Research

Defining food well-being from the perspective of young Canadian consumers: an exploratory study

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Abstract

Food well-being (FWB) is fundamental for consumers' overall well-being. Previous studies have explored FWB through five domains (food socialization, literacy, marketing, availability, and policy) or food-related concepts (e.g., food pleasure, healthiness, and satisfaction). However, the understanding of FWB is limited due to two main issues: (1) the absence of a clear definition and reliable measurement tools for this multifaceted and multidisciplinary phenomenon, and (2) the tendency of studies to focus on individual dimensions rather than examining it as an integrated whole, making it difficult to understand how these dimensions are interconnected. To address these gaps, a qualitative exploratory study was conducted with young Canadian consumers using a focus group and 15 individual interviews. A directed content analysis revealed a disconnect between consumer perceptions and the existing definition of FWB. This study makes three key contributions to understanding FWB: first, it provides a deeper insight into FWB conceptualization by identifying new themes within its domains. These include: (1) food socialization, shaped by family, peers, and meal traditions; (2) food literacy, encompassing both conceptual and procedural knowledge, as well as individual goals; and (3) food marketing, shaped by the impact of marketing activities (the 4Ps) on food experiences. Second, this study presents a comprehensive framework that illustrates the interconnections among FWB domains. It highlights, for example, how food socialization influences food literacy, the interactions between food literacy and food marketing, and the role of policy in shaping FWB. Third, it offers practical implications for enhancing FWB in contemporary consumer society.

Keywords Food well-being · Food waste · Sustainable food system · Food consumption · Healthy eating · Food policy

1 Introduction

Food well-being (FWB) was introduced in Block et al. [1, p. 6], refers to "a positive psychological, physical, emotional, and social relationship with food at both individual and societal levels." Block et al. [1] identified five FWB domains, including food socialization, literacy, marketing, availability, and policy. At the 28th United Nations Climate Change Conference (COP 28), 159 countries signed the COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action. Food is critically related to several urgent challenges in contemporary society, including health and sustainability issues (e.g., climate change, food loss, and waste). COP 28 calls for a healthy and sustainable food system to promote human health and face climate challenges [1]. Many food well-being (FWB) domains (e.g., nutrition, health, food accessibility and affordability, reducing food loss and waste) are foundations for establishing a healthy and sustainable system [2, 3].

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Previous studies have shown that FWB positively impacts consumers' objective and subjective well-being and life satisfaction [4, 5]. Other studies focus on interactions between FWB and consumers' food consumption behaviors, such as calorie intake, consumption volume [6], and purchasing intentions [7]. Many researchers note that consumer FWB is influenced by food-related factors (e.g., freshness, nutrients, diet, and naturalness) [8], contextual factors (e.g., eating context, food transportation, and acquisition), and individual factors [9]. In particular, some studies have shown that consumer FWB significantly depends on knowledge (regarding dietary, nutritional, and labeling systems), motivation [10], tendency to eat [11], and food-related quest for authenticity, achievement, pleasure, and sustainability [12].

However, the understanding of FWB is still limited for two main reasons. First, a systematic review [13] reveals a lack of consensual conceptual definitions and grounded measurement instruments (operational definitions) for FWB, which is a complex, multidimensional, and multidisciplinary phenomenon. The extent of the studies was based on related concepts such as "food pleasure," "food healthiness," or "food satisfaction" rather than Block et al.'s [1] FWB definition per se. Second, existing studies focus on only one or several FWB dimensions separately, such as food availability [10] and food socialization [14], rather than FWB as a whole, which makes it difficult to understand how each dimension relates to others.

Thus, this exploratory study aims to better understand the conceptualization of FWB, which clarifies the themes that define FWB domains and identifies the relationships among them. More precisely, we attempt to answer the following research questions (RQs): (1) What are the themes of FWB domains from a consumer standpoint? (2) How do consumers perceive FWB (Is there a gap between consumers' perceptions and the theoretical definition)? (3) How do the FWB domains relate to one another? To this end, we conducted a qualitative study based on a focus group and 15 in-depth interviews. The findings revealed the difference between the FWB definition in the literature and consumers' understanding.

The study makes three key contributions. First, this paper offers an in-depth conceptual understanding of FWB from a consumer perspective by exploring the themes of its domain (food socialization, literacy, marketing, availability, and policy), which can help develop holistic measurements. Second, it proposes a holistic framework for the relationships among different FWB domains, which can contribute to research for theory development and testing. Finally, this paper provides several actionable suggestions for stakeholders in the food industry to improve each FWB domain.

2 Food well-being definitions and measurements

FWB is a complex concept that lacks a common definition [13, 15]. FWB has been defined from hedonic, eudemonistic, and mixed perspectives that have led to three research streams. From a hedonic perspective, FWB is achieved through subjective "pleasure" and "happiness" in food consumption. The FWB is investigated through the concepts of food pleasure [16], food experience [17], and FWB practices [18]. The second research stream adopts a eudemonistic standpoint, from which FWB needs to consider morality and normality. Studies based on the eudemonistic approach attempt to gain insights into FWB from the perspectives of "food healthiness" [6] and "beliefs about food health" [5]. Most research adopts a holistic perspective by considering both hedonic and normalized dimensions through the concepts of food-related satisfaction [13] and consumer-perceived FWB [19, p. 63]. On the basis of this holistic perspective, Block, et al. [1] proposed shifting to an alternative paradigm based on "food as well-being" (which reconciles pleasure and healthiness) rather than "food as health." Block et al.'s [1] framework extends "food as health" to "food as well-being"—a broader concept that reconciles "pleasure and healthiness" and incorporates diverse domains (food socialization, literacy, marketing, availability, and policy).

However, a consistent definition is a *necessary condition* for developing a good measure of the formal theory that leads to good empirical theory building (e.g., building FWB measurement instruments and statistically testing relationships between FWB domains) [20]. Clarifying the definition of FWB is essential for empirical research to maximize theoretical contributions and practical implications. From a theoretical perspective, a systematic literature review reveals two issues regarding the conceptualization and measurement of FWB: (1) previous studies are based on comparable or related concepts rather than FWB per se, for example, the Experiential Eating Pleasure Scale [21], satisfaction with food-related life [22], and the Five Well-being Index in the Food Context [The World Health Organization (WHO)]. None of these tools directly measure FWB domains (food socialization, literacy, marketing, availability, and policy). However, those measurements based on similar concepts (not a definition of FWB) do not refer to the real and all properties of FWB. (2) Knowledge about FWB is fragmented since the existing studies focus only on one or some dimensions of FWB rather than FWB as a whole, such as food availability [10] and food socialization [14], hindering an understanding of how each dimension relates to the others and of the complexity of the phenomenon. From a practical viewpoint, a meaningful instrument

of FWB (considering consumer views) is needed to improve the effectiveness of practical initiatives for enhancing FWB and food system transformation [23].

3 Methods

The primary goal of this study is to offer an initial empirical basis for understanding the complex phenomena of FWB, with a focus on its fundamental dimensions. To this end, we carried out a qualitative study based on a focus group of seven consumers and 15 individual in-depth interviews (Table 1).

In the first step, a focus group lasting approximately 60 min was conducted with seven undergraduate business students as part of a class activity. The group comprised 57% women and 43% men, with 71.4% of participants aged 25–34 and 42.8% being single (see Table 2). The primary objective of the focus group was to generate new themes that define the concept of FWB in general, as well as its specific domains from the consumer perspective (addressing RQ1). A focus group was chosen for this purpose because the dynamics of group interaction and the flexibility of the method can provide deeper insights into novel concepts [24].

In the second step, we conducted 15 individual in-depth interviews, lasting approximately 30–60 min each, to refine the emerging themes, reveal the differences between the definitions in the literature and consumer perceptions of FWB (to answer RQ2) and identify the potential relationships among the FWB domains (to answer RQ3). The individual interactions can also reduce group effects and social desirability bias in the focus group [24]. This technique of triangulation, which is based on different data collection modes (focus groups and individual interviews), can improve the trustworthiness of the findings [25].

A total of 15 participants were recruited using the snowball sampling method in Quebec, Canada. The first participant for the individual interviews was recruited through an advertisement on the university's website, which sought individuals interested in FWB and consumption. Subsequent participants were recruited through referrals from initial participants using the snowball sampling technique. All participants were informed that their involvement was voluntary, and no incentives were provided. However, their contribution was highly valued, as it helped deepen the understanding of public well-being in relation to food consumption. The snowball sampling technique is particularly effective for exploratory qualitative research, as it allows for insights into specific groups—such as consumers interested in food well-being or 'green' consumers—by encouraging participants to refer others who might also be interested in the study. This approach can increase willingness to participate, especially when individuals are invited by peers from within the same group [26]. The sample for the individual interviews was primarily composed of young, single female consumers, who represented 80% of the participants, all under age 34 (see Table 3).

