

Signaling sustainability: Do Canadian consumers prefer broad or narrow food sustainability labels?

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Abstract

Sustainability labeling has been increasingly integrated into many food product labels in response to consumer interest in purchasing sustainably produced food. While a product label may contain the phrase “sustainably produced”, little additional information is available to consumers regarding how sustainability has been enhanced, or the dimensions of sustainability encompassed by the label. Using data from a survey of 1416 Canadian consumers, we examine consumer perceptions of sustainability and preferences for broad versus narrow sustainability claims across several contexts, including the dimensions of sustainability and the scope of a sustainability standard with respect to compliance criteria, product coverage, and geographical coverage. We find low levels of consumer knowledge and understanding of sustainability labeling, heterogeneity with respect to which dimension of sustainability appeals to different types of consumers, and a general preference for broad over narrowly defined sustainability labels, particularly with respect to the scope of criteria encompassed by the label. Our findings suggest some confusion as to what constitutes sustainability in the context of agri-food, but that broader, more encompassing labels are likely to gain more traction with consumers.

KEYWORDS

dimensions of sustainability, information asymmetry, knowledge, label breadth, sustainability criteria, sustainability labels

Résumé

L'étiquetage durable est de plus en plus intégré dans de nombreux produits alimentaires en réponse à l'intérêt des consommateurs pour l'achat d'aliments produits de manière durable. Même si l'étiquette d'un produit peut contenir l'expression « produit de manière durable », peu d'informations supplémentaires sont disponibles pour les consommateurs sur la manière dont la durabilité a été améliorée ou sur les dimensions de la durabilité couvertes par l'étiquette. À l'aide des données d'une enquête menée auprès de 1 416 consommateurs canadiens, nous examinons les perceptions des consommateurs en matière de durabilité et leurs préférences pour des allégations larges ou étroites en matière

de durabilité dans plusieurs contextes, y compris les dimensions de la durabilité et la portée d'une norme de durabilité en ce qui concerne les critères de conformité, la couverture des produits et la portée d'une norme de durabilité. Nous constatons de faibles niveaux de connaissance et de compréhension des consommateurs en matière d'étiquetage de durabilité, une hétérogénéité quant aux dimensions de la durabilité qui attirent différents types de consommateurs, et une préférence générale pour des labels de durabilité larges plutôt qu'étroitement définis, en particulier en ce qui concerne la portée des critères englobés par l'étiquette. Nos résultats suggèrent une certaine confusion quant à ce qui constitue la durabilité dans le contexte de l'agroalimentaire, mais que des étiquettes plus larges et plus globales sont susceptibles de gagner plus d'adhésion auprès des consommateurs.

1 | INTRODUCTION

Sustainability is often considered to be a key aspect of food production. But what exactly does sustainability mean and how do consumers respond to food labels signaling sustainability? Though the term generates a general common understanding (usually relating to the environment), “sustainability” has different meanings in different contexts and is associated with many food products. From a labeling policy perspective, the extent to which sustainability labeling informs consumers (reducing information asymmetry) or creates a noisy information environment leading to information overload is a relevant consideration.

Consumers are increasingly aware that their food purchase decisions may have social and environmental consequences in food systems. Various stakeholders have recognized the importance of facilitating the adoption of sustainable food production practices, while credibly communicating sustainability to consumers. In December 2022, the Canadian federal government announced consultations to launch the development of a Sustainable Agriculture Strategy.¹ The Canadian Agri-Food Sustainability Initiative, a 5-year federal-provincial-territorial initiative to facilitate communication of sustainability attributes in the Canadian agri-food sector was launched in 2020.² Sustainable food production is also receiving considerable attention globally. The second of the United Nations' 17 Sustainable Development Goals is “Zero Hunger” and sustainable food production systems are considered a necessary part of achieving this important international objective.³

In 1987, the United Nations Brundtland Commission defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987). Establishing a universal, consistent definition of the term is not straightforward because it includes a balance of economic, environmental, and social dimensions. Given the various elements of sustainability, and the adoption of the term by individual firms to their own specific circumstances, the retail space is populated with a host of products branded as sustainable. As a result, consumers face a barrage of sustainability product labels, with varying definitions, application, and verification. Prior research finds that awareness, understanding, and usage of sustainability labels among consumers is low (Grunert et al., 2014), and that an ocean of labels confuses consumers (Atkinson, 2014).

In this article we utilize data from an online survey of 1416 Canadian consumers to examine consumer preferences for sustainability labels on food products. We are particularly interested in how consumers respond to different types of sustainability labeling—specifically, broad versus narrowly focused sustainability labels. We view broad sustainability labels as those that either encompass multiple dimensions of sustainability or exhibit breadth with respect to the number of compliance criteria, the range of products to which the label may be applied, or the geographic coverage of the label. In contrast, narrow sustainability labels are those with a more specific focus on one dimension of sustainability, or applicable

¹ <https://agriculture.canada.ca/en/about-our-department/transparency-and-corporate-reporting/public-opinion-research-and-consultations/sustainable-agriculture-strategy-discussion-paper>.

² <https://www.agrifoodsustainability.ca>.

³ See: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

to a specific product. Our interest in this research question is driven by the increasingly wide array of sustainability labels available in the marketplace.⁴

Unpacking consumer responses to broad versus narrow sustainability labels provides insights into the types of sustainability labeling that resonates with consumers. If consumers generally prefer narrowly-defined sustainability labels, then labels identifying a specific impact (such as dolphin-safe tuna or bird-friendly coffee) or focused on a single dimension (such as environmental impact) may be more useful information signals in a crowded information environment. On the other hand, a preference for broader sustainability labels (such as the Canadian Certified Organic label, the Rainforest Alliance Certification label, or a label addressing multiple dimensions of sustainability) indicates that consumers are comfortable with sustainability labeling that is applicable across a broader range of contexts or products.

The extent to which narrow versus broad sustainability labels provides useful information to Canadian consumers is a relevant consideration for both policymakers and industry stakeholders. Policymakers may be interested in the extent to which different types of sustainability labels either assist consumers in making informed choices or create confusion. In Canada, the Canadian Food Inspection Agency (CFIA) is responsible for the regulation of food labeling claims. While it does not currently regulate the use of sustainability claims on food products, it does require that voluntary labeling information, claims and statements should be “truthful, not misleading nor likely to create an erroneous impression, and that they are in compliance with any specific requirements that exist for a given type of claim” (Canadian Food Inspection Agency, 2022). Lack of trust in labels reduces the effectiveness of labels in addressing sustainability goals, while labels certified by a public authority or an independent third-party institution are often perceived as more trustworthy (Majer et al., 2022; Yang et al., 2023).

