

The role of food-related consideration of future consequences, health and environmental concerns in explaining sustainable food (fish) attitudes

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Abstract

Purpose – This study explores the direct and indirect effects of two components of food-related consideration of future consequences (CFCs), including CFC-Immediate and CFC-Future, on sustainable food attitudes (SFA) via food-related health and environmental concerns.

Design/methodology/approach – Partial least squares structural equation modeling technique was used on a data set of 664 Vietnamese consumers collected in Central Vietnam to evaluate measurement and structural models.

Findings – CFC-Immediate and CFC-Future as well as health and environmental concerns have positive effects on SFA. Indirect effects of CFC-Immediate on SFA via health concerns and CFC-Future on SFA via health/environmental concerns are also discovered.

Research limitations/implications – Future studies should examine the impact of environmental values on CFCs, forming a more comprehensive understanding regarding the relationship between the two variables, especially by including a wider range of sustainable food types to gain diverse knowledge about sustainable food consumption.

Practical implications – Communicative messages should focus on both health and environmental concerns while emphasizing both immediate and more distant outcomes of sustainable food (fish) consumption for individuals with different dominant temporal orientations.

Originality/value – This study sheds light on the direct and hierarchical relationships among food-related CFCs, health and environmental concerns and SFA to better understand the intricate psychological process of sustainable food consumption.

Keywords Sustainable food attitudes, Future time perspective, Food-related CFC-Immediate and CFC-Future, Food-related health and environmental concerns, Direct and hierarchical relationships

Paper type Research paper

1. Introduction

Sustainable food consumption (SFC) is a major issue in the food domain due to its radical impact on individuals (e.g. health concern), society and the environment (e.g. environmental

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concern) (Ceri *et al.*, 2019). It is widely accepted as a social phenomenon and is thus likely to reflect individual social-psychological factors and environmental values, as suggested by the extended perspective of the value-belief-norm/attitudes (VBN) paradigm of pro-environmental behavior (Olsen and Tuu, 2021; Stern, 2002; Stern *et al.*, 1985). For example, SFC might be affected by the inclination to consider the outcomes in the near term (e.g. safety and social acceptance) and/or the more distant future (e.g. environmental and social well-being) of such behaviors (Olsen and Tuu, 2021; Olsen *et al.*, 2023). Also, consumers use sustainable foods due to the emphasis on living healthy and/or the desire to live in a less polluted/cleaner environment (Vermeir *et al.*, 2020; Yadav, 2016). In this sense, future time perspective (Dassen *et al.*, 2015; van Beek *et al.*, 2013), such as consideration of future consequences (CFCs) (Joireman and Liu, 2014; Joireman *et al.*, 2012), and environmental values (Schwartz, 1992), such as egotism (pro-self)/altruism (pro-other) (Kareklas *et al.*, 2014; Prakash *et al.*, 2019), can involve in the psychological process of forming sustainable food attitudes (SFA) (Arnocky *et al.*, 2013; Olsen and Tuu, 2021) – a reliable predictor of SFC (Olsen and Tuu, 2021; Olsen *et al.*, 2023).

CFCs and egoistic/altruistic values are theoretically relevant to explain SFA since they reflect temporal conflicts (Joireman and Liu, 2014; Milfont *et al.*, 2012) and social dilemmas (Khachatryan *et al.*, 2013; Olsen and Tuu, 2021) that occur when evaluating sustainable food (Arnocky *et al.*, 2013; Olsen *et al.*, 2023). It is anticipated, however, that they would show weak or non-significant relationships with SFA since they are general and abstract while SFA is domain specific (Klößner, 2013; Murphy *et al.*, 2020). Previous studies (e.g. Joireman and Liu, 2014; Olsen and Tuu, 2021) have adopted the approach of domain-specific variables to establish and offer insights into the relationship among CFCs, environmental values and sustainable consumption attitudes/behaviors. Nonetheless, there still exist some gaps that need to be filled regarding the role of domain-specific CFCs and environmental values in the context of SFC.

Firstly, previous studies have not investigated the combined roles of domain-specific CFCs (e.g. food-related CFCs) and domain-specific egoistic/altruistic values (i.e. food-related egoistic/altruistic values) in explaining SFA. It is argued that individuals can be time-oriented in some life domains, but not in others (McKay *et al.*, 2017; Murphy *et al.*, 2020). Furthermore, while the two components of CFCs (CFC-Immediate and CFC-Future) are distinct and negatively related, they can both exist (Joireman *et al.*, 2012), generating temporal conflict in food consumption and predicting subsequent sustainable behaviors (Olsen and Tuu, 2021; Olsen *et al.*, 2023). Thus, there is an urge to explore if and how the temporal conflicts in the food domain are associated with SFA.

Besides, while egoistic and altruistic values are also conceptually distinct and incompatible (Kareklas *et al.*, 2014; Schwartz, 1992), they both exist together within individuals, showing social dilemmas in explaining SFC (Khachatryan *et al.*, 2013; Olsen and Tuu, 2021). In terms of food consumption, food-related health concern reflects the pro-self concept, so it can be understood as egoistic in nature (Magnusson *et al.*, 2003; Yadav, 2016). Meanwhile, food-related environmental concerns indicate a pro-other concept and thus are altruistic in nature (Ebreo *et al.*, 2003; Yadav and Pathak, 2016). Following the thought of social dilemmas, there might be a conflict between food-related health and environmental concerns that subsequently influences SFA. However, there is currently a lack of understanding regarding the relationships among these variables. Also, a hierarchical relationship between food-related CFCs and health/environmental concerns, leading to the formation of SFA, has not been established, hindering the understanding of the intricate psychological process of sustainable consumption behaviors. According to the extended value-belief-norm (VBN) (Joireman and Liu, 2014; Stern, 2002), environmental values (e.g. food-related health and environmental concerns) are a significant determinant of pro-environment attitudes/behaviors (e.g. Steg *et al.*, 2005). Furthermore, this framework proposes that environmental values are driven by social-psychological factors such

as time orientation (Black *et al.*, 1985). In this sense, the extended VBN suggests that environmental values mediate the effect of social-psychological variables on attitudes towards one's sustainable actions. The current study, therefore, further discusses and validates the mediating mechanisms linking food-related CFCs and SFA via food-related health and environmental concerns.