Overall, the focus group and individual interviews were performed in three sections, starting with questions regarding consumers' perceptions of the importance and role of food consumption. Next, Sect. 2 addresses consumer perceptions of the main domains of FWB (food socialization, literacy, policy, availability, and marketing) (Table 7 in Appendix).

The focus group and individual interview transcripts were examined through a directed content analysis in NVivo. Directed content analysis distinguishes the conventional approach to coding sheets derived from a predetermined framework (Block et al.'s [1] FWB) rather than directly from the data [27]. The data were coded in two stages [28]. First, according to Block et al.'s framework and literature, we created a list of codes about themes defining FWB before fieldwork (deductive coding). Then, other codes emerge progressively if the data do not fit the initial codes. The objective is to generate and categorize novel themes that better define FWB domains from the consumer's viewpoint and clarify the relationships among each domain (inductive coding) (Table 8 in Appendix).

4 Results

4.1 Consumer FWB

The focus groups and individual interviews revealed the difference between Block et al.'s [1] FWB framework and consumers' perceptions of it. If we compare the themes that emerged in the individual interviews and those presented in Block et al.'s [1] framework, several issues are brought to light (Fig. 1).

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Table 1 Overview of methodology

Step	Research question	Objective of each step	Data collection	Result
Step 1: generating the novel themes that define each domain of FWB from a consumer perspective (food socialization, food literacy, food marketing, food availability, and food policy)	RQ1: what are the themes of FWB domains from a consumer standpoint?	Generate an initial list of themes of FWB from existing literature and focus group (to answer RQ1)	Literature revue and Focus group	Figure 1 (synthesis of existing and emergent themes of consumer food well-being)
Step 2: refine the list of emerging themes, reveal the gap between the definition in literature and consumer perceptions, and identify the potential relationships among the FWB domains	- RQ1: what are the themes of FWB domains from a consumer standpoint? - RQ2: how do consumers perceive FWB (Is there a gap between consumers' perceptions and theoretical definition)? - RQ3: how do these domains of FWB relate to each other?	- Refine and complement the list of emerging themes from the focus group (to answer RQ1) - Reveal the gap between the definition in literature and consumer perceptions' towards FWB (to answer RQ2) - Identify the potential relationships among the FWB domain (to answer RQ3) - Reduce the group effects and social desirability bias in the focus group → enhance the credibility of findings and trustworthiness (triangulation on different data collection modes)	Individual interviews	Table 4 (theoretical view versus consumer view of food well-being) Figure 2 in the paper (relationships among FWB domain from a consumer perspective)

Table 2 Participant characteristics in focus the group

Pseudonym	Gender	Age group	Marital status	Profession/study
Daphne	F	25–34	In a domestic partnership or civil union	Administration and business
Jean	M	25–34	Single, never married	Administration and business
Rosalie	F	25–34	In a domestic partnership or civil union	Administration and business
Jordan	M	18–24	Single, never married	Administration and business
Kasandra	F	25–34	In a domestic partnership or civil union	Administration and business
Laurence	F	25–34	In a domestic partnership or civil union	Administration and business
Samuel	M	18–24	Single, never married	Administration and business

Table 3 Participant characteristics in the interviews

Pseudonym	Gender	Age group	Marital status	Profession
Aminata	F	18–24	Single, never married	Environmental management
Emylie	F	25–34	Single, never married	Psychology
Lisa	F	18–24	Single, never married	Psychology
Maude	F	18–24	In a domestic partnership or civil union	Psychology
Ange	F	25–34	Single, never married	Social work
Clara	F	18–24	Single, never married	Psychology
Eloïse	F	18–24	In a domestic partnership or civil union	Culture and art
Laurie-Anne	F	18–24	In a domestic partnership or civil union	Action Culturelle
Christian	M	35–44	Single, never married	Psychology
Gabrielle	F	25–34	In a domestic partnership or civil union	Psychology
Maya	F	18–24	Single, never married	Culture
Jean	M		Single, never married	Administration and business
Amirath	F	18–24	Single, never married	Administration and health
William	M	25–34	Single, never married	Administration and business
Laurie	F	18–24	Single, never married	Administration and business

1) Food socialization: food socialization is defined as "processes consumers use to learn about food, its role, and FWB in a person's cultural realm" [1, p. 7]. The literature indicates that culture and subculture significantly influence consumer food consumption since food can reflect cultural values that transfer from generation to generation [1]. Consumers learn from their childhood food-related behaviors (e.g., food preparation, food consumption) through socialization processes [1, 29]. The literature has identified two means of food socialization: the first relies on learning from socialization agents such as family, parenting, peers, and school. The second is based on observation and mimicking others. The findings of the interviews revealed that food socialization is essentially based on learning from the family, especially parents. Specifically, the family has a major influence on goals related to food consumption, such as health (functional goal), happiness (hedonic goal), and reducing waste (symbolic goal). Moreover, the family significantly affects food literacy by providing "conceptual knowledge" (e.g., nutrition, information, and labeling) and "procedural knowledge" (e.g., daily routines to achieve nutritional goals).

> "[my family culture] definitely influences my food consumption; it makes me want to eat fresher, so it forces me to go grocery shopping more often, to buy more varieties […] Making dishes with simple ingredients too. So, I don't systematically turn to organic but try to find things that aren't entirely processed, that are primary." (Individual 1)

In addition, peers may influence food consumption and practices in the context of "being a couple" or "apartment sharing."
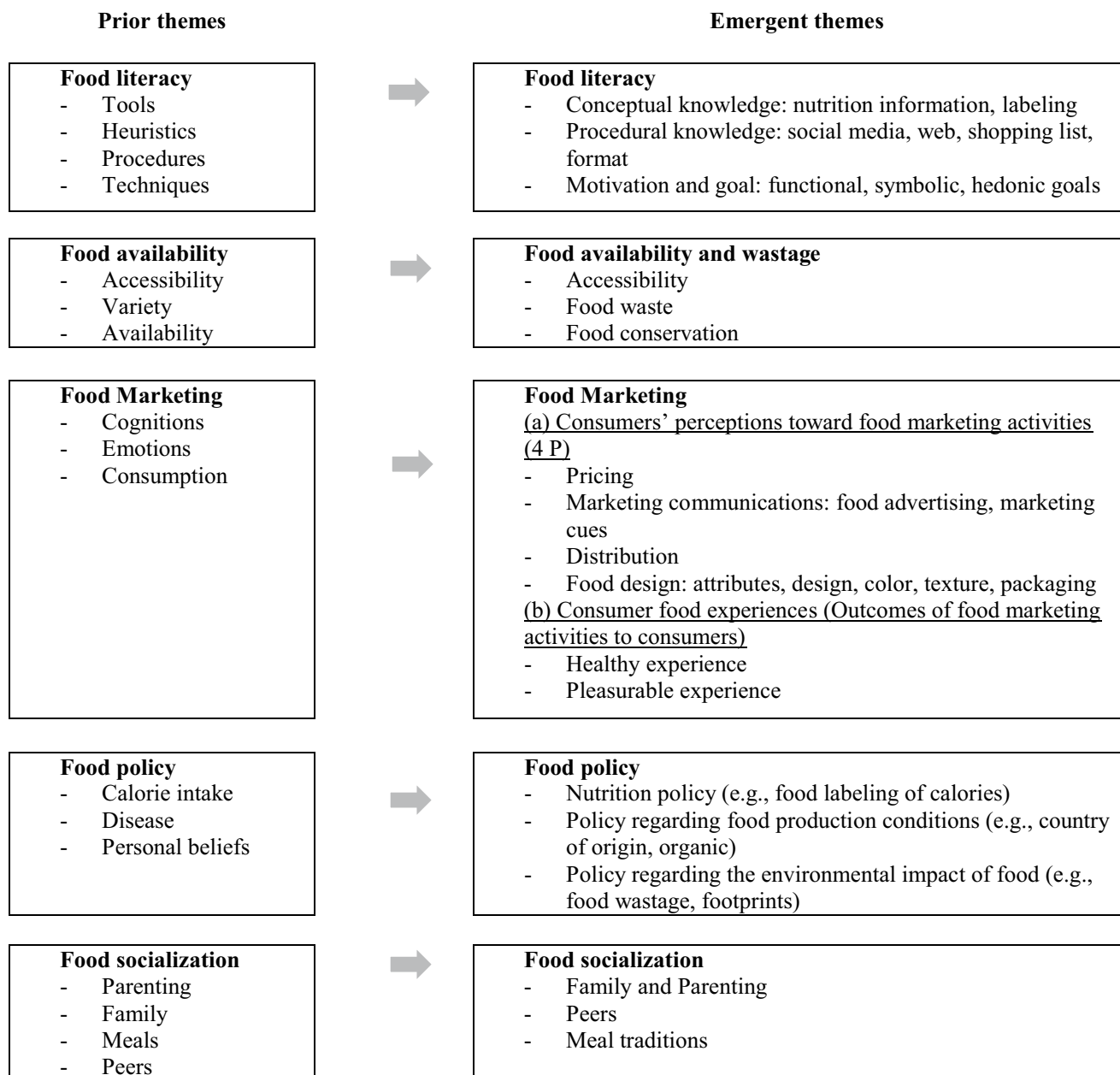
Prior themes   **Emergent themes**