For industry stakeholders seeking to utilize sustainability claims on food products, understanding the extent to which a narrowly focused, more specific claim versus a broader, more encompassing sustainability claim resonates with consumers is a relevant consideration in product labeling and strategic marketing decisions. If broad sustainability labels appeal to consumers, a firm or industry group might be better served by seeking certification from a globally recognized, general sustainability program than by certification from an industry or issue-specific label, and vice versa.

Our contribution to the literature is three-fold: first, we seek to better understand the current level of knowledge and awareness of sustainability labeling among Canadian consumers. Second, sustainability is a multidimensional concept, therefore we examine which core dimensions of sustainability (environment, economic, social welfare, animal welfare, food security, climate change) resonate with Canadian consumers. We identify the specific groups to whom these dimensions appeal utilizing a rank-ordered probit model.

Third, we examine Canadian consumer attitudes toward broadly versus narrowly defined sustainability labels across several contexts. Specifically, we examine whether consumers prefer sustainability labels that encompass multiple sustainability dimensions versus a single dimension identified as important by the respondent. In the subsequent analysis this is referred to as the “hypothetical scorecard” method. We also examine Canadian consumer attitudes toward existing food sustainability labels, encompassing a broad (vs. narrow) set of criteria, range of products, or geographical scope. This is referred to as the “pairwise comparison” method in the subsequent analysis. The hypothetical scorecard and pairwise comparison methods of evaluating preferences for broad versus narrow sustainability labeling are analysed using a set of logistic regression models. Given recent sustainability initiatives in the Canadian agri-food sector (e.g., the Sustainable Agriculture Strategy, the Canadian Agri-Food Sustainability Initiative), our research is timely, contributing to a more nuanced understanding of Canadian consumer attitudes toward sustainability.

We find: (1) a relatively low understanding and awareness of sustainability labels; (2) considerable heterogeneity among Canadians with respect to the aspect (dimension) of sustainability that resonates the most; and (3) that Canadian consumers demonstrate a preference for sustainability labels framed in a broadly defined sense, as opposed to narrower, more restricted applications.

Our article is organized as follows: we begin in Section 2 by reviewing relevant literature on sustainability labeling and discussing the context for sustainability labels in Canada. In Section 3 we describe the survey sample, survey design, and measurement of key variables. Section 4 specifies our econometric models. The results section assesses consumers’ beliefs and knowledge about sustainability labeling (descriptive analysis), evaluates how respondents differ in their ranking of six dimensions of sustainability (rank-ordered probit model), and examines whether consumers prefer broad versus narrow

⁴ According to Ecolabel Index, an online directory of ecolabels, there are 456 ecolabels in use around the world, of which 112 are in use in Canada. These labels are not only applied to foods, but also other product categories, from energy, clothing to household cleansers and tourism (<https://www.ecolabelindex.com/>).

sustainability labels across different contexts (a set of logistic regression models). Section 6 concludes with a discussion of policy and industry implications.

2 | BACKGROUND AND LITERATURE REVIEW

Food labels act as signals to consumers about a host of product attributes. Consumers consider a range of factors in their purchase decisions and labels act as a tool to reduce asymmetric information between firms and consumers (Asioli et al., 2020; Hobbs, 2019). Food marketers are incentivized to develop labels that signal positive food attributes to particular consumer segments, while regulators seek to ensure that labeling is not misleading, for example, through regulating the definition and use of “certified organic” claims on food products. Consumers may experience decision fatigue, information overload and confusion when presented with multiple product labels competing for their attention (Grunert et al., 2014).

Sustainable food systems seek to integrate economic, environmental, and social elements, such that safe, nutritious food is provided without compromising future production (Food and Agriculture Organization, 2018). Sustainable food systems begin with agricultural production methods which balance productivity, resilience, the efficient use of resources, and environmental and social sustainability. The sustainability dimensions of these production methods include animal welfare, climate change, economic welfare, food security, environmental and social welfare impacts (Béné et al., 2019; Grunert et al., 2014). The sheer breadth of elements encompassed by sustainability, coupled with varying perspectives on their prioritization, measurement, and verification, create challenges for policymakers. They seek to ensure a transparent and informed food labeling environment that does not compound information asymmetry for consumers concerning the sustainability characteristics of food products.

Consumers are expected to have a positive willingness to pay (WTP) for food quality attributes they value, incentivizing firms to label these attributes (Unnevehr et al., 2010). Credence attributes, such as the sustainability attributes of a food product, are unobservable to consumers in the absence of credible labeling (Darby & Karni, 1973). The asymmetric information arising from credence attributes and the need for credible labels and verification systems has been examined extensively in the literature, including the use of “ecolabels” to signal sustainability (see e.g., Aisoli et al., 2020; Innes & Hobbs, 2011; Lusk & McCluskey, 2018; Marette et al., 2012; Sønderskov & Daugbjerg, 2011; Yang et al., 2020; Yip et al., 2017).

There are presently over thirty food sustainability labels available on food products in Canada.⁵ The majority of these labels are certified and managed by third party organizations, however, some firms have developed proprietary labels, relying on arm’s length or third-party certification processes (an example being the Coffee and Farmer Equity (C.A.F.E.) label established by Starbucks in collaboration with Conservation International and Scientific Certification Systems (SCS)⁶). The claims made by these sustainability labels, and the contents of their respective codifying documents, vary tremendously. In Canada, the use of sustainability or environmental labels is not directly regulated by the government (beyond a general guideline that voluntary labels should not be misleading). However, certain labels adhering to established standards, such as Canada Organic, are subject to regulatory oversight from the CFIA. It is worth noting that, in general, organic labels represent the exception rather than the norm in terms of regulatory oversight.

Sustainability labels make a wide variety of claims, often concurrently on the same food product. Food labels with sustainability claims currently available in Canada include both broadly defined labels encompassing a range of sustainability dimensions or applied to a wide range of products, as well as narrowly defined labels focusing on a specific dimension of sustainability and/or a specific product. The broadest labels often simply claim outright, or by implication, that their products are produced more sustainably than those without the labels (e.g., organic, natural). The effectiveness of these claims often relies on presumptions that consumers associate terms such as “organic” and “natural” with the concept of sustainability.

Other more intermediate labels (in terms of breadth) position their products as the best choices in categories of sustainable production methods and promote their alignment with initiatives such as stewardship of ocean, forest or ecosystem health, or protection of the rights of farm laborers (e.g., Rainforest Alliance). Several of the most specific labels are narrower in focus, addressing a single sustainability objective, such as being free of genetically modified ingredients or protecting dolphins during tuna harvesting (e.g., Non-GMO Project verified, Dolphin Safe, respectively). Or labels may be narrow in the sense of apply to only one product (e.g., RSPO Certified Sustainable Palm Oil).