This study, therefore, is based on the extended VBN (Joireman and Liu, 2014; Stern, 2002) to discuss and test the direct effects of two components of food-related CFCs (i.e. CFC-Immediate and CFC-Future), and two domain-specific egoistic/altruistic values (i.e. food-related health and environmental concerns, respectively) on SFA, providing knowledge regarding if and how each temporal component and environmental value are connected to SFC. This study also extends previous studies on temporal conflict and social dilemmas (Joireman and Liu, 2014; Khachatryan *et al.*, 2013) and delves deeper into the psychological process forming SFA. As a result, the findings would bring more insight into policy development to promote sustainable consumption.

Fish is a typical kind of food that is consumed daily in various countries all over the world, such as South Korea (Lee and Nam, 2019), Indonesia (Fiandari *et al.*, 2019), Japan (Kitano and Yamamoto, 2020), Spain (Bao *et al.*, 2018), Norway (Rortveit and Olsen, 2009) and Vietnam (Thong and Olsen, 2012), among others. Fish, especially farmed fish, is good for health but also contains chemical contaminants causing health risks and environmental issues; therefore, fish is a main focus for sustainable aquaculture (Dube and Chanu, 2012; Reverter *et al.*, 2020). Recently, there has been increasing attention to sustainable fish consumption (Honkanen and Young, 2015; Verain *et al.*, 2016). Therefore, this study focuses on fish as a typical sustainable food product. Consequently, this study not only discusses and develops universal arguments for the relationships among food-related CFCs, environmental values and SFA but also focuses on consumers' attitudes toward sustainable fish consumption, providing not only general knowledge regarding the associations among variables but also specific insights into the consumption of fish.

After the introduction, the theoretical framework and hypothesis development will be presented, followed by methods used to conduct the present research and the estimated results. Subsequently, the implications, including theoretical implications for scholars and practical implications for businesses, will be proposed. Finally, some limitations and future research directions will be discussed.

2. Theoretical framework and hypothesis development

2.1 Sustainable food attitudes

Generally, attitudes are psychological tendencies expressed through the evaluation of a specific entity in either a favorable or an unfavorable manner (Eagly and Chaiken, 1993). In other words, attitudes allude to the positive or negative evaluation of the outcomes associated with performing a given behavior (Fishbein and Ajzen, 2010). Therefore, SFA can be defined as a tendency to respond with some degree of favorableness or unfavorableness to SFC based on the evaluation of the outcomes of such behavior (Eagly and Chaiken, 1993; Fishbein and Ajzen, 2010).

The VBN framework (Stern, 2002; Stern *et al.*, 1985) has been widely adopted to explain sustainable/ethical behaviors (Joireman and Liu, 2014; Olsen *et al.*, 2023). This framework expects that environmental values would form individual beliefs about the consequences of one's actions regarding environmentally friendly behaviors (e.g. SFC), finally leading to norms/attitudes towards such actions. Furthermore, the extended perspective of the framework proposes that environmental values and attitudes are shaped by social-psychological factors that are "influenced by forces in . . . society [. . .] that place people within the social structure, [. . .] shape general social ideology, [and] [. . .] offer people information

and opinions relevant to environmental hazards . . . ” (Stern *et al.*, 1985, p. 207) such as gender, political orientation and personality traits (Joireman and Liu, 2014).

2.2 Food-related CFCs

Originally, Strathman *et al.* (1994, p. 742) defined CFCs as “the extent to which individuals consider the potential distant outcomes of their current behaviors and the extent to which they are influenced by these potential outcomes”. Thus, they are a stable individual personality trait in the extent to which people consider distant versus immediate consequences of potential behaviors (Joireman *et al.*, 2006, 2008, 2012). Previous studies have demonstrated that CFCs can predict diverse outcomes such as financial planning, health-related behavior and environmental concern (Joireman and King, 2016; McKay *et al.*, 2017). However, as suggested by Dassen *et al.* (2015), “for the purposes of behavior prediction, CFC should be tailored to the behavior at interest and not be measured as a general construct” (p. 17). Accordingly, CFCs have been adapted to specific domains (McKay *et al.*, 2017; Murphy *et al.*, 2020), including food consumption (Dassen *et al.*, 2015; Olsen and Tuu, 2017; van Beek *et al.*, 2013).

Within this domain, food-related CFCs (i.e. CFC-Immediate and CFC-Future) reflect the extent to which people consider the potential distant outcomes of their current behaviors and are influenced by those potential outcomes (Joireman *et al.*, 2012; Strathman *et al.*, 1994) in food consumption (Olsen and Tuu, 2017, 2021). While CFCs have been considered as a personality trait or as an attitudinal construct (Kooij *et al.*, 2018; Olsen *et al.*, 2023), this study adopts the former view and treats CFCs as a stable individual difference which is consistent with previous studies that focus on general CFCs (Joireman and Liu, 2014; Joireman *et al.*, 2012; Khachatryan *et al.*, 2013) as well as the majority of prior studies in the food domain (Dassen *et al.*, 2015; Olsen and Tuu, 2017; van Beek *et al.*, 2013). Thus, following the extended perspective of the VBN framework, CFCs can activate environmental values (e.g. health and environmental concerns), which in turn lead to environmentally friendly behaviors (e.g. SFC).

2.3 Food-related egoistic and altruistic values

Value is defined as “a desirable trans-situational goal varying in importance, which serves as a guiding principle in the life of a person or other social entity” (Schwartz, 1992, p. 21). Rooted in human values, de Groot and Steg (2007) argue that environmental values reflect desirability and action tendencies for environmental situations as guiding principles for selecting or evaluating environment-related behavior, people and events. Until now, the structure of environmental values has developed to include four dimensions: altruistic, biospheric, egoistic and hedonistic values (de Groot and Steg, 2007; Steg *et al.*, 2005). In line with the VBN framework, environmental values of egoism and altruism are the key determinants of positive attitudes of consumers towards and/or ethical buying behavior (Prakash *et al.*, 2019; Yadav and Pathak, 2016).

