 137(2), Art. 2. <https://doi.org/10.1177/1757913916636414>
- Ramón-Arбуés, E., Martínez Abadía, B., Granada López, J. M., Echániz Serrano, E., Pellicer García, B., Juárez Vela, R., Guerrero Portillo, S., & Saéz Guinoa, M. (2019). Eating behavior and relationships with stress, anxiety, depression and insomnia in university students. *Nutrición Hospitalaria*. <https://doi.org/10.20960/nh.02641>
- Ren, C., & Fusté-Forné, F. (2024). Food, national identity and tourism in Greenland. *Food, Culture & Society*, 27(1), 69–93. <https://doi.org/10.1080/15528014.2023.2199667>
- Reuter, P. R., Forster, B. L., & Brister, S. R. (2021). The influence of eating habits on the academic performance of university students. *Journal of American College Health*, 69(8), 921–927. <https://doi.org/10.1080/07448481.2020.1715986>
- Rezaei, R., Safa, L., Damalas, C. A., & Ganjkanloo, M. M. (2019). Drivers of farmers' intention to use integrated pest management: Integrating theory of planned behavior and norm activation model. *Journal of Environmental Management*, 236, 328–339. <https://doi.org/10.1016/j.jenvman.2019.01.097>
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), Art. 2. <https://doi.org/10.18637/jss.v048.i02>
- Schwartz, S. H. (1992). Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. In *Advances in Experimental Social Psychology* (Vol. 25, pp. 1–65). Elsevier. [https://doi.org/10.1016/S0065-2601\(08\)60281-6](https://doi.org/10.1016/S0065-2601(08)60281-6)
- Schwartz, S. H. (1977). Normative influences on altruism. In *10. Advances in experimental social psychology* (pp. 221–279). Academic Press.
- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of social issues*, 50(4), 19–45.
- Serra-Majem, L., Tomaino, L., Dernini, S., Berry, E. M., Lairon, D., Ngo De La Cruz, J., Bach-Faig, A., Donini, L. M., Medina, F.-X., Belahsen, R., Piscopo, S., Capone, R., Aranceta-Bartrina, J., La Vecchia, C., & Trichopoulos, A. (2020). Updating the mediterranean diet pyramid towards sustainability: Focus on environmental concerns. *International Journal of Environmental Research and Public Health*, 17(23), Art. 23. <https://doi.org/10.3390/ijerph17238758>
- Sheldon, K. M. (2005). Positive value change during college: Normative trends and individual differences. *Journal of Research in Personality*, 39(2), Art. 2. <https://doi.org/10.1016/j.jrp.2004.02.002>
- Shin, Y. H., & Hancer, M. (2016). The role of attitude, subjective norm, perceived behavioral control, and moral norm in the intention to purchase local food products. *Journal of Foodservice Business Research*, 19(4), Art. 4. <https://doi.org/10.1080/15378020.2016.1181506>
- Shin, Y. H., Im, J., Jung, S. E., & Severt, K. (2018). The theory of planned behavior and the norm activation model approach to consumer behavior regarding organic menus. *International Journal of Hospitality Management*, 69, 21–29. <https://doi.org/10.1016/j.ijhm.2017.10.011>
- Shaw, D., & Shiu, E. (2003). Ethics in consumer choice: a multivariate modelling approach. *European journal of marketing*, 37(10), 1485–1498.
- Roser, M., Ritchie, H., & Ortiz-Ospina, E. (2019). *World Population Growth*. Published online at: OurWorldInData.org. Available from: <https://ourworldindata.org/world-population-growth>.
- Soper, D.S. A-priori Sample Size Calculator for Structural Equation Models [Software], (2022). <https://www.danielsoper.com/statcalc>.
- Sparks, P., & Shepherd, R. (1992). Self-identity and the theory of planned behavior: assessing the role of identification with «green consumerism». *Social Psychology Quarterly*, 55(4), Art. 4. <https://doi.org/10.2307/2786955>
- Sparks, P., & Shepherd, R. (2002). The role of moral judgments within expectancy-value-based attitude-behavior models. *Ethics Behaviour*, 12(4), 299–321. [https://doi.org/10.1207/S15327019EB1204\\_01](https://doi.org/10.1207/S15327019EB1204_01)
- Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., De Vries, W., De Wit, C. A., Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Rayers, B., & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223), Art. 6223. <https://doi.org/10.1126/science.1259855>
- Steg, L., & De Groot, J. I. M. (2012). Environmental Values. In S. D. Clayton (A. c. Di), *The Oxford Handbook of Environmental and Conservation Psychology* (1<sup>st</sup> ed., pp. 81–92). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199733026.013.0005>.
- Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental Psychology*, 38, 104–115. <https://doi.org/10.1016/j.jenvp.2014.01.002>
- Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3). <https://doi.org/10.1111/0022-4537.00175>. Art. 3.
- Stets, J. E., & Burke, P. J. (2000). Identity theory and social identity theory. *Social Psychology Quarterly*, 63(3). <https://doi.org/10.2307/2695870>. Art. 3.