⁵ See: <https://www.ecolabelindex.com/>.

⁶ <https://www.scsglobalservices.com/services/starbucks-cafe-practices>

The diverse array of sustainability labels, however, may not provide greater clarity for consumers regarding sustainable food choices. Grunert et al. (2014) posit that label overload is commonly present, limiting the usefulness of the labels. In their survey of European consumer responses to food sustainability labels, Grunert et al. (2014) found consumers were motivated by broadly defined food sustainability but less concerned about the sustainability of items contextualized by specific product categories. Any concerns at the product level were driven by existing beliefs surrounding production processes. Additionally, the nebulous nature of sustainability negatively affected consumer engagement with labeling, while more specific and self-explanatory sustainability labels elicited a positive response. Vlaeminck et al. (2014) used an online survey to select an easy to interpret and informative ecolabel, then conducted a framed field experiment in a Belgian supermarket, finding that the ideal ecolabel increased purchases of eco-friendly food products by 5.3%.

In an analysis of German consumers' responses to sustainability labeling on milk products, Janßen and Langen (2017) point to heterogeneity in consumer preferences, concluding that with respect to different sustainability labels "the more the merrier does not always apply" (p. 1244), and arguing the case for a universal sustainability label. Tebbe et al. (2018) recognize that food products may contain more than one sustainability label. Using a laboratory experiment they find that, while labels increase WTP, respondents are insensitive to the number of labels, including those with the addition of new criteria. The specific type of sustainability information conveyed by the labels was less important than the general signal of sustainability.

Nevertheless, as Ufer et al. (2022) argue, the consolidation of information (multiple traits) into a single label may reduce the effectiveness of the label as a communication tool. So-called "redundant labeling" occurs when labels include additional information already signaled by another label claim; for example, the addition of "non-GMO" to organic products which are, by definition, non-GMO. Ufer et al. (2022) find the use of redundant labels to be effective at capturing consumer attention in the context of organic and animal-welfare friendly labels, suggesting that consumers are susceptible to misinterpreting labels.

Beyond the range of sustainability claims, labels can be further characterized by their underlying attributes, which are not immediately apparent to consumers when making purchase decisions but are present in the codifying documents or standards underlying each label. These underlying attributes include the volume of criteria against which the producers or products are measured to meet the label standards, the products to which the labels may be applied, and the geographic coverage of the producers or products. For example, in our analysis we classify Rainforest Alliance Certified as a "broad" sustainability label with respect to the number of compliance criteria. It features 34 compliance criteria, consisting of 18 related to social welfare, 11 to environmental impact, 3 to economic impact, and 3 related to animal welfare (see, Section 3.2.3 [Existing sustainability labels—breadth of criteria, products, and geographic origins] for a full discussion). In contrast, the Smithsonian Bird-Friendly coffee label is focused on a single criteria related to environmental impact, and therefore in our classification is considered a narrow label with respect to the number of compliance criteria.⁷

The Rainforest Alliance certified label is also broad with respect to product coverage and can be applied to many products from rainforest environments, including crops, cattle, and palm oil products. In contrast, the Bird Friendly coffee label is narrow in product coverage (one product—coffee). Another example of broad versus narrow labels in the context of product coverage is the Certified Sustainable Seafood label from the Marine Stewardship Council, which is a broad label covering seafood (in general) from wild-capture fisheries, versus the (narrower) Dolphin-Safe label, which applies specifically to tuna.

Finally, sustainable labels that are broad in terms of geographic coverage include the Canada Organic Label, which can be applied to products from anywhere in Canada or internationally that meet Canadian organic certification requirements, versus a label with a narrower geographic focus such as the British Columbia Certified Organic label, which applies to British Columbian organic products marketed exclusively in the Canadian province of British Columbia. Given the variety of sustainability labels available on food products both in Canada and globally, the extent to which these labels inform or confuse consumers, and whether broadly versus narrowly defined sustainability labels resonate with consumers is a relevant consideration for both policymakers and industry stakeholders.

Given this context, our analysis seeks to better understand (i) Canadian consumers' awareness of sustainability labeling and their knowledge of sustainability labels; (ii) which core dimension(s) of sustainability resonate with Canadian consumers, and how preferences for different dimensions of sustainability differ across different types of consumers; and (iii) preferences for broad versus narrow sustainability labeling across a number of contexts (including the dimensions of sustainability and the scope of sustainability standard).

⁷ For details of the Rainforest Alliance Sustainable Agriculture Standards see <https://www.rainforest-alliance.org/for-business/2020-certification-program/>. For information on the Bird Friendly Coffee sustainability certification, see <https://nationalzoo.si.edu/migratory-birds/bird-friendly>.

TABLE 1 Sample summary statistics ($n = 1416$).

Description	Coding Structure	Sample	Canada Census 2021 ^a
Age	18–34 years old	23.9%	26.7%
	35–54 years old	34.4%	32.2%
	55 years old or over	41.7%	41.1%
Gender	Female	51.1%	50.7%
	Male/other	48.9%	49.3%
Household income ^b	Less than \$39,999	25.5%	19.4%
	\$40,000 to \$69,999	23.2%	21.8%
	\$70,000 to \$99,999	17.7%	18.4%
	\$100,000 and over	33.6%	40.4%
University degree	Achieved university undergraduate degree or above	50.6%	32.9% ^c
Children	Live with children under the age of 18	19.8%	37.0%
Household size	Number of people in a household	2.5	2.4
Province ^d	British Columbia	18.9%	17.6%
	Ontario	45.3%	49.9%
	Prairies	26.6%	23.6%
	Other provinces	9.2%	8.9%

^aStatistics Canada, 2021. Census Profile, 2021 Census of Population.

^bTotal annual household income before taxes in Canadian dollars.

^cHighest level of education achieved for population aged 25 to 64 years.

^dThe survey was administered in English only, thus had very few respondents from Quebec ($n = 2$). The census distribution data were updated by excluding the province of Quebec.

3 | SURVEY DATA AND VARIABLES

3.1 | Survey sample

We conducted an Internet survey with a representative sample of 1502 English-speaking Canadians in February–March 2021.⁸ As the focus of this study was on sustainability perceptions and food choices, only primary grocery shoppers or those who shared responsibility for grocery shopping participated, with quotas on age, gender, and household income imposed to ensure the representativeness of our sample both in terms of inclusivity and research relevance. To ensure data quality, respondents who sped through the survey within 5 min or less were excluded from the analyses ($n = 86$) given the average completion time was 15 min.⁹ The final sample consists of 1416 respondents, whose socio-demographic characteristics are summarized in Table 1, along with a comparison to the 2021 Canadian census.