While egoistic value leads individuals to act in their own interest (caring about social power, wealth, authority, influence and ambition), altruistic value fosters individuals to act for the welfare of others with little or no personal benefit (caring about people and society) (de Groot and Steg, 2007; Steg *et al.*, 2005; Yadav, 2016). The two values are distinct and negatively correlated, both theoretically and practically, probably generating a social dilemma in a specific domain of life, such as SFC (Khachatryan *et al.*, 2013; Olsen and Tuu, 2021), leading to the need to assess the role of the two values in the research context to develop a better understanding regarding the acceptance of SFC among consumers.

Food-related health concern can be understood as caring about health-related issues and safety problems for individuals and their families (Prakash *et al.*, 2019; Yadav, 2016) related to food consumption. Health concern demonstrates the benefits to oneself (i.e. good health and

better quality of life) and is thus consistent with the concept of pro-self that reflects egoistic value (Magnusson *et al.*, 2003) in the context of ethical/organic consumption (Yadav, 2016; Yadav and Pathak, 2016). Meanwhile, food-related environmental concern is the degree to which people are aware of environmental problems related to food consumption and support efforts to solve them or indicate a willingness to contribute personally to their solution (Dunlap and Jones, 2002). Studies have argued that environmental concern reflects altruistic values in ethical/organic consumption settings (Kareklas *et al.*, 2014; Prakash *et al.*, 2019; Yadav, 2016). Furthermore, altruistic motives or values are essential for shaping individual beliefs about the environment, meaning that environmental consciousness is growing among individuals driven by their altruistic values (Yadav, 2016; Yadav and Pathak, 2016). Therefore, consistent with previous studies in the SFC context (Prakash *et al.*, 2019; Yadav, 2016; Yadav and Pathak, 2016), health and environmental concerns can be considered manifestations of egoistic and altruistic values in the food domain.

2.4 Hypothesis development

2.4.1 Food-related health and environmental concerns and SFA. It is widely accepted that (food-related) health concern is one of the main motivations to engage individuals in environmentally friendly behaviors (Kushwah *et al.*, 2019). Generally, compared to traditional food, the sustainable one is considered healthier and has a higher level of nutrition as its production does not use any chemical fertilizers and harmful pesticides (Prakash *et al.*, 2019; Yadav, 2016). Sustainable food, therefore, can meet the individual requirements of being healthy and safe during food consumption, fostering positive evaluations and subsequently positive attitudes towards sustainable food (Smith and Paladino, 2021). This is in line with the postulation that suggests that health-conscious individuals are more likely to demonstrate eco-friendly behavior than others (Zanoli and Naspetti, 2002). The argument is also evident in different studies in ethical/green/organic settings (Kushwah *et al.*, 2019). For example, previous research has shown that health concern can influence their attitudes toward green products (Kumar, 2019). Similarly, scholars have also proved that health concern is one of the main drivers of organic food (Yadav, 2016; Yadav and Pathak, 2016) and eco-friendly food (Prakash *et al.*, 2019). Therefore, it is expected that health concern relating to food consumption (i.e. food-related health concern) fosters SFA in the current research context. This study proposes that

H1. Food-related health concern has a positive effect on SFA.

Food-related environmental concern indicates an individual's willingness to perform sustainable behaviors (e.g. SFC) to protect the natural environment with little thought of benefits for themselves (Ebreo *et al.*, 2003). Environmental concern among individuals is more likely to foster positive attitudes toward SFC because it is pro-environmental and promotes the common good (Kareklas *et al.*, 2014). Several studies have validated the association between environmental concern and ethical consumption attitudes/intentions/behaviors. For example, Smith and Paladino (2021) show a significant influence of environmental concern on individual attitudes towards buying organic food, which, in turn, promotes purchase intention. Prakash *et al.* (2019) demonstrate a similar relationship among environmental concern, attitudes and behavioral intention towards eco-friendly packaged products. Yadav (2016) and Yadav and Pathak (2016) validate that environmental concern fosters attitudes and finally leads to the purchase intention of organic food among young consumers. The findings of these studies are consistent with the argument that the main reasons for individual sustainable dietary choices are animal ethics, social responsibility and concern for the environment (Olsen and Tuu, 2021; Olsen *et al.*, 2023). Individuals who hold strong altruistic values such as environmental concern often avoid practices that harm society and act proactively for social benefit (Kareklas *et al.*, 2014; Prakash *et al.*, 2019). In this sense, it is

expected that environmental concern relating to food consumption (food-related environmental concern) is more likely to foster positive attitudes toward SFC. Therefore, this study proposes that

H2. Food-related environmental concern has a positive effect on SFA.

2.4.2 Food-related CFCs and SFA. Food-related CFCs (i.e. CFC-Immediate and CFC-Future) are personality traits reflecting the extent to which people consider the potential distant outcomes of their current behaviors and are influenced by those potential outcomes (Joireman *et al.*, 2012) in food consumption (Olsen and Tuu, 2017, 2021). Individuals with a higher level of CFC-Immediate are more concerned with immediate benefits rather than benefits that will not occur for some time, while those with a higher level of CFC-Future believe certain behaviors are worthwhile because of future benefits and are more likely to put less importance on immediate benefits (Olsen and Tuu, 2017, 2021). In the food domain, CFCs demonstrate the tendency to evaluate food consumption in terms of near (e.g. safety and social acceptance) and/or distant (e.g. environmental and social well-being) outcomes of such action (Olsen and Tuu, 2021; Olsen *et al.*, 2023). Previous studies have demonstrated associations between (food-related) CFCs and healthy behaviors and/or organic food choice (Dassen *et al.*, 2015; van Beek *et al.*, 2013).

It is argued that individuals consume sustainable food for a wide range of reasons such as quality, perceptions of nutritional value and food safety, sensory appeal (i.e. taste), pleasure, social acceptance and/or a cleaner environment, animal welfare and supporting the local economy (Cerri *et al.*, 2019; Kushwah *et al.*, 2019; Vermeir *et al.*, 2020), which can be categorized into immediate and future outcomes. In other words, SFC can meet both the immediate and future demands of individuals and thus is more likely to foster positive attitudes among individuals with dominance of either food-related CFC-Immediate or CFC-Future (Olsen and Tuu, 2021; Olsen *et al.*, 2023). Therefore, this study proposes that

H3. Food-related CFC-Immediate has a positive effect on SFA.