Food literacy	Food literacy
- Tools - Heuristics - Procedures - Techniques	- Conceptual knowledge: nutrition information, labeling - Procedural knowledge: social media, web, shopping list, format - Motivation and goal: functional, symbolic, hedonic goals

Food availability	Food availability and wastage
- Accessibility - Variety - Availability	- Accessibility - Food waste - Food conservation

Food Marketing	Food Marketing
- Cognitions - Emotions - Consumption	(a) Consumers' perceptions toward food marketing activities (4 P) - Pricing - Marketing communications: food advertising, marketing cues - Distribution - Food design: attributes, design, color, texture, packaging (b) Consumer food experiences (Outcomes of food marketing activities to consumers) - Healthy experience - Pleasurable experience

Food policy	Food policy
- Calorie intake - Disease - Personal beliefs	- Nutrition policy (e.g., food labeling of calories) - Policy regarding food production conditions (e.g., country of origin, organic) - Policy regarding the environmental impact of food (e.g., food wastage, footprints)

Food socialization	Food socialization
- Parenting - Family - Meals - Peers	- Family and Parenting - Peers - Meal traditions

Fig. 1 Synthesis of existing and emergent themes

"I usually do the grocery shopping at home, but I eat with a friend, so sometimes she does the shopping. […] There are three of us eating at home [...] When it comes to shopping, yes, but it's always based on what we want to eat. I'm not the one who decides what we will eat because we're in a group with certain dietary restrictions. But depending on what we decide, I'm the one who decides what we buy." (Individual 2)

Several participants mentioned that the meals and cultural traditions in their country of origin influence their food consumption. The meal tradition reflects their identities.

"I went to African grocery stores a lot. And more often, the grocery stores in my country of origin. Rarely do I go to big [local] grocery stores […] I prefer to maintain the eating habits I've always had." (Individual 5)

2) Food literacy: the concept of food literacy is developed from the concept of food literature, which includes food and nutritional knowledge. In addition to conceptual knowledge (e.g., nutrition information), food literacy has extended the food literature by including two other dimensions: procedural knowledge and goals related to food consumption [1].

Procedural knowledge refers to the means and routines for acting on conceptual knowledge to achieve specific goals (e.g., healthiness, happiness, ethics/morality). Block et al. [1] operationalize food literacy through tools, heuristics, procedures, and techniques. However, the findings of the interviews show that consumers cannot distinguish among tools, techniques, and heuristics applied in food decision marketing. Consumers only show their knowledge (e.g., nutrition, labeling) and how to apply it (e.g., practices, routines). Two emergent themes of this study are as follows: (1) conceptual knowledge, which includes food and nutritional knowledge and information, and (2) procedural knowledge, which involves regrouping the means, tools, heuristics, techniques, and routines for acting/applying conceptual knowledge (e.g., social media and web shopping).

"I look at where it was produced. I look at the ingredients to see if they come from far away or if there are 40,000 kinds of packaging. I don't know if there are scores here, but I think it was in France. But in France, I looked at the scores A, B, C, D. And then scored A, the best, score D, the worst stuff inside, like candies, super fatty stuff and all. (<u>Conceptual knowledge</u>*). But in fact, I don't rate that much because I often buy the same things that I already know what they are. When I buy vegetables, it's always the same. Sometimes, they're organic; sometimes, they're not. I still try to buy organic vegetables. After that, the rest of my products are rice, pasta, and soy, maybe."* (<u>Procedural knowledge</u>) (Individual 14)

The findings also confirmed that consumers' food-related behaviors were derived from motivations driving their food consumption (functional, hedonic, and symbolic goals) [30]. Some consumers attempt to improve health and reduce health risks (e.g., disease, allergy, weight loss) by adopting healthy consumption patterns (e.g., consuming organic, gluten-free, low-calorie, low-sodium, low-fat foods).

Instrumental goals:

- *"My diet is essential to me. The role it plays is at the nutritional level because when it comes to my health, I'm obliged to focus on a certain type of food and products to consume. So yes, I pay a lot of attention to that. I pay more attention to health because, in the end, you can't just consume."* (Individual 3)
- *"I still attach a lot of importance to my diet. I think about it a lot. I've done a lot of research over the years on what foods were better for me than not. I've tried different diets like going gluten-free, dairy-free, and vegetarian."* (Individual 9)

Other consumers aim to enjoy the sensory experiences or impulses of food. The primary goal for these consumers is to find "eating pleasure" rather than "healthiness" in food consumption. Specifically, the findings identified two types of hedonic goals: those related to epicurean pleasure and to visceral eating pleasure. This is confirmed with the extant study [11]. The goal of epicurean pleasure refers to seeking pleasure through the aesthetics and appreciation of sensory and symbolic value through food consumption.

<u>Epicurean pleasure</u>: *"I grew up with parents who had a farm. I come from a family where food is important, and so is a restaurant. I think I was raised in a family atmosphere where food was part of the family values. Even today, I think that influences my diet. It's still very important to me. I believe that everything you eat influences how you feel. At least I pay particular attention to how I nourish my body".* (Individual 4)

The goal of visceral eating pleasure is to satisfy eating impulses. It is influenced by external cues (e.g., external eating, marketing cues) or internal emotions (e.g., happiness or distress).

<u>Visceral eating pleasure</u>: *"Here are many aspects to enjoying food. It's eating a good thing, even outside the home. Because eating out is addictive and all, so I'd say eat anything you're not used to eating if you're on a certain diet. This can sometimes lead to weight gain or to a loss of taste and frustration."* (Individual 3)

In addition to functional and hedonic goals, consumers' food behaviors are also derived from symbolic goals such as creating/improving relationships with family and friends, aligning with social norms (e.g., physical attractiveness) [30], and expressing identities (e.g., socially responsible consumer/green consumer).

Symbolic goal: *"I'm actively trying to lose weight. And I know that physical activity is a factor, but my physical activity is very good. I do intense sports three times a week, and I move every day. […] The thing that's slowing down my weight loss is my diet. I'm really concerned about getting my diet right to lose weight."* (Individual 13)

Moreover, we found that most consumers attempt to address different goals simultaneously, although some goals (visceral eating pleasure vs. healthy eating) seem conflicting.

Hybrid goal: *"Food is such an important thing. I never did it for 'No, I'm going to get fat.' It's never been about image. It's really more about pleasing myself. No anxiety. I get anxious when, for example, I don't have time to cook for myself if I tell myself I don't give myself the time to do it. You have to take the time to cook. It makes me so happy. It's a form of meditation, just sharing, just making things; it's so good. Love food!"* (Individual 10)

3) Food marketing: food marketing is a crucial FWB domain. Previous studies focus on marketing activities (4P's: product, price, promotion, and distribution) on three dimensions of consumers' behaviors (cognitive, emotional, and behaviors) [1]. The findings reveal that consumers' perceptions toward marketing activities significantly influence their cognitions (goals, food ethic, and morality), food experience, and practices. Two categories of themes emerge from this study, including "perceptions toward food marketing activities" and its "outcomes."

The first category of themes regroups consumers' perceptions toward food marketing activities, including pricing, advertising, and distribution strategies. A new theme, "food design," emerged that extended the "traditional product in 4P's" by including attributes, design, texture, and food packaging.

- *"I went to the grocery store and thought, this is expensive. But that wouldn't really stop me from buying."* (Group 1)
- *"The price, if it's a better food, if it's local or if… I'll favor it, even if it's a dollar more, that's fine. I often give up if the difference is almost double the price, even on promotion. […] Two products, I'll favor the local one or the one that's less… It's precisely in this kind of situation that I'll look at labels and things like that. The quantity, too."* (Individual 4)

A new theme, "food design," emerged that extended the "traditional product in 4P's" by including attributes, design, texture, and food packaging.

"I like the beautiful designs […]. I'm really going to go with… You know, the stuff I don't know, but they may have a nice design if I don't know what it tastes like". (Individual 4)

The second category of themes refers to the outcomes of consumers' perceptions of food marketing activities, including cognitions, food experiences, and practices. We have combined two dimensions of consumer behavior (emotions and consumption) into a novel dimension named "food experiences." Batat et al. [17] and Batat and Addis [31] propose improving FWB through "food experience design", which considers the "food experience in terms of health and/or pleasure".