Our sample closely matches the 2021 Canada Census statistics with respect to age, gender, household income, and province of residence (excluding Quebec), although leans toward a higher level of education. The sample consists of 51.1% female respondents (vs. 50.7% of the Canadian population), with a median age within the range of 35–54 years old (vs. 41.6 of the population), and a median household income category of \$70,000–\$99,999 (versus \$84,000 of the population). Half of the respondents have obtained a university degree (vs. 32.9% of working-age Canadians), and one-fifth lived with children under 18 years old (vs. 37.0% of the Canadian households).

⁸ This research received ethics approval (BEH#2363) from the University of Saskatchewan. The online survey was administered by the Canadian Hub for Applied and Social Research (CHASR) at the University of Saskatchewan. The participants were recruited through the research vendor AskingCanadians. The survey was conducted exclusively in English, resulting in a limited representation of participants from Quebec ($n = 2$), the predominantly French-speaking province in Canada.

⁹ “Too fast” responses were excluded from analyses to improve data quality as this may indicate people did not take the survey seriously (Zhang and Conrad 2014). The survey instrument had approximately 2700 words, requiring at least 5–6 min to read through all the questions, let alone to provide careful and accurate responses (assuming a fast reading rate of 450 words/min or 7.5 words/s) (Greszki et al., 2015). A robustness analysis including these respondents (Appendix A) indicates that excluding ‘too fast’ responses did not introduce systematic differences in estimates or the interpretation of results.

3.2 | Survey design and measurement of key variables

Participants were asked a variety of questions about food sustainability, including their knowledge of the issue, perceived importance of multiple sustainability dimensions, and preferences for food sustainability labels.¹⁰

3.2.1 | Knowledge of sustainability

The survey measured participants' subjective knowledge by asking "In your opinion, how knowledgeable are you about sustainability?" with response options: Not at All Knowledgeable, Somewhat Knowledgeable, Average Knowledgeability, More Knowledgeable than Average, and Highly Knowledgeable. For the subsequent empirical analysis, three dummy variables were created for *Subjective Knowledge*, where *Low* indicates that participants self-reported as "Not at All" or "Somewhat Knowledgeable", *Average* indicates the "Average Knowledgeability", and *High* if "More than Average" or "Highly Knowledgeable" was chosen.

To assess familiarity with existing food sustainability labels, participants were asked whether they had previously seen any of the 15 sustainability labels included in the survey: Canada Organic, Animal Welfare, Bird Friendly, British Columbia Certified Organic, Certified Naturally Grown, Dolphin Safe, Fair Trade, Fair Wild, MSC Certified Sustainable Seafood, Non-GMO, Ocean Wise, Rainforest Alliance Certified, RSPO Certified Sustainable Palm Oil, SPCA Certified, and Starbucks C.A.F.E Practices. To minimize the burden on participants, only four labels (with images) were randomly assigned to each participant. The variable *Seen Labels* was created by summing the number of "Yes" responses (coded as 1) to four randomly assigned labels. A higher score indicates a greater level of exposure to existing food sustainability labels.

Following Grunert et al. (2014), to measure actual knowledge of the 15 food sustainability labels, participants were subsequently asked "What do you think this label means?". Each participant was shown the same four labels they were assigned in the previous question and responded to multiple choice questions featuring four potential answers, only one of which was correct, plus a "Don't know" option. The objective knowledge multiple choice questions for the 15 sustainability labels can be found in the online supplementary Appendix (S1). A correct answer to a label question was coded as 1, and 0 otherwise. The variable *Objective Label Knowledge* was created by summing the number of correct answers to the four label questions. A higher score indicates a higher propensity to correctly interpret the meaning of the sustainable labels.

3.2.2 | Perceived importance of sustainability dimensions

Sustainability is a multifaceted concept that includes impacts on the environment, economy, social welfare, animal welfare, food security, and climate change. A primary consideration of the survey was to gain insights into which aspects of sustainability resonate with Canadian consumers, and whether they prefer sustainability labels with a narrow or a broad coverage of these dimensions.

Participants were asked to rank six categories of sustainability—environmental impact, economic impact, social welfare, animal welfare, food security, and climate change—according to how important these categories were to them, from 1 (most important) to 6 (least important). The choice of these six sustainability dimensions was informed by prior literature and by sustainability claims observed in the marketplace. Béné et al. (2022) discuss a sustainability index comprised of 29 indicators under four broad categories (environment, economic, social and policy, food and nutrition—including food security). Animal welfare labels have been associated with sustainability claims in prior literature (see, Grunert et al., 2014 for a discussion). Both animal welfare and climate change appear as dimensions in recent sustainable labeling initiatives. For example, the Canadian Roundtable for Sustainable Beef references animal health and welfare as one of the guiding principles of sustainable beef (www.crsb.ca). The Starbucks C.A.F.E. Practices Sustainability Scorecard system includes climate change as a dimension (Starbucks, 2016), while The Rainforest Alliance Sustainable Agriculture Standard refers to "adapting and building resilience to climate change" as a pillar of Climate Smart Agriculture (Rainforest Alliance, 2017). Six integer variables *Environmental Impact*, *Economic Impact*, *Social Welfare*, *Animal Welfare*, *Food Security*, and *Climate Change* were created and took the value of the corresponding importance ranking (i.e., equal to 1 if ranked 1st, equal to 2 if ranked 2nd, and so on).

¹⁰ A copy of the survey instrument is available from the authors upon request.

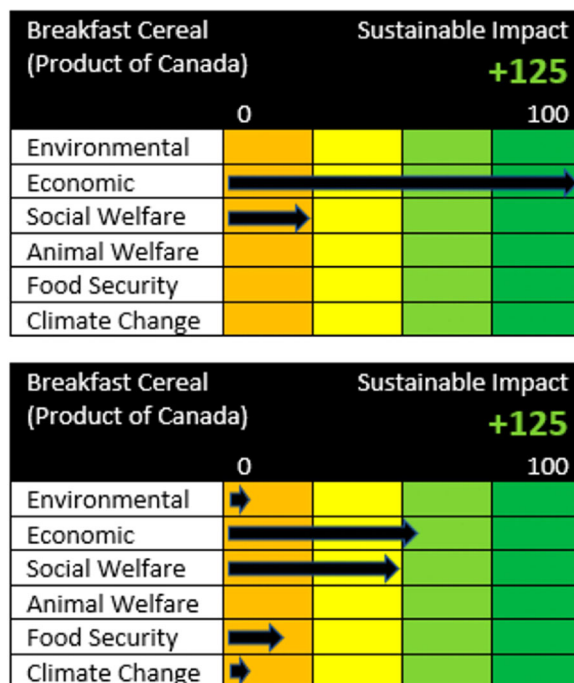


FIGURE 1 Example of scorecard question.