H4. Food-related CFC-Future has a positive effect on SFA.

2.4.3 The mediating role of food-related health and environmental concerns. Previous review and meta-analysis studies have shown that CFCs are correlated with health and environmental values, beliefs and behaviors (e.g. Joireman and King, 2016; Milfont *et al.*, 2012). However, previous research has demonstrated mixed results regarding the correlation between each component of CFCs and health and environmental decision-making. Within the health domain, CFC-Immediate is the only determinant predicting higher body mass index and smoking status and healthy eating (van Beek *et al.*, 2013). Some authors find that CFC-Future is a stronger predictor of exercise (Joireman *et al.*, 2012; van Beek *et al.*, 2013) and healthy eating (Joireman *et al.*, 2012) than CFC-Immediate. There also exists research showing that both components of CFCs are determinants of (un)healthy eating (Dassen *et al.*, 2015; Olsen and Tuu, 2017). In the environmental domain, CFC-Future is the only predictor of environmental values and belief in global warming (Joireman and Liu, 2014), and CFC-Immediate is better than CFC-Future in explaining environmental motives (Arnocky *et al.*, 2013). Khachatryan *et al.* (2013) find that both components have unique relationships with environmental values and preference, and Olsen and Tuu (2021) indicate that both CFC-Immediate and CFC-Future can predict the consumption of environmentally friendly food. The review of previous findings suggests that the best predictors (i.e. CFC-Immediate, CFC-Future or both) depend on the nature of the behaviors in question (Enzler, 2015). Furthermore, it can be expected that CFCs subscales would be associated with the relevant domain-specific values, beliefs and behaviors, showing differential associative patterns among CFCs and those variables (McKay *et al.*, 2017; Olsen and Tuu, 2017).

According to the extended perspective of VBN, environmental values and attitudes are shaped by social-psychological factors (Stern *et al.*, 1985). Joireman and Liu (2014) argue that social-psychological forces can include a wide range of social and psychological variables such as gender, political orientation and personality traits. As this study treats food-related CFCs as a stable personality trait (e.g. Dassen *et al.*, 2015; Joireman and Liu, 2014; Joireman *et al.*, 2012; Khachatryan *et al.*, 2013; Olsen and Tuu, 2017; van Beek *et al.*, 2013), it is argued that there might exist a chain of sequential effects from food-related CFCs to SFA via health/environment concerns as suggested by the extended VBN framework (Stern *et al.*, 1985). This study, therefore, explores this potential hierarchical order to further consolidate the knowledge of if and how SFA can be formed. Consequently, it is expected that, in the SFC domain, the personality trait of CFCs, including CFC-Immediate and CFC-Future, is foundational to health and environmental concerns.

Food-related health concern reflects health-related issues and safety problems for individuals and their families (Prakash *et al.*, 2019; Yadav, 2016) relating to food consumption not only because of short-term effects (e.g. digestive disorders) but also due to long-term effects (e.g. chemical substances causing diseases) (Magnusson *et al.*, 2003). For example, sustainable food is believed to have greater nutritional value and to be produced in a natural way that does not involve the use of harmful chemical fertilizers (Prakash *et al.*, 2019; Yadav and Pathak, 2016), which can improve individual health in both short and long term. Also, food-related environmental concern means that individuals are aware of environmental problems relating to food consumption and are ready to contribute/support efforts to solve them, protecting the environment (Dunlap and Jones, 2002). Therefore, it might not only include immediate issues such as food waste, single-use coverage and high use of chemical fertilizers and pesticides in conventional food production but also involve more distant consequences, for example, gas emissions contributing to global warming, widespread use of antibiotics causing antibiotic resistance and habitat destruction (Kushwah *et al.*, 2019; Testa *et al.*, 2020; Vermeir *et al.*, 2020). Given that the nature of food-related health and environmental concerns are influenced by both immediate and distant food consumption outcomes, these two variables could be affected by both CFC-Immediate and CFC-Future. Therefore, both CFC-Immediate and CFC-Future could affect them. In other words, it is expected that CFC-Immediate and CFC-Future will have a positive influence on food-related health and environmental concerns among individuals. Thus, this study proposes that

H5. Food-related CFC-Immediate has positive effects on food-related health concern (a) and food-related environmental concern (b).

H6. Food-related CFC-Future has positive effects on food-related health concern (a) and food-related environmental concern (b).

As discussed earlier, changes in food-related health and environmental concerns are more likely to influence SFA, with a higher level of these variables leading to a strong level of SFA. In this sense, it is expected that food-related health and environmental concerns are intermediary steps or necessary conditions, linking the indirect effect of food-related CFCs on SFA. This expectation is consistent with the extended perspective of VBN (Joireman and Liu, 2014; Stern, 2002), which generally establishes a serial chain of effects from social-psychological factors to environmental values leading to positive attitudes. Put differently, extended VBN has suggested the mediating role of environmental values linking the indirect impact of personality traits on attitudes. Also, these mediating effects are supported by the awareness model of CFCs, which suggests that CFCs impact attitudes toward a behavior through an awareness of the consequences of one's behavior (CFCs → perceived consequences → behavior) (Joireman and King, 2016). Thus, this study proposes that

- H7. Food-related CFC-Immediate has indirect effect on SFA via food-related health concern (a) and food-related environmental concern (b).
- H8. Food-related CFC-Future has indirect effect on SFA via food-related health concern (a) and food-related environmental concern (b).

2.4.4 *Control variables.* Following previous studies (Olsen and Tuu, 2017; Olsen *et al.*, 2023), the present research integrates age, gender, education and income as control variables in the proposed model. The proposed research model is presented in Figure 1.