"These [food] are positive emotions. I often eat without really being hungry. When I eat for pleasure, it's more because I want to have the taste in my mouth but not really because I'm hungry. [...] I know it isn't very good for my health, but I'll go just because it tastes good. Who cares? And then it makes me happy to do it." (Individual 4)

4) Food policy: food policy includes four types of policies in the food system: (1) food production and pricing policy; (2) food safety policy in production, storage, transportation, and distribution; (3) nutrition policy, which provides a guide regarding "types and amounts of nutrients and foods"; and (4) food and nutrition labeling policies that inform the consumer how food contributes to a healthy diet [1]. The findings show that different policies can help consumers make better decisions in food nutrition (healthy diet, reducing health risks), make informed decisions regarding food production and conditions (e.g., local food, organic food), and reduce food waste.

Nutrition policy: *"There's the Canada's Food Guide, which removed dairy products. Then there's food action. I find that in recent years, what I used to do is grocery stores […] that sell less beautiful fruits, vegetables, and products that will expire at lower costs."* (Individual 12)   Policy regarding food production conditions: *"I only know about*

the Quebec Initiative for Local Consumption, but otherwise, I don't know about laws or anything. […] Of course, I think it's important to consume locally. I try to buy local food as much as possible." (Individual 2)   <u>Policy regarding the environmental impact of food</u>: *"I think that restaurants are places where there is a lot of waste. There's a lot of food produced there, rather than in everyone's kitchen. Visually, there's some waste, but I think the food industry is responsible for most of the waste."* (Individual 8).

5) Food availability: themes regrouped in consumers' lists of their lack of knowledge of some new concepts regarding food availability. Some themes were regrouped into consumer lists because they lacked knowledge of new food availability concepts. Food availability "involves how the distribution and availability of food influence consumption behaviors at home, at work, in restaurants, in grocery stores, and in the wider community." [1, p. 9]. This study shows that consumers pay more attention to food availability and waste than to food accessibility and variability. This conclusion may be linked to the context and sample of this study. The study is conducted in an industrial country (province of Quebec, in Canada), rather than a developing country, where hunger and accessibility issues are not the main concerns of consumers or society.

> <u>Food accessibility</u>: *"Local grocery stores sell the same products. As I said earlier, I don't care if a product is organic. If it's here, at Maxi (a local supermarket in Quebec), I know it's at Maxi. I could buy it at Maxi because I know that, generally speaking, African grocery stores are more expensive than other supermarkets and grocery stores because of the import and transport of food."* (Individual 5)

Food availability and wastage increase consumers' attention. Many participants mentioned that consumers, ONGs, policy-makers, marketing practitioners (e.g., retailers, supermarkets), and restaurants need to make more effort to address food availability and waste issues.

> <u>Food waste</u>: *"At home (my family), we don't waste, which means if I make too much food, I don't throw it away; I keep it. So, I keep the leftovers, and then I look at them. Either I eat the leftovers as they are or try to transform them into something else, but we don't throw them away."* (Individual 2)

> <u>Food conservation</u>:

> *"I'm the kind of person who buys in bulk and stocks up a lot. If I'm buying dry products in particular, I don't really like buying in bulk for fresh products because I'm on my own, but anything in oil. If there's something in bulk that's just half the price, three times the price, I'll definitely take that, even if it costs more at the time, but in terms of quantity/ price, it's worth it. I'll do that. I like to stock my pantry. [...] Preserving, it's true that vegetables quickly become ugly, they wilt, they become soft, everything that's like a cucumber and all that stuff."* (Individual 4)

The differences between the FWB framework and consumer interpretations are highlighted in Table 4.

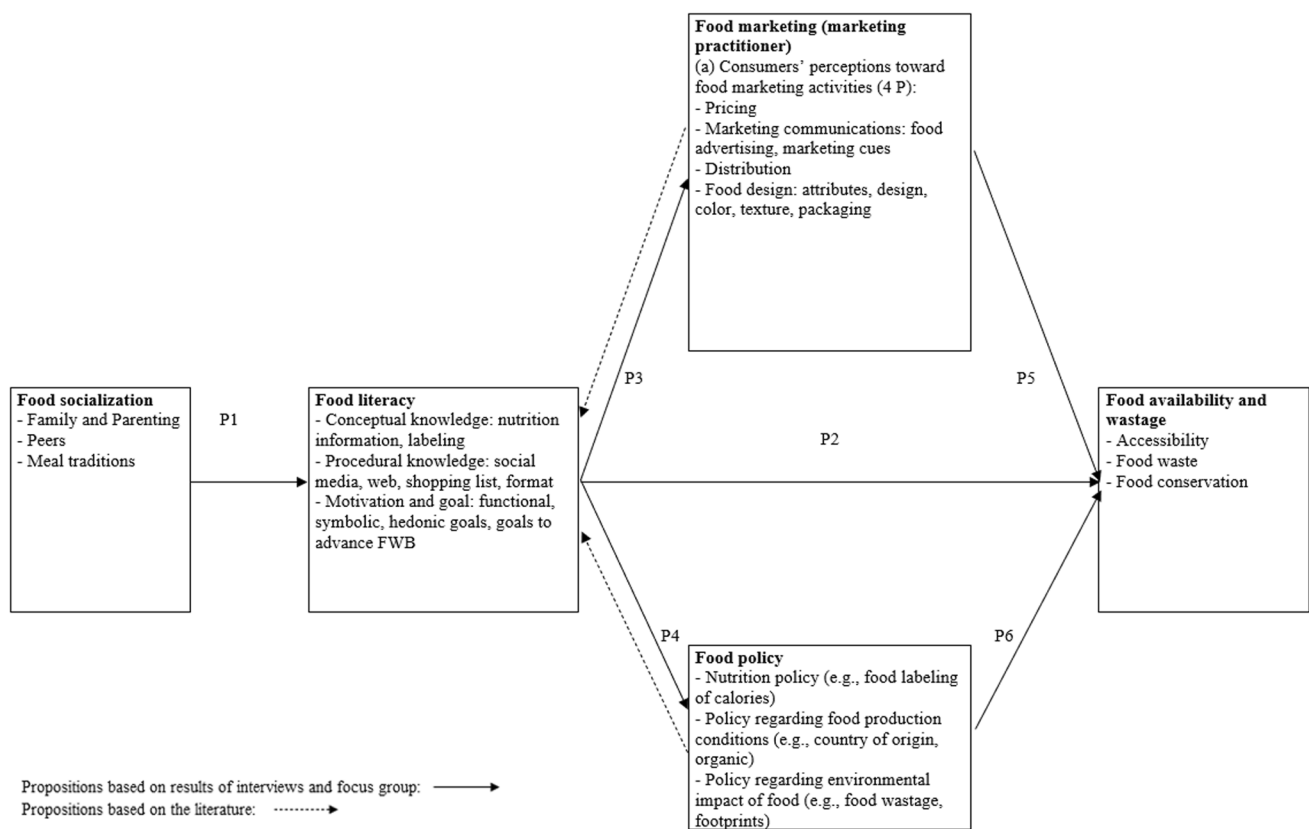## 4.2 Relationships between FWB domains from a consumer perspective

The findings identified the potential relationships among the five FWB dimensions from a consumer standpoint. We propose a novel framework and theoretical propositions for theory development and testing in future work (Fig. 2 and Table 9 in Appendix).

1) Impact of food socialization on food availability and waste through food literacy.
   Previous research findings have shown that food socialization significantly influences food literacy in children and adolescents, affecting their eating habits and preferences [14, 34]. Several studies have focused on socialization agents (especially parents [35, 36], schools [37, 38], and peers [36]) and noted that the former are crucial for increasing consumer food literacy, shaping healthy eating habits, and ultimately promoting a sustainable food system [39].

Table 4 Theoretical view versus consumer view of food well-being

Food well-being dimensions [1]	Theoretical view	Consumer view	Insights of this study in the FWB framework at the individual level
Food literacy	- Tools - Heuristics - Procedures (procedural knowledge): "food-related sequences of events, actions, or routines that occur in a particular context (e.g., how to shop for, prepare, and sauté fresh broccoli)." - Techniques	- Conceptual knowledge: nutrition information, labeling - Procedural knowledge (acting on nutrition knowledge to promote nutrition goals and FWB and daily routine): social media, web, shopping list, format - Motivation and goal: functional, symbolic, hedonic goals, goals to advance FWB	- Regrouping "tools," "heuristics," "procedures," and "techniques" to "conceptual and procedural knowledge." - Including "motivations/food consumption goals": (1) functional goals; (2) symbolic goals; (3) hedonic goals; and (4) FWB goals (balancing the three previous goals) [30]
Food availability	- Accessibility - Variety - Availability	**Food availability and wastage** - Accessibility - Food waste - Food conservation	Extending "food availability" to "food availability and wastage."
Food marketing	- Cognitions - Emotions - Consumption	**(a) Consumers' perceptions toward food marketing activities (4P)** - Pricing - Marketing communications (e.g., food advertising/ marketing cue) - Distribution - Food design: (consumers' perception towards attributes, design, color, texture, and packaging) **(b) Consumer food experiences (Outcomes of food marketing activities to consumers)** - Healthy experience: FWB goals, healthy eating, food ethic, and morality (eudemonistic perspective) - Pleasurable experience: food pleasure, the anticipation of food events and food practices, purchasing, consumption, remembering (hedonic perspective)	- Extending the effects of food marketing to "emotions" to "food experiences and practices "(to achieve hedonic and symbolic goals—ethic and morality of food) [11, 18, 32, 33] - Extending the effect of food marketing to "cognitions" to "food healthiness" (to achieve functional goals) → therefore, through food marketing activities (4P) to "food experience" (hedonic perspective) and "food healthiness" (eudemonistic), which can finally improve FWB (balancing hedonic, symbolic, and functional goals)
Food policy	- Calorie intake - Disease - Personal beliefs	- Nutrition policy (e.g., food labeling of calories) - Policy regarding food production conditions (e.g., country of origin, organic) - Policy regarding the environmental impact of food (e.g., food wastage, footprints)	Refining food policy to nutrition policy (food labeling of calories)
Food socialization	- Parenting - Family - Meals - Peers	- Family and parenting - Peers - Meal traditions (define social groups and individual identities)	Regrouping the impact of family and parenting