3.2.3 | Preferences for breadth of sustainability labels

To assess preferences for broad versus narrow sustainability labels, two sets of questions were asked—hypothetical scorecards and pairwise comparisons of existing food sustainability labels.

Hypothetical scorecards—Coverage of sustainability dimensions

In the scorecard questions, a hypothetical sustainability label was created (adapted from Engels et al., 2010) displaying scores for a food product (breakfast cereal) across the six dimensions of sustainability. An example of a scorecard question is shown in Figure 1. Participants were informed this was a new type of sustainability food label with the length of the black arrows displaying the product's sustainability impact score for each sustainability dimension, while rows with no arrows indicated a sustainable impact score of zero for that particular dimension. The total sustainability impact score for the product is shown in green at the top right of the label. Consistent with the previous ranking question (Section 3.2.2), the six sustainability dimensions included environmental impact, economic impact, social welfare, animal welfare, food security, and climate change.

Six pairs of scorecard labels were created, with each pair containing a narrow and a broad label. The top panel of each pair was a label with narrow coverage, showing a high score on only one sustainability category (e.g., economic impact in Figure 1, top label). The bottom panel of each pair was a label with broad coverage of sustainability categories (moderate scores on multiple categories, see Figure 1, bottom label). The total sustainability impact scores for both labels in a pair were the same, thus the two labels varied only in their width of coverage.¹¹ The hypothetical scorecard questions allow us to assess the trade-offs made by individuals in assessing sustainability claims. That is, for products with an identical overall “sustainability impact”, would individuals prefer a product with an enhanced impact on one aspect of sustainability (i.e., a “narrow” label) or a product with a more balanced profile of sustainability across multiple dimensions (i.e., a “broad” label)?

Appendix B contains the full set of broad/narrow labels used in the scorecard questions. From each pair of labels, participants were asked to “Select the label that would most positively influence your decision to purchase a Canadian-made breakfast cereal”. To reduce the burden for participants, each participant responded to three out of six scorecard pairs, with the three pairs determined by the three most important sustainability categories selected by that participant in the

¹¹ The scorecard design with respect to the combination of categories and length of the arrows was not experimentally derived, which represents a potential limitation to the analysis.

previous sustainability dimension ranking question. Six indicator variables—*Environmental_Narrow*, *Economic_Narrow*, *Social_Narrow*, *Animal_Narrow*, *Secutiry_Narrow*, *Climate_Narrow*—were created and set equal to one if participants chose the narrow label from a pair of scorecards, and zero otherwise.

Existing sustainability labels—Breadth of criteria, products, and geographic origins

A second method of eliciting participants' preferences for the breadth of coverage in sustainability labeling was devised, this time using existing food sustainability labels. Nine choice sets were developed containing pairwise comparisons of 15 sustainability labels (one broad, one narrow) that exist in the marketplace (the same labels used in the knowledge questions, see Section 3.2.1). For each pairwise comparison, survey respondents were directed toward the relevant point of comparison, that is, "Information on the compliance criteria for these labels is provided" or "Information on the types of products eligible to use these labels is provided", or "Information on the geographic origin of products eligible to use each label is provided" and then asked to "Select the label that would most positively influence your decision to purchase a product with that label." The nine choice sets and the percentage of respondents choosing each label are displayed in Table 2.

The labels in each choice set differed in the breadth of their coverage (narrow vs. broad) for the number of compliance criteria, type of products, and geographic origin of products to which the label could be applied. For each choice set, respondents were shown the relevant label and the accompanying explanatory text pertaining to the number of compliance criteria, product coverage, or geographical coverage, as shown in Table 2. For example, choice set 1 compares a narrow label with a single sustainability criterion (Bird Friendly Coffee) with a broad label based on 34 criteria (Rainforest Alliance Certified). Choice set 4 compares a narrow label that applies to one product (palm oil) with a broad label that applies to multiple products (Rainforest Alliance Certified), while choice set 7 compares a label with a narrow geographic coverage (British Columbia Certified Organic, certifying agricultural products produced in BC), with a similar label that has a broad geographic coverage (Canadian Organic, certifying products produced anywhere in the world that are compliant with Canadian organic standards).¹²

Nine indicator variables—*Compliance_Narrow_1, 2, 3*, *Type_Narrow_1, 2, 3*, *Origin_Narrow_1, 2, 3*—were created from the nine choices made in the pairwise label questions (where 1, 2, 3 refer to the three choice sets featuring compliance criteria, type of product, or geographic origin as per Table 2). If a participant chose the narrow label in a choice set, these indicator variables are coded as one, and otherwise zero. Respondents completed all nine choice sets.

4 | EMPIRICAL METHODS: RANK-ORDERED PROBIT AND LOGISTIC REGRESSIONS

4.1 | Dimensions of sustainability: Rank-ordered probit model

Participants' ranking of the six sustainability dimensions is analyzed using a rank-ordered probit model (Chapaaan & Staelin, 1982; Hausman & Ruud, 1987; StataCorp, 2021). Assume an individual $i = 1, \dots, N$ ranks the six sustainability dimensions in order from $j = 1, \dots, 6$, where 1 indicates the most important dimension and 6 is the least important.¹³ The utility of the j th dimension for individual i is defined as (Train, 2009):

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

where V_{ij} is the deterministic component of utility modeled as a linear function of a series of explanatory variables, including self-reported knowledge of sustainability (*Subjective Knowledge*) and a set of socio-demographic variables (*Age*, *Female*, *Household Income*, *University Degree*, *Province*) (Equation 2).

$$V_{ij} = \beta_{0j} + \beta_{1j} \text{Subjective Knowledge}_i + \beta_{2j} \text{Age}_i + \beta_{3j} \text{Female}_i + \beta_{4j} \text{Household Income}_i + \beta_{5j} \text{University Degree}_i + \beta_{6j} \text{Province}_i \quad (2)$$

¹² The use of actual sustainability labels for this question means that the products in the pairwise labelling comparisons differ, which we acknowledge may introduce a confounding factor and is a potential limitation. Nevertheless, the benefits of using actual sustainability labels (and therefore also being able to assess respondents' knowledge of these labels) rather than the creation of hypothetical labels applied to one product justify this approach.

¹³ Thus, the dependent variable in the rank-ordered probit model is a set of integer variables ranging from 1 (most important) to 6 (least important) for each sustainability dimension.

TABLE 2 Choice sets in pairwise label questions.