3. Methods

3.1 Research sample

Fish is widely regarded as a healthy and sustainable dietary option (Forleo *et al.*, 2022; Sacchettini *et al.*, 2021). Fish consumption is deeply ingrained in the dietary preference and norms of Vietnamese people (Cong *et al.*, 2013; Tuu *et al.*, 2008). Indeed, fish is a traditional food and among the most selected foods of Vietnamese consumers (Figuíe and Moustier, 2009; Thong and Olsen, 2012). This comes from the fact that Vietnam has a long coastline and abundant water resources, making fish an essential protein source in Vietnamese cuisine for centuries. Additionally, the preference for fresh seafood/fish of Vietnamese consumers, often sourced directly from local markets, supermarkets or coastal fishing villages, underscores the importance of quality and freshness in Vietnamese cuisine. This study seeks to investigate consumer perceptions of environmentally friendly fish products in coastal provinces of Central Vietnam which is a primary hub for fish production in the country (nhandan.vn, 2021).

The sample was collected at three coastal provinces of Central Vietnam: Phu Yen, Khanh Hoa and Ninh Thuan. This study adopted a non-probability sampling technique, specifically the convenience sampling method, to collect data. The respondents were local residents and domestic tourists visiting these coastal destinations. A screening question “Are you responsible for or influential in the food purchases for you/your family?” was used, and potential respondents who answered “No” were rejected. For eligible respondents, we explained the aim of the survey and emphasized that there was no right or wrong answer.

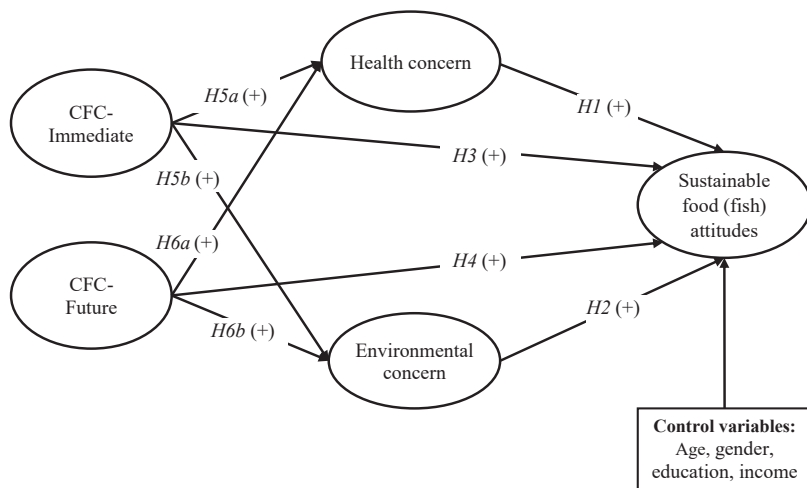


Figure 1.
Proposed
research model

Source(s): Authors’ own work

We also mentioned that the responses would be encoded and used only for research purposes. Additionally, we briefly explained some keywords from the questionnaire, such as environmental problems, sustainable food and sustainable food (fish) consumption. Furthermore, the data collectors were always ready to explain questions and comments from respondents.

A questionnaire, which derived items from previous studies (Section 3.2), was used to collect data. We used different methods to distribute the questionnaire, including face-to-face interviews, self-administered surveys, emails and social networks. However, the main approaches were face-to-face interviews and self-administered surveys, which were used to collect data from the majority of local people and tourists. Emails and social networks were only used for a small number of local residents who requested the data collectors to send them the questionnaire via these channels. A total of 705 questionnaires were collected, from which we eliminated 5 questionnaires for lacking much information. We further screened and removed an additional 10 questionnaires for lacking over 15% of information. We also removed 26 questionnaires that were potential outliers. Thus, the final sample size was 664, and the response rate was 94.2%. The sample's characteristics were 52.4% male, 64.5% married, and 94.6% had an education level from university graduate and below. The sample had an average participant age of 37 years, with a range spanning from 17 to 78 years. The average monthly income of the collected sample was US\$ 400.

3.2 Measurements of the studied constructs

The measurement scales for the studied constructs were adopted from previous studies. More specifically, 14 items measuring food-related CFCs (seven items for CFC-Immediate and seven items for CFC-Future) were used from Joireman *et al.* (2012), adapted for food consumption context (e.g. Olsen and Tuu, 2017; Olsen and Tuu, 2021). Three items measuring food-related health concern were borrowed from Yadav (2016) and modified for the food consumption domain by adding the clause "Relating to food consumption, . . ." before each item. Three items measuring food-related environmental concern were utilized from Fujii (2006), also modified for the food consumption domain (e.g. I think environmental problems relating to food consumption are very important). Three items measuring SFA were adopted from Nystrand and Olsen (2020). This scale focuses specifically on sustainable fish consumption by adding the clause "Consuming sustainable fish makes me feel . . .". All measurement scales use a seven-point Likert scale, ranging from 1: extremely disagree to 7: extremely agree.

3.3 Data analysis

This study employed partial least squares structural equation modeling (PLS-SEM) with SmartPLS version 4 and followed the guidance of Hair *et al.* (2021) to assess the measurement and structural models. More specifically, outer loadings, Cronbach's alpha and composite reliability (CR) were used to assess reliability with a minimum value of 0.7. Convergent validity was evaluated using average variance extracted (AVE) with a minimum value of 0.5, and discriminant validity was appraised by the heterotrait-monotrait ratio of correlations (HTMT) matrix with a cutoff value of 0.85. The structural model tested the proposed hypotheses. The significance of the proposed hypotheses was evaluated by the variance inflation factor (VIF) with a maximum value of 3, path coefficient and *p*-value (5%). The bootstrap procedure with 5,000 sub-samples was adopted, and the confidence interval (CI) was used to assess the reliability of estimated hypotheses. The bootstrap procedure was also used to estimate the proposed indirect effects. Hair *et al.* (2021) have suggested that evaluating the model quality in PLS-SEM should use the coefficient of determination R^2 , Cohen's f^2 and the $PLS_{Predict}$ procedure to indicate exploratory power, effect sizes and

predictive power of the research model. Therefore, the current study used these criteria to appraise the proposed model.