Fig. 2 Relationships among FWB domain from a consumer perspective

In line with previous research, the findings reveal that consumers' food socialization plays an important role, which may influence other dimensions directly or indirectly through socialization agents (family, parenting, and peers) and meal traditions. Many participants mentioned that family, especially parents, significantly influences their goals and motivations in food consumption, such as searching for health, happiness, and sustainability (e.g., reducing waste).

- *"I think it's a significant influence. My family introduced me to the foods I'm used to. As much as I got used to certain foods when I was young, I realized that it was better that I didn't eat as much of them. My family values health and eating well. (Individual 9)*
- *"I grew up with parents who had a farm and all that. I come from a family where food is important, and so is a restaurant. I think I was raised in a family atmosphere where food was part of the family values. Even today, I think that influences my diet. It's still very important to me. I believe that everything you eat influences how you feel. At least I pay particular attention to how I nourish my body." (Individual 4)*

Consumers learn how to convert and store food to avoid food waste from their families.

"At home (my family), we don't waste, which means if I make too much food, I don't throw it away. I keep it. So, I keep the leftovers, and then I look at them. I eat the leftovers as they are or try to transform them into something else, but we don't throw them away. After that, it's true that I sometimes forget certain things in the fridge and that it's filling up again, but as long as it's edible, we'll eat it." (Individual 2)

Consumers learn conceptual and procedural knowledge from their parents and peers (being a couple or apartment-sharing) to make better food decisions.

"I usually do the grocery shopping at home, but I eat with a friend, so sometimes she does the shopping. […] There are three of us eating at home […] When it comes to shopping, yes, but it's always based on what we want to eat. I'm

not the one who decides what we will eat because we're in a group with certain dietary restrictions. But depending on what we decide, I'm the one who decides what we buy." (Individual 2)

In addition, consumer food literacy seems to be shaped by meals and cultural traditions in consumers' countries, even when they travel and live in other countries for a long time.

"I'm half Vietnamese, half French. My whole upbringing was based on Vietnamese food. My mother and grandmother cooked all the time. Every night, in any case, I ate Vietnamese food at home. They're dishes, not necessarily big elaborate dishes, I don't know what, but they're always based on rice, then sautéed vegetables, then often chicken, stuff, soy. I buy a lot of rice, and I eat rice with all my dishes all the time. But otherwise, it's still a lot. Even the way I cook my vegetables, they're often stir-fried with Vietnamese spices, Asian spices anyway." (Individual 14)

Hence, we posit the following propositions:Proposition 1 *Consumers' food socialization may positively affect their food literacy. Socialization agents (family, parenting, and peers) and meal traditions may impact consumers' conceptual, procedural knowledge and motivation in food consumption.***Proposition 2** *Consumers' food socialization may affect their food waste behaviors through food literacy (conceptual/procedural knowledge and motivation in food consumption).*

2) Interaction between food literacy and food marketing

The findings indicate that food marketing activities, especially pricing/promotion, packaging, advertising, and communication, may influence purchasing quantity; however, they are not the only determinants of food decisions. Several participants indicated that they attempted to balance price with food quality and categories (organic, local) for different goals (searching for healthiness, happiness, or other social causes such as local food).

- *"The price, if it's a better food, if it's local or if… I'll favor it, even if it's a dollar more, that's fine. I often give up if the difference is almost double the price, even on promotion. Sometimes, I wait; there are foods I really like […]. I'll favor two products: the local one or the one that's less. It's precisely in this kind of situation that I'll look at labels and things like that. The quantity, too."* (Individual 4)
- *"[The price] doesn't really matter. Especially if it's a discount; otherwise, it depends. I can buy small too. The important thing is that it's good quality. […] I don't even look at the price. The important thing for me is to get something I like, and then it's good."* (Individual 6)
- *"[…] I pay attention to sales, but it's not premeditated. It's just that we all have our eating habits. I'm not going to buy something just because it's discounted. Usually, there's a company that I already like. It's like saying yogurt is the same yogurt I always buy. But since it's expensive, I just buy it when it's on sale because I know it's regularly on sale."* (Individual 9)

In addition, previous studies note that the effectiveness and valence (positive or negative) of the effects of advertising and communication strategies depend on consumers' knowledge and backgrounds (e.g., the domain of education and profession) [40–42].

The findings confirm that participants with marketing and business backgrounds perceive marketing activities more positively than others do.

"It doesn't really matter. Especially if it's special; otherwise, it depends. I can buy small too. The important thing is that it's good quality. Unfortunately, sometimes I don't even look at the price. The important thing for me is to get something I like, and then it's good. I try to go for specials, but when it's not a special, I'll go for the same thing." (Individual 6)

Other participants indicated that marketing activities do not necessarily help consumers make better decisions. They tend to make rational decisions according to their needs and goals rather than promotions and advertising. Some participants expressed skepticism toward advertising and pricing strategies, which aligns with studies on consumer skepticism toward marketing, especially in green marketing activities (e.g., green advertising [43] and green claims for organic food [44]).

- *"When you have communication, packaging, and merchandising, it helps me understand what I'm buying, I'd say. And that's it. And then, I'm a marketing student, so I think I can read between the lines of a publication, in that I try*

to see what the company is trying to put forward in its product […]. Obviously, there's advertising, which can be good or bad. There may be distribution. It's the choice of distribution." (Individual 7)

- *"It's [communication marketing] true that it influences me, but I don't know if it helps me make my best decisions. Their goal is to help me make my best decisions and convince me to buy the product. I don't think it helps me make my best decisions."* (Individual 8)

Hence, we posit the following proposition:Proposition 3 *Consumers' food literacy levels may positively affect their perceptions and understanding of food marketing practices (4Ps) and their food experiences. Simultaneously, consumers' perceptions of food marketing practices and understanding may affect their food literacy.*

3) Impact of food literacy on food policy

Several studies have revealed that the efficacy and effectiveness of food policy require consumers' previous knowledge of nutrition and health. On the one hand, it is vital to integrate former knowledge and sustainable food systems to establish an effective food policy [45]. On the other hand, a system-oriented and integrated (concepts of sustainability, healthy) food policy can shape consumers' knowledge, skills, and motivations, enabling a sustainable food system that helps consumers access safe and nutritious food [45].

The results show that consumer food literacy may affect awareness and understanding of food policy (nutrition, food production conditions, and environmental impact). Most participants indicated the important role of the government, retailers (especially supermarkets), restaurants, and NGOs. They call for actional guidance to help consumers make healthy, durable food decisions.

"I know there's the Canadian food guide, which I don't see at all. I don't read it. I know that the only thing I have going for me is that I occasionally watch the food news. I trust, for example, that Radio Canada has a grocery show. Sometimes I watch. Sometimes, I listen to a documentary-style program on Radio Canada. I looked at the article in the press, "Protégez-vous," which is my source of information. Learning is done over time. That's what it's all about." (Individual 6).

Hence, we posit the following proposition:Proposition 4 *Consumers' food literacy may positively affect their food policy perceptions and understanding. Simultaneously, consumer perceptions of and knowledge of food policy may affect their food literacy.*

4) Effects of food policy and marketing on food availability and waste

Block et al. [1] emphasized that favorable food policies can improve FWB. Broadly speaking, there are four types of policies in food systems related to (1) food production and pricing, (2) food safety (during production, storage, transportation, and distribution), (3) food nutrition (providing guidelines regarding nutrition information, such as Canada's Food Guide), and (4) food labeling (helping consumers make healthy and informed food-related decisions by providing more visible information about ingredients and nutrition). Several studies have recommended improving legislation and laws to prevent and address food waste, such as the Common Agricultural Policy in Europe [46], promoting sustainable food packaging (e.g., small-size packages, plastic-free, reusable or biodegradable packaging to ensure food safety and prolonged shelf life) [18, 47, 48], standardized and easy-to-understand data labeling [48, 49], and fiscal instruments (e.g., tax deductible for food donations, waste tax) [50].