Please select the label that would most positively influence your decision to purchase a product with that label			
	Choice Set 1	Choice Set 2	Choice Set 3
Number of compliance criteria covered by labels			
	12.5% ^a	11.4% ^a	16.0% ^a
	Total number of criteria: 1 Environmental Impact = 1	Total number of criteria: 1 Animal Welfare = 1	Total number of criteria: 1 Social Welfare = 1
			
Types of products eligible to use labels			
	26.3% ^a	16.5% ^a	13.9% ^a
	Products containing palm oil	Product(s): Tuna	Product(s): Coffee
			
Types of products eligible to use labels			
	73.7% ^b	83.5% ^b	86.1% ^b
	Product(s): Produced in rainforests, includes crop, cattle, and palm oil products	Product(s): Seafood from wild-capture fisheries, including tuna	Product(s): Cane sugar, cereals, cocoa, coffee, fresh fruit, herbs and spices, honey, nuts, oilseeds and oleaginous fruits, prepared and preserved fruit and vegetables, tea, vegetables
			(Continues)

TABLE 2 (Continued)

Geographic origin of products eligible to use labels	Choice Set 7	Choice Set 8	Choice Set 9
	 Produced: in British Columbia, Canada	 Produced: in Canada	 Produced: in 10 countries
	58.3% ^a 41.7% ^b	73.2% ^a 26.8% ^b	29.1% ^a 70.9% ^b
	Produced: Anywhere in the world	Produced: in Canada or the USA	Produced: in 60+ countries

^aPercentage of respondents choosing a narrow label in each choice set.

^bPercentage of respondents choosing a broad label in each choice set.

The random error term ε_{ij} represents the unobserved component of the utility and is assumed to follow a multivariate normal distribution with mean zero and covariance Ω , that is, $(\varepsilon_{i,1}, \dots, \varepsilon_{i,6}) \sim MVN(0, \Omega)$. For a utility-maximizing individual i , the probability of observed ranking is $P(U_{i,6} - U_{i,5} \leq 0, U_{i,5} - U_{i,4} \leq 0, \dots, \text{and } U_{i,2} - U_{i,1} \leq 0)$. The log-likelihood of observing the full ranking of sustainability dimensions for all individuals is thus expressed as:

$$LL = \sum_{i=1}^N \log P(U_{i,6} - U_{i,5} \leq 0, U_{i,5} - U_{i,4} \leq 0, \dots, \text{and } U_{i,2} - U_{i,1} \leq 0) \quad (3)$$

The log-likelihood function (Equation 3) is maximized to estimate the model parameters (β, Ω) using the maximum simulated likelihood method.

4.2 | Broad versus narrow labels: Logistic regression models

Participants' preferences for narrow versus broad sustainability labels (elicited from the hypothetical scorecard questions and the pairwise comparison of existing sustainable labels) are analyzed using a series of logistic regression models while accounting for the panel nature of the data (i.e., each participant made several repeated narrow vs. broad choices). The probability of individual i choosing the narrow label is defined as (Greene, 2012):

$$P_i = \frac{\exp(\beta_0 + X_i\beta)}{1 + \exp(\beta_0 + X_i\beta)} \quad (4)$$

where X_i are explanatory variables including whether individual i reports reading food labels (*Read Labels*), previous exposure to four sustainability labels randomly assigned to the respondent (*Seen Labels*), ability to correctly identify the meaning of four sustainability labels (*Objective Label Knowledge*), self-reported sustainability knowledge (*Subjective Knowledge*), and a set of socio-demographic variables (*Age, Female, Household Income, University Degree, Province* [see, Table 3]). The log-likelihood of observing all the choices made by individuals (Equation 5) is maximized to estimate the model parameters (β) .

$$LL = \sum_i^N (y_i \ln(P_i) + (1 - y_i) \ln(1 - P_i)) \quad (5)$$

where y_i is an indicator variable that equals 1 if individual i chose the narrow label and 0 otherwise.¹⁴ See Table 3 for variable definitions.

5 | RESULTS

This section examines consumers' beliefs, perceptions, and knowledge of sustainability (Section 5.1—descriptive analysis), investigates which dimensions of sustainability are important to which consumers (Section 5.2—rank-ordered probit model), and assesses preferences for broad versus narrow sustainability labels across multiple dimensions (Section 5.3—logistic regressions). All variable definitions, along with descriptive statistics, are provided in Table 3.

5.1 | Sustainability beliefs and knowledge

Approximately 41.5% of the sample reported themselves as “not at all” or “somewhat” knowledgeable about sustainability, 43.4% reported “average” knowledge, and the remaining 15.1% claimed to know “more than average” or be “highly” knowledgeable about sustainability. These data represent “subjective knowledge” in the subsequent regression analysis.

¹⁴ Models were estimated with Stata 17 choice models “*cm*” commands (*cmlogit* for the logistic models, *cmroprobit* for the rank-ordered probit choice model) (StataCorp, 2021).

TABLE 3 Description and summary of variables used in econometric analysis.

Variables	Coding structure	Mean	S.D.
Dependent variables			
Dimensions of sustainability model			
Environmental Impact	An integer variable ranging from 1 (most important) to 6 (least important), determined by the ranking of environmental impact as a sustainability category.	2.88	1.41
Economic Impact	An integer variable ranging from 1 (most important) to 6 (least important), determined by the ranking of economic impact as a sustainability category.	3.73	1.71
Social Welfare	An integer variable ranging from 1 (most important) to 6 (least important), determined by the ranking of social welfare as a sustainability category.	4.07	1.54
Animal Welfare	An integer variable ranging from 1 (most important) to 6 (least important), determined by the ranking of animal welfare as a sustainability category.	3.92	1.68
Food Security	An integer variable ranging from 1 (most important) to 6 (least important), determined by the ranking of food security as a sustainability category.	2.56	1.57
Climate Change	An integer variable ranging from 1 (most important) to 6 (least important), determined by the ranking of climate change as a sustainability category.	3.85	1.73
Broad versus narrow scorecard model			
Environmental_Narrow	1 if a participant selected the narrow environmental impact label in a scorecard question, 0 otherwise.	0.36	0.48
Economic_Narrow	1 if a participant selected the narrow economic impact label in a scorecard question, 0 otherwise.	0.28	0.45
Social_Narrow	1 if a participant selected the narrow social welfare label in a scorecard question, 0 otherwise.	0.39	0.49
Animal_Narrow	1 if a participant selected the narrow animal welfare label in a scorecard question, 0 otherwise.	0.29	0.46
Security_Narrow	1 if a participant selected the narrow food security label in a scorecard question, 0 otherwise.	0.35	0.48
Climate_Narrow	1 if a participant selected the narrow climate change label in a scorecard question, 0 otherwise.	0.46	0.50
Broad versus narrow pairwise label models			
Compliance_Narrow_1, 2, 3	1 if a participant selected the narrow label of the number of compliance criteria in a pairwise label question, 0 otherwise.	0.13	0.33
		0.11	0.32
		0.16	0.37
Type_Narrow_1, 2, 3	1 if a participant selected the narrow label of the type of products in a pairwise label question, 0 otherwise.	0.26	0.44
		0.16	0.37
		0.14	0.35
Origin_Narrow_1, 2, 3	1 if a participant selected the narrow label of the geographic origin of products in a pairwise label question, 0 otherwise.	0.58	0.49
		0.73	0.44
		0.29	0.45
Explanatory variables			
Subjective Knowledge	Low = 1 if a participant self-reported as “not at all” or “somewhat” knowledgeable about sustainability, 0 otherwise.	0.41	0.49
	Average = 1 if a participant self-reported an “average Knowledge” about sustainability, 0 otherwise.	0.43	0.50
	High = 1 if a participant self-reported as “more than average” or “highly” knowledgeable about sustainability, 0 otherwise.	0.15	0.36
Read Labels	1 if a participant reported reading food labels more than 50% of the time, 0 otherwise.	0.45	0.50
Seen Labels	An integer variable ranging from 0 to 4, determined by the number of sustainable labels a respondent had seen before.	0.99	1.05
Objective Label Knowledge	An integer variable ranging from 0 to 4, determined by the number of correctly answered questions about the meaning of sustainable food labels.	1.64	1.11