- Stryker, S. (1968). Identity salience and role performance: The relevance of symbolic interaction theory for family research. *Journal of Marriage and the Family*, 30(4), Art. 4. <https://doi.org/10.2307/349494>
- Teisl, M. F., Noblet, C. L., & Rubin, J. (2009). The psychology of eco-consumption. *Journal of Agricultural & Food Industrial Organization*, 7(2). <https://doi.org/10.2202/1542-0485.1268>
- Van Der Werff, E., Steg, L., & Keizer, K. (2013). The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour. *Journal of Environmental Psychology*, 34, 55–63. <https://doi.org/10.1016/j.jenvp.2012.12.006>
- Vargas, A. M., de Moura, A. P., Deliza, R., & Cunha, L. M. (2021). The role of local seasonal foods in enhancing sustainable food consumption: A systematic literature review. *Foods*, 10(9), Art. 9. <https://doi.org/10.3390/foods10092206>
- Velicer, W. F., Diclemente, C. C., Rossi, J. S., & Prochaska, J. O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors*, 15(3). [https://doi.org/10.1016/0306-4603\(90\)90070-E](https://doi.org/10.1016/0306-4603(90)90070-E). Art. 3.
- Vermeulen, S. J., Campbell, B. M., & Ingram, J. S. I. (2012). Climate change and food systems. *Annual Review of Environment and Resources*, 37(1), Art. 1. <https://doi.org/10.1146/annurev-environ-020411-130608>
- Wallnoefer, L. M., Riefler, P., & Meixner, O. (2021). What drives the choice of local seasonal food? Analysis of the importance of different key motives. *Foods*, 10(11), 2715. <https://doi.org/10.3390/foods10112715>
- Weller, K. E., Greene, G. W., Redding, C. A., Paiva, A. L., Lofgren, I., Nash, J. T., & Kobayashi, H. (2014). Development and validation of green eating behaviors, stage of change, decisional balance, and self-efficacy scales in college students. *Journal of Nutrition Education and Behavior*, 46(5), Art. 5. <https://doi.org/10.1016/j.jneb.2014.01.002>
- Westland, J. C. (2010). Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications*, 9, 476–487. <https://doi.org/10.1016/j.elerap.2010.07.003>
- Whitley, C., Takahashi, B., Zwickle, A., Besley, J., & Lertpratchya, A. (2016). Sustainability behaviors among college students: An application of the VBN theory. *Environmental Education Research*, 24, 1–18. <https://doi.org/10.1080/13504622.2016.1250151>
- Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, 30(3). <https://doi.org/10.1016/j.jenvp.2010.01.003>. Art. 3.
- Wilkins, J. L., Bowdish, E., & Sobal, J. (2000). University Student Perceptions of Seasonal and Local Foods. *Journal of Nutrition Education*, 32(5), Art. 5. [https://doi.org/10.1016/S0022-3182\(00\)70574-7](https://doi.org/10.1016/S0022-3182(00)70574-7)
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., De Vries, W., Majele Sibanda, L., ... Murray, C. J. L. (2019). Food in the Anthropocene: The EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, 393(10170), Art. 10170. [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)
- World Health Organization. (2019). Sustainable healthy diets: Guiding principles. Food & Agriculture Org.



- Xu, X., Sharma, P., Shu, S., Lin, T. S., Ciais, P., Tubiello, F. N., & Jain, A. K. (2021). Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. *Nature Food*, 2(9), 724–732. <https://doi.org/10.1038/s43016-021-00358-x>
- Xu, Y., Zhang, L., & Liu, P. (2024). You must separate: How perceived importance and language intensity promote waste separation. *Journal of Environmental Management*, 354, 120267. <https://doi.org/10.1016/j.jenvman.2024.120267>
- Yang, Q., Xinyue, L., Hoque, M. E., Al Mamun, A., Rahman, M. K., & Yao, J. (2023). Modelling the mass consumption potential of organic food: Evidence from an emerging economy. *Plos one*, 18(9), Article e0291089. <https://doi.org/10.1371/journal.pone.0291089>
- Yazdanpanah, M., Hayati, D., Hochrainer-Stigler, S., & Zamani, G. H. (2014). Understanding farmers' intention and behavior regarding water conservation in the Middle-East and North Africa: A case study in Iran. *Journal of Environmental Management*, 135, 63–72. <https://doi.org/10.1016/j.jenvman.2014.01.016>
- Zhang, L., Ruiz-Menjivar, J., Luo, B., Liang, Z., & Swisher, M. E. (2020). Predicting climate change mitigation and adaptation behaviors in agricultural production: A comparison of the theory of planned behavior and the Value-Belief-Norm Theory. *Journal of Environmental Psychology*, 68, Article 101408. <https://doi.org/10.1016/j.jenvp.2020.101408>
- Zinsstag, J., Schelling, E., Crump, L., Whittaker, M., Tanner, M., & Stephen, C. (Eds.). (2020). *One Health: the theory and practice of integrated health approaches*. CABI.