The findings show that different policies can help consumers make better decisions regarding food nutrition (healthy diet) and sustainable food choices (e.g., local food). Some consumers call for legislation to increase the responsibility of relaters and restaurants in food waste prevention and reduction.

<u>Nutrition policy</u>: *"There's the Canada's Food Guide, which removed dairy products. Then there's food action. I find that in recent years, what I used to do is grocery stores […] that sell less beautiful fruits, vegetables, and products that will expire at lower costs."* (Individual 12) <u>Policy regarding food production conditions</u>: *"I only know about the Quebec Initiative for Local Consumption, but otherwise, I don't know about laws or anything. […] Of course, I think it's important to consume locally. I try to buy local food as much as possible."* (Individual 2) <u>Policy regarding the environmental impact of food</u>: *"I think that restaurants are places where there is a lot of waste. There's a lot*

of food produced there, rather than in everyone's kitchen. Visually, there's some waste, but I think the food industry is responsible for most of the waste." (Individual 8)

In addition to food policy, previous studies have shown that food marketing may influence food availability and wastage through consumer perceptions and that consumer-related food waste may be influenced by pricing (e.g., buy one free, large packaging size) [51–54] and communication (e.g., labeling systems, guidance for storage) strategies and social marketing approaches (social media) to reduce wastage [55–57].

The results reveal a primary barrier that influences the effectiveness and efficacy of food marketing activities. Most participants seem to distrust claims concerning marketing actions (pricing, communication), specifically (e.g., green advertising [43], claims for organic food [44], and health- or sustainability-related labeling [58, 59]). To overcome consumer skepticism, previous studies suggest using more narrative (adding more concrete details rather than general and vogue ones) and two-sided messages (showing benefits for consumers and companies, individual and social benefits) [60]. Companies can also eliminate consumer doubts by using blockchain technology to improve the transparency and traceability of products [59].

- *"I'm the kind of person who buys in bulk and then stocks up a lot. If I'm buying dry products in particular, I don't really like large formats for fresh products because I'm on my own, but anything in oil. If there's something in bulk that's just half the price, three times the price, I'll definitely take that, even if it costs more at the time, but in terms of quantity/price, it's worth it; I'll do that. I like to stock my pantry. […] Preserving, it's true that vegetables quickly become ugly, they wilt, they become soft, everything that's cucumber and all that stuff."* (Individual 4)
- *"Regarding marketing, I'm not too keen on being transparent. It irritates me a little to be steered and then forced toward certain things. However, I do like it when there are associations with certain nutritionists or others, where there are little labels that already have a little remark to say that this is a good choice. I know that grocery stores have been doing this more and more in recent years. That can help a little, but otherwise, I look at what I need, I look at the price, and then I go with that."* (Individual 1)

Hence, we posit the following propositions:**Proposition 5** *Consumers' knowledge of food policy may affect their food waste behavior. The more people know about food policy, the more likely they are to reduce food waste.***Proposition 6** *Consumers' perceptions and understanding of food marketing practices may affect their food waste behaviors.*

5 Theoretical contributions

This study makes three main contributions to the literature concerning FWB. First, this study provides a better understanding of FWB conceptualization from a consumer perspective by exploring the themes of the main FWB domains (food socialization, literacy, marketing, availability, and policy). Most previous work has investigated one or more domains of FWB (e.g., food availability [10] or food socialization [14] rather than FWB comprehensively. In contrast, this study explores consumers' overall perceptions of each domain of FWB and the links among them through a systematic literature review on FWB, 15 individual interviews, and a focus group. The content analysis revealed the difference between Block et al.'s [1] FWB framework and consumers' perceptions. Specifically, the findings show that food socialization is influenced by "family and parenting," "peers," and "meal traditions," which align with the themes in the literature. Food literacy is defined by "conceptual knowledge," "procedural knowledge," and "functional, symbolic, hedonic, and hybrid goals" from consumers' standpoints. Food marketing regroups "consumers' perceptions toward food marketing activities" (4Ps) and their outcomes toward consumers' food experiences (healthy and pleasurable aspects). The emerging theme, named consumers' food experience, is critical since it extends traditional consumers' food-related behavior (cognitions, emotions, and consumption) to a broad concept—food experiences (integrating food events and practices for healthy and pleasurable goals). Moreover, consumers' food experiences may influence food design (an emerging theme in food marketing) through food experience design, which advances FWB [31].

Table 5 Practical implications

Consumer interpretations of FWB themes	Practical suggestions
Food literacy	- Develop new initiatives incorporating conceptual and procedural knowledge: (a) include a campaign focusing on a different weekly topic: how to choose healthy food with discounts? Healthy food purchasing through labeling systems (nutrition labels, date labels: best before date, guidance for store) - Establish new pricing and company initiatives that support FWB (e.g., discounts for more nutritious food, down-sizing packed food) - Create a section for healthy food (e.g., organic foods, OMG free foods) in the supermarket to make decisions easily (do not need to read detailed information on packaging to identify these foods) - Demonstrate in supermarkets, stores, and restaurants: choose healthy food by considering portion sizes (compare the unit price for similar items), nutrition, freshness rather than price, and discounts
Food accessibility, availability, and wastage	Accessibility and availability - Create a section in the supermarket for a nich ingredients (e.g., Asian, African ingredients) - Create a discount section and applications for food near the best-before date - Improve the accessibility and availability of affordable, nutritious food → to this end, we suggest creating local -, community-based food distribution systems that provide affordable, nutritious, fresh food Food waste and conservation - Develop easy-to-understand date labels and convenient storage initiatives to reduce effect and save time in food consumption and conservation; - Promote small-size food or novel "food-safe packaging" (e.g., reclosed packaging, multi-portion packaging). Make them more available - Build a community-based distribution system to redistribute the overleft and uneaten food for Foodbanks and low-income consumers - Promoting anti-food waste and food-sharing applications (e.g., Food Hero, Too Good To Go, Olio) in the community and food retailers
Food marketing	Build a consumer-, community-centric focus program to fit their needs better (e.g., searching for health and happiness). To this end, it is necessary to co-create/co-design programs *with* consumers and the community, not just *for* them
Food policy	- Improve the nutrition guidelines by balancing different motivations: searching for health and happiness to avoid "a strict dietary restriction" and improving overall well-being (physical and mental) - Establish actionable guidelines and demonstrations (video in mass and social media) to illustrate how to control food better and deal with leftovers in the household, restaurant, and supermarkets. The goal is to help consumers adopt healthy eating patterns/habits - Enable public policies intervention/role in the Food retail industry (e.g., supermarket, grocery store): interventions at the point of sale such as nutrition education and promotion, fiscal policies to encourage healthy food, and reduce waste)
Food socialization	- Consider the community in food socialization, which could engage and involve diverse socialization agents (family, peers, school) and food culture (culinary, meal traditions) - Empower consumers through co-design, integrating consumers in FWB

Second, measuring FWB is challenging since it lacks an agreed-upon definition and is multidisciplinary. FWB domains are interrelated with each other. The results revealed that food socialization and food literacy contribute to other domains (food marketing and policy). Food availability, waste, and overall FWB are the primary outcomes. This study identifies two challenges in the FWB field. First, there is a distinction between how FWB is defined in the literature and how it is interpreted by consumers. Second, this study revealed a lack of grounded measurement tools for FWB due to confusion regarding its conceptualization. The findings reveal a new theme for each domain of FWB from a consumer standpoint, which can be used to develop a novel measurement using a representative sample and respond to the calls for novel measurement tools according to Block et al. [1] FWB framework [13, 30].

Third, the findings reveal several opportunities for theory development, extension, and theory testing in the domains of FWB. For example, food literacy has direct/indirect impacts on food availability and wastage through food marketing and policy.