(Continues)

TABLE 3 (Continued)

Variables	Coding structure	Mean	S.D.
Age	1 if a participant was 55 years old or over, 0 otherwise.	0.42	0.49
Female	1 if a participant identified as female, 0 otherwise.	0.51	0.50
Household Income	1 if a participant earned a total household income of \$100,000 and over, 0 otherwise.	0.34	0.47
University Degree	1 if a participant achieved a university undergraduate degree or above, 0 otherwise.	0.51	0.50
Province	British Columbia = 1 if a participant resides in British Columbia, 0 otherwise.	0.19	0.39
	Ontario = 1 if a participant resides in Ontario, 0 otherwise.	0.45	0.50
	Prairies = 1 if a participant resides in prairie provinces (Alberta, Manitoba, or Saskatchewan), 0 otherwise.	0.27	0.44
	Other = 1 if a participant resides in other provinces or territories, 0 otherwise.	0.09	0.29

To measure usage and knowledge of existing food labels, participants were asked, “How often will you read the labels on packaged food items you are considering purchasing?” About 44.8% of participants indicated they read food labels more than 50% of the time (the indicator variable *Read Labels* was set equal to one and zero otherwise), and the remaining 55.2% read food labels less than 50% of the time or not at all. Table 4 summarizes respondents’ exposure to the 15 food sustainability labels and the percentage of respondents correctly interpreting the meaning of the label.

The level of exposure to sustainable labels varies among consumers. Participants were randomly assigned four labels, and 41.2% reported they had not seen any of the four assigned labels, 30.5% have seen one label, 18.3% have seen two labels, and the remaining 10% have seen three or four labels. As can be seen in Table 4, the label seen by most participants is the “Non-GMO Project” label, followed by “Starbucks C.A.F.E. Practices” and “Canada Organic”. Less than 5% of the sample report having ever seen the “Fair Wild”, “Animal Welfare”, “RSPO Certified Sustainable Palm Oil”, and “Bird Friendly” labels.

The extent to which participants correctly interpreted the meaning of the label varied widely, but only four of the labels were correctly interpreted by more than 50% of respondents (“Rainforest Alliance Certified”, “Fair Trade”, “Canada Organic”, “Animal Welfare”) (see, Table 4). In a few cases, quite a high percentage of respondents chose the right interpretation despite a relatively low proportion having previously seen the label. This might be attributed to good guesses from the four multiple choice answers plus a don’t know response (a 20% probability of randomly choosing the correct response) or may reflect the intuitive nature of these labels—such as “Certified Naturally Grown”, “British Columbia Certified Organic”, and “Animal Welfare”. Whether respondents had previously seen the four randomly assigned sustainability labels (*Seen Labels*) and their ability to correctly identify the meaning of the label (*Objective Label Knowledge*) are explanatory variables in the subsequent logistic regression models.

5.2 | Importance of sustainability dimensions

One objective of our research is to examine which dimensions of sustainability resonate with consumers, and to determine to whom these dimensions appeal. Participants were asked to rank six dimensions of sustainability from the most to the least important (environmental impact, economic impact, social welfare, animal welfare, food security, climate change—see Section 3.2.2).

Table 5 presents the estimated probability of each sustainability dimension being ranked as the most important, along with the marginal effect estimates of the rank-ordered probit model (see, Section 4.1).¹⁵

Based on our model results, 36.9% of Canadian consumers were expected to rank “food security” as the most important sustainability dimension, followed by “environmental impact” chosen by 19.4% (see, Table 5). Similar numbers of consumers would consider “economic impact” (12.8%), “climate change” (12.7%), and “animal welfare” (11.3%) as the most important dimension of sustainability, while only 6.9% chose “social welfare”.

As Table 5 shows, relative to participants who claimed to have average knowledge about sustainability, those who considered themselves more knowledgeable were more likely to rank the “environmental impact” and “social welfare” as the

¹⁵ The marginal effect estimates measure the changes in probability (of ranking a sustainability dimension as the most important) in response to the change in independent variables. For instance, relative to respondents who reported average knowledge about sustainability, those had a higher level of knowledge in sustainability are more likely, by 6.6 percentage points, to rank the “environmental impact” as the most important sustainability dimension.

TABLE 4 Exposure to and knowledge of sustainable food labels.

Sustainable food labels		Label exposure ^a (%)	Correct interpretation ^b (%)
	Non-GMO	57.7%	33.4%
	Starbucks C.A.F.E. practices	45.1%	21.8%
	Canada organic	44.6%	55.7%
	Fair trade	43.4%	57.4%
	Dolphin safe	30.1%	31.4%
	Rainforest alliance certified	30.0%	63.3%
	MSC certified sustainable seafood	28.1%	47.0%
	Ocean wise	26.4%	20.7%
	SPCA certified	22.7%	46.1%
	Certified naturally grown	16.5%	45.9%
	British columbia certified organic	15.6%	44.1%
	Bird friendly	4.8%	6.3%
	Rspo certified sustainable palm oil	3.6%	44.9%

(Continues)

TABLE 4 (Continued)

Sustainable food labels		Label exposure ^a (%)	Correct interpretation ^b (%)
	Animal welfare	2.6%	54.3%
	Fair wild	2.2%	43.3%

^aResponses to question “Have you seen this label before?” Permitted responses are “Yes”, “No”, and “Don’t know”.