4. Results

4.1 *The reliability and validity of constructs*

The results, as presented in Table 1, indicated that all factor loadings, Cronbach's alpha values and CR values were larger than 0.7, demonstrating that the reliability of the studied constructs was acceptable. Additionally, all the AVE values were greater than 0.5, demonstrating that their convergence validity was also ensured. The HTMT correlation matrix, as demonstrated in Table 2, demonstrated that all HTMT values were less than the cutoff value of 0.85. Thus, the discriminant validity of the studied constructs was validated. Also, the square root of the AVE of a studied construct was larger than all correlations between that construct and other constructs in the model, providing further evidence that discriminant validity was acceptable (Fornell and Larcker, 1981).

4.2 *Common method biases (CMB)*

This study employed the common latent factor (CLF) approach (Podsakoff *et al.*, 2003) justified for PLS-SEM (Liang *et al.*, 2007) to check for common method biases (CMB) in the current study. Accordingly, a CLF whose indicators were all the indicators of the studied constructs was added to the model. The new model was estimated, and the results showed that most of the factor loadings of CLF were insignificant. Furthermore, the variance explained by CLF was very small compared to the studied construct, generating a proportion of 1:190. Therefore, it could be concluded that CMB was not serious in the present study. Moreover, the collinearity approach proposed by Kock and Lynn (2012) was also used to further test for CMB. Accordingly, a regression model was estimated with the studied constructs as independent variables and a randomly created one-item construct as the dependent variable. The testing results indicated that the VIF value for each estimated path was less than 3.3. Thus, it can be concluded that CMB was not a significant issue in the present study.

4.3 *Hypothesis testing results*

The testing results, as shown in Table 3, indicated that all VIF values ranged from 1.0 to 1.54 and were less than 3, implying that multicollinearity was not a serious problem in the current study. Among the proposed hypotheses, seven direct and three indirect hypotheses were supported by the collected data.

Direct effects: Health (H1: $\beta = 0.23, p < 0.001$) and environmental (H2: $\beta = 0.23, p < 0.001$) concerns had positive effects on SFA. Two components of CFCs, CFC-Immediate (H3: $\beta = 0.14, p < 0.001$) and CFC-Future (H4: $\beta = 0.16, p < 0.001$), also exerted positive impacts on SFA. CFC-Immediate had a positive influence on health concern (H5a: $\beta = 0.21, p < 0.001$) but not on environmental concern (H5b: $\beta = 0.06, p > 0.05$). Finally, CFC-Future had positive influences on both health concern (H6a: $\beta = 0.29, p < 0.001$) and environmental concern (H6b: $\beta = 0.24, p < 0.001$).

Indirect effects: CFC-Immediate had an indirect effect on SFA only via health concern (H7a: $\beta = 0.05, p < 0.001$), while CFC-Future had an indirect effect on SFA via both health concern (H8a: $\beta = 0.07, p < 0.01$) and environmental concern (H8b: $\beta = 0.06, p < 0.001$).

Control effects: Among the investigated control variables, gender ($\beta = 0.16, p < 0.05$) had a significant impact on SFA, while age ($\beta = -0.06, p > 0.05$), education ($\beta = 0.05, p > 0.05$) and income ($\beta = -0.04, p > 0.05$) did not exert significant influences on this variable.

Constructs and indicators	Factor loadings	Cronbach's alpha	Composite reliability	Variance extracted
<i>Food-related CFC-Immediate:</i> Relating to consuming food . . .		0.97	0.97	0.84
I act only to satisfy immediate needs, and what happens in the future is less important	0.89			
My convenience is an important factor in the decisions or actions I take	0.94			
I usually ignore warnings about the future consequences of my food behavior because I think that the consequences are easily solved	0.91			
I think that renouncing something now is unnecessary. What happens in the future can be taken care of when it comes	0.92			
To me, obtaining present values or goals is always important first and foremost; future consequences will be solved later	0.94			
My food consumption behavior depends on the results I get now in the present; I am not concerned about its long-term impact	0.92			
<i>Food-related CFC-Future:</i> Relating to consuming food . . .		0.94	0.95	0.74
I consider how things can be in the future and try to influence these things with my daily eating behavior	0.86			
I am often engaged in using food to achieve results that do not appear before many years	0.87			
I am willing to sacrifice my immediate happiness and well-being to achieve results in the future	0.87			
I often think about the negative consequences of consuming food in the future, even though the negative outcome will not occur until after many years	0.87			
I prioritize using food products that will be better for myself in the future rather than obtaining immediate consequences	0.83			
When deciding to consume food products, I often think about how it affects me in the future	0.87			
My present behavior is affected by the results that I receive in the future	0.83			
<i>Food-related health concern:</i> Relating to food consumption, . . .		0.81	0.89	0.72
I chose food carefully to ensure the good health	0.88			
I didn't consider myself as health-conscious consumer (reserved)	0.82			
I think often about health-related issues	0.85			
<i>Food-related environmental concern</i>		0.91	0.94	0.85
Environmental problems relating to food consumption are very important	0.92			
Environmental problems relating to food consumption cannot be ignored	0.91			

Table 1.
Reliability and
convergence validity of
studied constructs
(continued)

Table 1.

Constructs and indicators	Factor loadings	Cronbach's alpha	Composite reliability	Variance extracted
We should care about environmental problems relating to food consumption <i>Sustainable food attitude: Consuming sustainable fish makes me feel . . .</i>	0.93	0.89	0.93	0.83
Good	0.90			
Enjoyable	0.92			
Wise	0.91			

Source(s): Authors' own work

Table 2.
HTMT correlation matrix

Constructs	1	2	3	4	5
1. Food-related CFC-Immediate	0.92	-0.04	0.20	0.05	0.21
2. Food-related CFC-Future	0.06	0.86	0.28	0.24	0.26
3. Food-related health concern	0.22	0.30	0.85	0.52	0.43
4. Food-related environmental value	0.06	0.23	0.60	0.92	0.39
5. SFA	0.22	0.27	0.49	0.42	0.91

Note(s): SFA: sustainable food attitudes; HTMT and Fornell and Larcker (1981) correlations are below and above the diagonal, respectively; square root values of average variance extracted are on the diagonal

Source(s): Authors' own work

The bootstrap procedure with 5,000 sub-samples was applied to assess the reliability of the estimations. The results indicated that the path coefficients of significant relationships had CIs that did not include the value of zero (0). Thus, it can be concluded that the estimated results were reliable.