Table 6 Rationales, research questions, results, and contributions

Rationales (research gaps)	Research questions (RQ)	Results	Theoretical contributions
Research gap 1: responding to the calls for a consistent definition and a meaningful, holistic measurement considering all domains of FWB [13, 30] and consumers' views, which, in turn, improve FWB and promote a sustainable food system (COP 28) → The existent works about FWB are based on related concepts (e.g., food pleasure, food healthiness, food satisfaction) rather than FWB per se (construct validity issue) → A lack of a measurement instrument considering all FWB domains (content validity issue)	- RQ1: what are the themes of FWB domains from a consumer standpoint? - RQ2: How do consumers perceive FWB (Is there a gap between consumers' perceptions and the theoretical definition)?	- Figure 1 (synthesis of existing and emergent themes of consumer food well-being) - Table 4 (theoretical view versus consumer view of food well-being)	Providing a better understanding of FWB conceptualization from a consumer perspective to explore the themes of the main domains of FWB (food socialization, literacy, marketing, availability, and policy) → Identifying the new theme for each domain of FWB clarifies the distinction between the theoretical definition and consumers' understanding of this concept, which in turn develops a more consistent and meaningful definition → These emerging themes can also contribute to developing a new measurement instrument necessary for theory development
Research gap 2: lacking holistic framework highlighting the relationship among FWB domains → A lack of a holistic framework clarifies how each dimension relates to others, which hinders a complete understanding of the phenomenon's complexity	RQ3: how do the FWB domains relate to one another?	Figure 2 in the paper (relationships among FWB domain from a consumer perspective)	Proposing a holistic framework regarding the relationships among different domains of FWB, which can be used in future studies for theory building, extension, and testing

6 Practical implications

This study highlights the importance of understanding consumers' perceptions of FWB to improve the practices of diverse stakeholders for developing a sustainable food system. The findings reveal the gap between consumer perceptions (empirical) and definitions (theoretical) of FWB. The former is one of the main barriers to translating research results into practice to advance FWB and the food system [23]. This study offers a deeper understanding of FWB by closing the gap between theoretical definitions and what consumers perceive and experience in the real world. The findings reveal several practical insights for stakeholders in the food industry, including retailers, food designers, and policy-makers, regarding novel emerging themes for the FWB domain (Table 5).

Food literacy: from a consumer's point of view, food literacy is defined as conceptual and cognitive knowledge, procedural knowledge that involves regrouping particular skills and behaviors, and goals related to food consumption. Food literacy is perceived as a broad concept that may include nutrition, food safety, purchasing, preparation, cooking, conservation, and redistribution (to avoid wasting) [61]. We suggest that policy-makers mobilize food literacy as a tool to achieve public health and sustainable outcomes (reducing waste). For example, the government could establish a campaign focusing on different weekly topics: How can healthy food be chosen with discounts? Healthy food is purchased through labeling systems (nutrition labels, date labels: best before date, guidance for storage). In particular, combining diverse food literacy initiatives with food marketing interventions is essential. Initiatives include, for example, i) establishing new pricing and company initiatives that support FWB (e.g., discounts for more nutritious food, downsizing packed food); ii) creating a section for healthy food (e.g., organic foods, OMG free foods) in the supermarket to make decisions easily (e.g., do not need to read detailed information on packaging to identify these foods); and iii) demonstrating in supermarkets, stores, and restaurants how to choose healthy food by considering portion sizes (compare the unit price for similar items), nutrition, and freshness rather than price and discounts.

Food accessibility, availability, and wastage: some participants (especially immigrants) mentioned that special or niche ingredients in their original country were less available, requiring travel to special stores. Most participants value local foods for freshness, availability, and social causes (supporting the local economy). Therefore, we recommend that retailers (i) create a section in the supermarket for niche ingredients (e.g., Asian, African ingredients) and for food near the best-before date and (ii) establish local, community-based distribution systems to provide affordable, nutritious, fresh food [10].

With respect to food waste, several participants emphasized the critical role of packaging and labels in reducing food waste. Thus, we suggest developing easy-to-understand date labels and convenient storage initiatives to reduce the effects and save time in terms of food consumption and conservation. Likewise, food packaging designers and retailers could promote small-size food or novel "food-safe packaging" (e.g., reclosed packaging, multiportion packaging). Policy-makers can build a community-based distribution system to redistribute leftover and uneaten food for food banks and low-income consumers. In addition, promoting anti-food waste and food-sharing applications (e.g., Food Hero, Too Good To Go, Olio) in community and food retailers could be helpful.

Food marketing: the results revealed that marketing activities are perceived effectively, but many felt that they were useless or even had the negative effect of pushing them to buy more than was needed (e.g., discounts for large quantities of food or buying one and receiving another one free). Some participants felt that price did not affect their preference for organic food, whereas others did not prefer to pay more for healthy foods. They do not trust messages in advertising, such as healthy and sustainable claims. Moreover, most participants mentioned their preference for local food, which is usually perceived as fresher, more authentic, seasonal, and of higher quality. Thus, campaigns may highlight both "healthy" and "local" (made-in) food. Retailers and marketers can also build consumer community-centric focus programs to better fit their needs (e.g., searching for health and happiness). To this end, it is necessary to cocreate/codesign programs with consumers and the community, not just for them.

Food policy: most participants called for a convenient, actionable food policy in terms of nutrient and food safety, accessibility, and availability. It is crucial to improve nutrition guidelines by balancing different motivations: searching for health and happiness to avoid "a strict dietary restriction" and improve overall well-being (physical and mental). In addition, it could be helpful to establish actionable guidelines and demonstrations (videos for mass viewing, social media, and point-of-sale locations) to illustrate how to better control food and address leftovers in households, restaurants, and supermarkets. The goal is to help consumers adopt healthy eating habits. Finally, fiscal policies to encourage healthy food consumption and reduce waste can be applied to the food retail industry to improve the effectiveness of food policy.

Discover

Food socialization: the results show that family, parents, and peers play crucial roles in consumer food socialization, especially when they are young. Some participants also mentioned that the community, universities, and NGOs were important for improving food socialization. Thus, it seems appropriate to consider the community in food socialization, which could engage and involve diverse socialization agents and food culture (culinary and meal traditions) [62].

7 Conclusion

This study explores FWB domains from a consumer perspective. It provided conceptual clarity by comparing and contrasting the extant themes in different domains of FWB and novel themes emerging from an empirical qualitative study. It provides a holistic review of the relationships among different FWB domains. Table 6 provides a summary of the study's rationale, results, and contributions.

To ensure the validity of the findings, the research process was based on (1) data triangulation (combining the data collection approaches of focus groups and in-depth individual interviews with two samples) and (2) method triangulation (literature review and content analysis). This study is designed to be an exploratory study in ongoing research, leading to other theoretical and empirical studies. The main limitation of this study is the sample composition, which primarily consisted of young, single female consumers in Canada. As a result, the findings may not fully capture the perspectives of other demographic groups, such as males, middle-aged and elderly individuals, or married consumers. Previous research suggests that young women tend to be more engaged with issues related to food choices, cooking, grocery shopping, dietary restrictions for body image improvement [63], and sustainable food practices [64] compared to other populations. To improve the validity and generalizability of these findings, further empirical research that is more representative of the broader Canadian population, including variations in age, gender, and marital status, is necessary.

Data availability The datasets generated during and/or analyzed during the current study are not publicly available due to privacy or ethical restrictions but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate This research was approved by the Research Ethics Committee of the Université du Québec à Rimouski (Reference no. 2023-258). The study was carried out following the ethical standards of the Ethics Committee of the Université du Québec à Rimouski. All participants were adults (over 18 years old). Informed consent was obtained from all participants in the study.

Competing interests The authors declare no competing interests.

Appendix

See Tables 7, 8, 9.

Table 7 Guide of the focus group and individual interview

Sections	Topics	Open-end questions	Complementary questions
Section 1. Introduction	Importance and motivation of food consumption in life (e.g., health, happiness)	What do you think about food consumption in your life?	- How important is your diet to you, and what role does it play in your health, well-being, and beauty? - Can you give an example?
Section 2. Consumer perceptions towards Food-well being	Food socialization	Can you talk about the role of your family, friends, or other people in your food consumption decision?	- How do these people (e.g., family, friends) influence your decisions? - Does the culture in your family influence food buying or consumption (e.g., is there a culture/preference for eating organic, vegetarian produce)?
	Food literacy	Can you tell us how you make a food consumption decision in different stages (e.g., before, during, and after going to the grocery store)?	- Do you make a shopping list? - Do you find information (e.g., price, nutrition, environmental claims) before going to the grocery store? - Do you read and understand the labels on the packaging? If yes, what and how do you read it? If not, why?
	Food policy	Do you know about public actions or initiatives concerning food consumption (e.g., nutrition, health, food waste)?	- Do you know the policies (e.g., law, draft law, measures, agreement, movement led by the NGO) that help you make a healthy and safe food purchasing decision? - Are these policies clear/helpful to you? If not, how to improve them?
	Food availability	Can you easily find the food you need?	- Can you easily find the food (e.g., organic, local)? If so, where did you find it? If not, what do you do (e.g., to find an alternative)? - Do you consume all the things that you buy? If not, what do you do for the leftovers? - How do we reduce the leftovers or food waste?
	Food marketing	Can you talk about the role of marketing actions (e.g., pricing, communication) in your food-related decisions?	Do marketing actions influence your decision? If yes (how), if not (why not)?
Section 3. Social-demographic information	- Gender - Age group - Material status - Education		

Table 8 Coding sheet

Food well-being domain	Definition [2, p. 7]	Initial themes (codes)
Food socialization	"Processes consumers use to learn about food, its role, and FWB in a person's cultural realm"	- Parenting - Family - Meals - Peers
Food literacy	"More than knowledge; it also involves the motivation to apply nutrition information to food choices. Whereas food knowledge is the possession of food-related information, food literacy entails both understanding nutrition information and acting on that knowledge in ways consistent with promoting nutrition goals and FWB"	- Tools - Heuristics - Procedures - Techniques
Food policy	"Policies related to food systems" [p. 10]	- Calorie intake - Disease - Personal beliefs
Food availability	"How the distribution and availability of food influence consumption behaviors at home, at work, in restaurants, in grocery stores, and in the wider community, including foods produced globally and prepared by larger firms and those produced and accessed locally through community gardens, farmers? Markets, and homegrown produce"	- Accessibility - Variety - Availability
Food marketing	"The role of three of these traditional marketing elements: product, promotion, and price"	- Cognitions - Emotions - Consumption

Table 9 Relationships between domains of food well-being

Potential relationship	Proposition	Participant's quote	Literature
Food socialization → food literacy → food availability and wastage	P1: consumer food socialization may positively affect their food literacy. The socialization agents (family, parenting, and peers) and meal traditions may impact consumers' conceptual, procedural knowledge and motivation in food consumption	- "I think it's a significant influence. My family introduced me to the foods I'm used to. As much as I got used to certain foods when I was young, I realized that it was better that I didn't eat as much of them. My family values health and eating well. (Individual 9) - "I grew up with parents who had a farm and all that. I come from a family where food is important, and so is a restaurant. I think I was raised in a family atmosphere where food was part of the family values. Even today, I think that influences my diet. It's still very important to me. I believe that everything you eat influences how you feel. At least I pay particular attention to how I nourish my body." (Individual 4)	- Developing food literacy in children and adolescents for a sustainable food system through food socialization agencies (family, pairs and social network, culture) and policy (social norms, social media) [39] - Food socialization agency (family, school) influences FWB through eating habits and preferences [14, 34, 65], parental role [35], school [37], and workshops in schools [38] - Advancing food literacy (by environmental education, peers, and family) to prevent food waste [36]
	P2: consumer food socialization may affect their food waste behaviors through food literacy (conceptual/procedural knowledge and motivation in food consumption)	- "At home (my family), we don't waste, which means if I make too much food, I don't throw it away. I keep it. So, I keep the leftovers, and then I look at them. I eat the leftovers as they are or try to transform them into something else, but we don't throw them away. After that, it's true that I sometimes forget certain things in the fridge and that it's filling up again, but as long as it's edible, we'll eat it." (Individual 2) - "80%, yes, because I take the time to think about everything I need. And then, at 80%, yes, unless my budget exceeds it. Because you need to know that sometimes, I can write down things I don't really need in the lists." (Individual 11)	Conceptual knowledge: - Good storage knowledge and skills, leftover reuse [51, 66] - Knowledge about the meaning of food date labels and environmental impacts [48, 49, 67, 68] Procedural knowledge: - Apps [9] - Food management skills: shopping list, meal planning [69, 70] - tools package (measuring cup, stickers, leaflets, recipes) to reduce food waste [71] Culture: over-buying, over-serving [70] Motivation: [47, 70]

Table 9 (continued)

Potential relationship	Proposition	Participant's quote	Literature
Food literacy ↔ food marketing	P3: consumer food literacy levels may positively affect their perceptions and understanding of food marketing practices (4P's) and their food experiences. Simultaneously, consumers' perceptions of food marketing practices and understandings may affect their food literacy	Food literacy → food marketing: - *"[The price] doesn't really matter. Especially if it's a discount; otherwise, it depends. I can buy small too. The important thing is that it's good quality. [...] I don't even look at the price. The important thing for me is to get something I like, and then it's good."* (Individual 6) - *"When you have communication, packaging, and merchandising, it helps me understand what I'm buying, I'd say. And that's it. And then, I'm a marketing student, so I think I can read between the lines of a publication, in that I try to see what the company is trying to put forward in its product [...]. Obviously, there's advertising, which can be good or bad. There may be distribution. It's the choice of distribution."* (Individual 7) - *"It's [communication marketing] true that it influences me, but I don't know if it helps me make my best decisions. Their goal is to help me make my best decisions and convince me to buy the product. I don't think it helps me make my best decisions."* (Individual 8) Food marketing → food literacy - *"The price, if it's a better food, if it's local or if... I'll favor it, even if it's a dollar more, that's fine. I often give up the difference is almost double the price, even on promotion. [...] Two products, I'll favor the local one or the one that's less... It's precisely in this kind of situation that I'll look at labels and things like that. The quantity, too."* (Individual 4) - *"[The price] doesn't really matter. Especially if it's a discount; otherwise, it depends. I can buy small too. The important thing is that it's good quality. [...] I don't even look at the price. The important thing for me is to get something I like, and then it's good."* (Individual 6) - *"[...] I pay attention to sales, but it's not premeditated. It's just that we all have our eating habits. I'm not going to buy something just because it's discounted. Usually, there's a company that I already like. It's like saying yogurt is the same yogurt I always buy. But since it's expensive, I just buy it when it's on sale because I know it's regularly on sale."* (Individual 9)	- The effectiveness of food marketing depends on prior knowledge [40–42] - Marketing skepticism [43, 44]

Table 9 (continued)

Potential relationship	Proposition	Participant's quote	Literature
Food literacy ↔ food policy	P4: consumer food literacy levels may positively affect their food policy perceptions and understanding. Simultaneously, consumer perceptions of and knowledge of food policy may affect their food literacy	*"I know there's the Canadian food guide, which I don't see at all. I don't read it. I know that the only thing I have going for me is that I occasionally watch the food news. I trust, for example, that Radio Canada has a grocery show. Sometimes I watch. Sometimes, I listen to a documentary-style program on Radio Canada. I looked at the article in the press, "Protégez-vous," which is my source of information. Learning is done over time. That's what it's all about."* (Individual 6)	- Using food policy (e.g., social norms and social media) to enhance awareness, knowledge [36, 40], and motivation [39] - A system-oriented and integrated (concepts of sustainability and health) food policy can shape consumers' knowledge, skills, and motivations [45]
Food policy → food availability and wastage	P6: consumer knowledge of food policy may affect their food waste behaviors. The more they know food policy, the more they attempt to reduce food waste	Nutrition policy → Food availability and wastage - *"[…] I do know that there are a lot of community initiatives in centers like the Centre du Plateau where they distribute meal baskets and that there's also a lot of distribution of inexpensive meal baskets in universities."* (Individual 14) Policy regarding food production conditions → Food availability and wastage - *"I only know about the Quebec Initiative for Local Consumption, but otherwise, I don't know about laws or anything. […] Of course, I think it's important to consume locally. I try to buy local food as much as possible."* (Individual 2) - *"I thought there would be some action on food waste, but unfortunately, there isn't. Otherwise, grocery stores have taken actions, like keeping certain prices fixed, like at the maximum."* (Individual 12) Policy regarding the environmental impact of food → food availability and wastage - *"Individually, yes. Individually or at the government or NGO level? […] I think that restaurants are places where there is a lot of waste. There's a lot of food produced there, rather than in everyone's kitchen. Visually, there's certainly some waste, but I think the food industry is responsible for most of the waste. I have the impression that, let's admit it, in restaurants and grocery stores, things are a little better organized to reduce waste. That would be a good thing."* (Individual 8)	- Convenient tools and social norms to reduce food waste [71, 72] - Nudging to increase knowledge increase and reduce wastage [73], Cognitively-oriented nudges, and behaviorally-oriented nudges [74] - Community-based food waste campaign [75] - Educational approach at home [76]

Table 9 (continued)

Potential relationship	Proposition	Participant's quote	Literature
Food marketing → food availability and wastage	P5: consumer perceptions and understanding of food marketing practices may affect their food waste behaviors	- "'I'm the kind of person who buys in bulk and then stocks up a lot. If I'm buying dry products in particular, I don't really like large formats for fresh products because I'm on my own, but anything in oil. If there's something in bulk that's just half the price, three times the price, I'll definitely take that, even if it costs more at the time, but in terms of quantity/price, it's worth it; I'll do that. I like to stock my pantry. [...] Preserving, it's true that vegetables quickly become ugly, they wilt, they become soft, everything that's cucumber and all that stuff" (Individual 4) - "Regarding marketing, I'm not too keen on being transparent. It irritates me a little to be steered and then forced toward certain things. However, I do like it when there are associations with certain nutritionists or others, where there are little labels that already have a little remark to say that this is a good choice. I know that grocery stores have been doing this more and more in recent years. That can help a little, but otherwise, I look at what I need, I look at the price, and then I go with that." (Individual 1)	- Pricing strategy (e.g., promotion) causes overbuying and wastage [51, 52, 54] - Social marketing approaches (social media) to reduce wastage [55–57] - Consumer skepticism influences the effectiveness and efficacy of food marketing [58, 59, 77]

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