Assessing model quality: Following the guidance of Hair *et al.* (2021), this study adopted the coefficient of determination R^2 , Cohen's f^2 and the PLS_{Predict} procedure to evaluate the model quality estimated with PLS-SEM. The coefficient of determination (R^2) was 0.268, indicating that the model can explain 26.8% of the variance of SFA. Cohen's f^2 ranged from 0.02 to 0.10, suggesting that the relationships among constructs seemed small. Finally, the results of the PLS_{Predict} procedure, demonstrated in Table 4, showed that the values of the partial least square root mean square of error (PLS-SEM_MAE) were less than the maximum likelihood root mean square of error (LM_MAE) for two out of three items, demonstrating that the proposed model had medium predictive power.

5. Discussions

This study develops an integrated model to better understand temporal conflicts and social dilemmas on sustainable issues (Khachatryan *et al.*, 2013; Milfont *et al.*, 2012; Olsen and Tuu, 2021) in the specific domain of SFC (Arnocky *et al.*, 2013). In particular, this study, under the lens of extended VBN (Joireman and Liu, 2014; Stern, 2002), discusses and investigates if and how food-related CFCs and health/environmental concerns, as well as their causal relationships, are related to SFA. The testing results support the roles of food-related CFC-Immediate/CFC-Future and health/environmental concerns in directly and indirectly predicting SFA. This study, therefore, fills the gap in knowledge regarding how food-related CFCs and health/environmental concerns directly and hierarchically affect SFA, contributing to a more comprehensive understanding of the psychological process of SFA formation.

Hypotheses	VIF's	Std. β	t -value	Bootstrap	Conclusion
<i>Direct effects</i>					
H1: Health concern \rightarrow SFA	1.54	0.23	4.64***	[0.13; 0.32]	Support
H2: Environmental concern \rightarrow SFA	1.41	0.23	4.96***	[0.14; 0.33]	Support
H3: CFC-Immediate \rightarrow SFA	1.09	0.14	4.05***	[0.07; 0.21]	Support
H4: CFC-Future \rightarrow SFA	1.15	0.16	4.22***	[0.09; 0.23]	Support
H5a: CFC-Immediate \rightarrow health concern	1.00	0.21	6.89***	[0.15; 0.27]	Support
H5b: CFC-Immediate \rightarrow environmental concern	1.00	0.06	1.59 ^{ns}	[-0.01; 0.13]	Not support
H6a: CFC-Future \rightarrow health concern	1.00	0.29	6.99***	[0.21; 0.37]	Support
H6b: CFC-Future \rightarrow environmental concern	1.00	0.24	6.05***	[0.16; 0.31]	Support
<i>Indirect effects</i>					
H7a: CFC-Immediate \rightarrow health concern \rightarrow SFA		0.05	3.86***	[0.03; 0.08]	Support
H7b: CFC-Immediate \rightarrow environmental concern \rightarrow SFA		0.01	1.52 ^{ns}	[-0.002; 0.03]	Not support
H8a: CFC-Future \rightarrow health concern \rightarrow SFA		0.07	3.93***	[0.04; 0.10]	Support
H8b: CFC-Future \rightarrow environmental concern \rightarrow SFA		0.06	3.54***	[0.03; 0.09]	Support
<i>Control variables</i>					
Age \rightarrow SFA	1.14	-0.06	1.83 ^{ns}	[-0.12; 0.003]	-
Gender \rightarrow SFA	1.04	0.16	2.36*	[0.03; 0.29]	-
Education \rightarrow SFA	1.13	0.05	1.44 ^{ns}	[-0.02; 0.12]	-
Income \rightarrow SFA	1.23	-0.04	1.03 ^{ns}	[-0.11; 0.04]	-
R^2 (%)				SFA: 26.8	
f^2				f^2 Health concern \rightarrow SFA: 0.05; f^2 Environmental concern \rightarrow SFA: 0.05	
				f^2 CFC-Immediate \rightarrow SFA: 0.02	
				f^2 CFC-Future \rightarrow SFA: 0.03	
				f^2 CFC-Immediate \rightarrow Health concern: 0.05	
				f^2 CFC-Future \rightarrow Health concern: 0.10	
				f^2 CFC-Future \rightarrow Environmental concern: 0.06	

Note(s): SFA: sustainable food (fish) attitudes; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ^{ns} non-significant
Source(s): Authors' own work

Table 3.
Results of testing hypotheses

Construct	Indicator	PLS-SEM_MAE	LM_MAE	Q ² _predict
Sustainable food attitudes	SFA1	1.041	1.062	0.073
	SFA2	1.021	1.006	0.074
	SFA3	1.027	1.032	0.106

Note(s): MAE: mean absolute error; LM: linear regression model
Source(s): Authors' own work

Table 4.
PLS_{predict} procedure

5.1 Theoretical implications

In line with the VBN framework (Stern, 2002; Stern *et al.*, 1985), environmental values of egoistic (pro-self)/altruism (pro-other) (Kareklas *et al.*, 2014; Prakash *et al.*, 2019) can predict sustainable attitudes/behaviors from converse perspectives (i.e. negative and positive) (Khachatryan *et al.*, 2013; Olsen *et al.*, 2023), implying that social dilemmas can exist in the domain of sustainable consumption. As demonstrated in the current study, food-related health concern reflecting egoistic value and food-related environmental concern characterizing altruistic value are positively associated with SFA, indicating that these two values, while reflecting social dilemmas in the specific domain of food consumption, both

can foster SFA. The findings are consistent with previous studies in the setting of organic/green food consumption (Cerri *et al.*, 2019; Testa *et al.*, 2020; Vermeir *et al.*, 2020), suggesting that domain-specific environmental values (e.g. food-related health and environmental concerns) might have a distinctive relationship pattern compared to abstract ones. Thus, this study contributes to the understanding of whether and how food-related health and environmental concerns can explain SFA, enriching the knowledge regarding how domain-specific values can be associated with and their roles in predicting SFC in general and sustainable fish consumption as a specific food. It shows that certain ethical/green behaviors, such as consuming sustainable food (fish), can align with both domain-specific pro-self and pro-other values and therefore are facilitated by those values. Additionally, this study calls for the further inclusion of different combinations of two types of domain-specific values to provide more insights into the psychological process that shapes SFA.

Two components of CFCs, CFC-Immediate and CFC-Future, can predict sustainable attitudes/behaviors in contradictory manners (i.e. negative and positive), suggesting that temporal conflict might exist in the domain of sustainable consumption (Enzler, 2015; Murphy *et al.*, 2020). The current study shows that food-related CFC-Immediate and CFC-Future positively influence SFA, suggesting that general SFC as well as the consumption of sustainable fish are influenced by the consideration of both immediate and more distant outcomes. Therefore, while general CFC-Immediate and CFC-Future can be seen as temporal conflicts (Joireman *et al.*, 2008, 2012), the two components of food-related CFCs are not necessarily contradicted but coexist in facilitating SFA, including attitudes toward sustainable fish. The finding is consistent with the previous argument that two components of CFCs exist together within individuals (Khachatryan *et al.*, 2013; Olsen and Tuu, 2021) and their impacts on a behavior depend on the nature of the behavior in question (Enzler, 2015). This research further contributes by offering the understanding that domain-specific CFCs may have unique associative patterns with a certain behavior compared to general ones, urging more studies on this matter in the sustainable consumption domain.

The findings also indicate that food-related CFC-Immediate and CFC-Future have indirect effects on SFA (towards fish) through food-related health and environmental concerns. The results align with the extended perspective of VBN (Black *et al.*, 1985; Stern, 2002), suggesting that social-psychological factors (e.g. food-related CFCs) can foster environmental values (e.g. food-related health and environmental concerns). These values, in turn, significantly determine pro-environment attitudes/behaviors. Therefore, the hierarchical relationship among food-related CFCs, health and environmental concerns and SFA is novel, providing scholars with a deeper and broader understanding of the intricate psychological process of sustainable consumption behaviors, including the consumption of sustainable fish. Furthermore, the findings suggest that food-related health and environmental concerns are necessary conditions for food-related CFCs to facilitate the consumption of sustainable food such as fish. Moreover, CFC-Immediate does not exert an indirect effect on SFA via environmental concern, suggesting that this concern is more related to the consideration of more distant rather than immediate outcomes. Thus, it is less likely to transfer the impact of CFC-Immediate on SFA. In a broader sense, environmental values can be expected to be the intermediaries linking personality traits to individual attitudes/behaviors regarding a specific sustainable food. Therefore, the proposed research model can be applied in future studies, aiming to investigate consumers' attitudes toward various sustainable foods (e.g. meat, vegetables).

5.2 Practical implications

In addition to significant theoretical implications for scholars, the current study also sheds important practical implications for businesses that produce and sell sustainable food, such as fish, in order to increase consumers' positive attitudes towards their products. The findings

indicate that both health and environmental concerns have a positive impact on SFA. Therefore, businesses should emphasize both of these values to enhance SFA (Olsen and Tuu, 2021). For instance, they can highlight issues related to human health and environmental harm associated with environmentally unfriendly produced food to encourage individuals who prioritize these values to engage more in activities that promote the consumption of sustainable food. Subsequently, businesses can develop a more effective communication strategy by emphasizing the healthy attributes (e.g. strong body) and/or environmental attributes (e.g. less pollution) of sustainable food such as fish to facilitate sustainable consumption.

The results also demonstrate that food-related CFC-Immediate and CFC-Future have positive effects on SFA. Therefore, a focus on both present and future consequences is important to increase the effectiveness of the businesses' communication campaign on sustainable food (fish) consumption. For example, demonstrating both short-term impacts (e.g. safety and social acceptance) and/or long-term impacts (e.g. environmental and social well-being) stemming from sustainable consumption may be an effective way to develop a promotional tendency to facilitate the consumption of sustainable food (fish) (Joireman *et al.*, 2012). Furthermore, messages sent to individuals with a higher level of CFC-Immediate, emphasizing the immediate benefits of sustainable food (fish), may be more effective. On the other hand, messages sent to individuals with a higher level of CFC-Future emphasizing the future benefits of sustainable food could generate more desirable outcomes.

The results also reveal the indirect effects of food-related CFCs on SFA via food-related health and environmental concerns, indicating that these concerns are necessary conditions for CFCs to lead to SFA. Therefore, businesses should emphasize measuring food-related CFCs and health/environmental concerns when implementing communication strategies to promote sustainable food (fish) consumption. For individuals with a higher level of CFC-Immediate, it is significant to measure the level of health concern during communication as this concern is necessary for shaping their attitudes towards sustainable food, including fish, and ultimately influencing sustainable behaviors. In terms of individuals with a higher level of CFC-Future, both health and environmental concerns should be monitored to ensure that communication fits their tendency of putting more importance on future outcomes. In other words, different communicative messages should be designed for individuals with different dominant CFCs to foster the consumption of sustainable food (fish).

5.3 Limitations and future research

This study treats food-related CFCs as a personality trait and establishes a hierarchical path from CFCs to environmental values and finally to SFA based on the extended perspective of VBN theory (Stern *et al.*, 1985). There also exists a view considering food-related CFCs as an attitudinal construct and thus supporting the role of the variable as an intermediary between environmental values and sustainable consumption behaviors (Olsen and Tuu, 2021). Indeed, both views have been proved to be theoretically sound (Olsen *et al.*, 2023). Therefore, future studies should examine the impact of environmental values on food-related CFCs. It is expected that the outcomes of these studies can form a more comprehensive understanding regarding the relationship between the two variables in the domain of sustainable consumption. Second, while discussing and developing universal arguments about the relationships among investigated variables, this study focuses on sustainable fish when measuring consumers' attitudes (c.f., Dassen *et al.*, 2015; Olsen and Tuu, 2017). Future studies should examine more kinds of sustainable food (e.g. meat, vegetables) to form a diverse knowledge of SFC. Future studies should also consider adding more environmental values and contextual factors that can act as contingent conditions to better predict SFC attitudes and behaviors. Finally, future studies should collect data from different areas to increase the representativeness of the sample.

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