^bResponses to question “What do you think this label means?” (Multiple choice answers).

TABLE 5 Marginal effect estimates for the rank-ordered probit model ($n = 1416$).

	Environmental impact	Economic impact	Social welfare	Animal welfare	Food security	Climate change
Probability (ranked 1st)	0.194	0.128	0.069	0.113	0.369	0.127
Explanatory variables						
<i>Subjective knowledge (base level = average knowledgeability about sustainability)</i>						
Low	−0.031** (0.015) ^a	0.009 (0.013)	0.008 (0.008)	−0.000 (0.011)	0.025 (0.023)	−0.010 (0.013)
High	0.066*** (0.025)	−0.036** (0.015)	0.022* (0.012)	0.008 (0.016)	−0.048 (0.030)	−0.013 (0.017)
<i>Age (base level = 18–55 years old)</i>						
55 years old or over	0.007 (0.015)	−0.038*** (0.012)	−0.037*** (0.007)	−0.018* (0.011)	0.104*** (0.022)	−0.018 (0.012)
<i>Female (base level = Male/other)</i>						
Female	0.066*** (0.015)	−0.069*** (0.012)	−0.011 (0.007)	0.038*** (0.011)	−0.025 (0.021)	0.001 (0.012)
<i>Household Income (base level = less than \$100,000)</i>						
\$100,000 and over	−0.001 (0.016)	0.005 (0.012)	−0.007 (0.008)	0.017 (0.012)	−0.005 (0.022)	−0.009 (0.012)
<i>Education (base level = Below the University Degree)</i>						
University Degree	0.035** (0.015)	−0.013 (0.012)	0.010 (0.008)	−0.054*** (0.011)	−0.019 (0.022)	0.040*** (0.012)
<i>Province (base level = Ontario)</i>						
British Columbia	−0.003 (0.021)	0.007 (0.014)	−0.004 (0.010)	−0.003 (0.014)	0.010 (0.028)	−0.008 (0.017)
Prairies	−0.033* (0.017)	0.082*** (0.016)	−0.004 (0.009)	−0.013 (0.012)	0.040 (0.026)	−0.071*** (0.013)
Other	−0.055** (0.023)	−0.004 (0.018)	−0.002 (0.013)	0.069*** (0.025)	0.003 (0.038)	−0.013 (0.022)
Model Fit						
Log-likelihood	−8423.543					
AIC	16975.09					
BIC	17311.44					
# of Participants	1416					

^aStandard errors are reported in parentheses.

*, **, *** denote 10%, 5%, 1% significance level, respectively.

most important dimension of sustainability, while less likely to consider “economic impact” as a central aspect of sustainability. Participants who considered themselves not at all or only somewhat knowledgeable about sustainability were less likely to rank “environmental impact” as the most important dimension. Subjective knowledge of sustainability appears to be unrelated to the perceived importance of other sustainability dimensions, as the estimates were not statistically significant.

Age is not associated with “environmental impact” and “climate change” being ranked as the most important aspect of sustainability. That is, “environmental impact” is equally important to people in all age groups, and “climate change” also appears to be similarly important across age groups. However, older participants were more likely to consider “food security” as the most important aspect of sustainability, while younger participants tend to emphasize “economic impact”, “social welfare”, and “animal welfare” as important dimensions of sustainability.

Respondents who identified as female were more likely to recognize the importance of “environmental impact” and “animal welfare” as a central part of the sustainability concept, whereas they were less likely to acknowledge “economic impact” as an important dimension of sustainability. None of the income variables in Table 5 are significant, indicating a similar perceived importance of all these sustainability dimensions across income levels. Those with a university degree were more likely to perceive “environmental impact” and “climate change” as the most important aspect of sustainability, while less likely to perceive “animal welfare” as important to sustainability.

Participants from British Columbia had similar views of sustainability to those from Ontario (the reference category). Participants from the prairie provinces—Alberta, Manitoba, and Saskatchewan, major agricultural production areas in Canada—were more likely to rank “economic impact” as the top sustainability dimension, relative to Ontario residents. Conversely, prairie consumers were less likely to agree that “climate change” and “environmental impact” were the most important sustainability dimension. Participants from other regions—collectively the Atlantic provinces, Quebec, and three territories—were more likely to emphasize the importance of “animal welfare”, while less likely to emphasize the importance of “environmental impact” to sustainability. Overall, findings suggest that sustainability, which is a multidimensional concept, means quite different things to different individuals.

5.3 | Preference for narrow versus broad sustainability labels

Our second major objective is to measure Canadians’ attitudes towards broad versus narrow sustainability labels across multiple contexts. Participants’ preferences for broad versus narrow sustainability labels were measured in terms of: (1) the types (dimensions) of sustainability signaled by the label (each participant responded to three hypothetical scorecard questions); (2) the scope of criteria covered by the standard (three pairwise label questions focusing on the number of compliance criteria encompassed by existing sustainability labels); (3) the number of products covered by the sustainability standard (three pairwise label questions focusing on types of products); and (4) the geographic coverage of the standard (three pairwise label questions focusing on geographic origin of products). Choices were analyzed using logistic regression models (see, Section 4.2). Table 6 reports the marginal effect estimates for the four logistic models.¹⁶

The preferences for narrow versus broad sustainability labels vary across contexts, although generally there appears to be a preference for broad over narrow sustainability labels. The Scorecard model (model 1, 2nd column of Table 6) indicates that, given labels with the same total sustainability score, about 34.5% of Canadian consumers would prefer a narrow label signaling a high score on only one sustainability category to a broad label with moderate scores on multiple categories.

The Pairwise Label models (Columns 3–5 of Table 6) assess consumers’ preferences for existing sustainability labels that vary in their number of compliance criteria, scope of product(s) certified, and the geographic origin(s) of products. Similar to the Scorecard model, fewer consumers prefer a narrow label in the context of compliance criteria (model 2) and the number/type of products covered by the label (model 3). Results suggest that 86.7% (1–0.133) of consumers prefer sustainability labels that encompass a relatively larger number of criteria (e.g., the Ocean Wise label encompasses multiple sustainable criteria including four environmental impact criteria and seven animal welfare criteria, whereas the Dolphin Safe label focuses on one animal welfare criteria, see Table 2 for details), and 81.1% (1–0.189) of respondents also prefer

¹⁶ The marginal effect estimates measure the changes in probability (of choosing a “narrow” label”) in response to the change in independent variables. For instance, relative to respondents who reported average knowledge about sustainability, those identified as more knowledgeable about the sustainability issue are more likely, by 4.6 percentage points, to choose a targeted label covering a narrower range of products.

TABLE 6 Marginal effect estimates for logistic models.

	Scorecard model	Pairwise label models		
	Narrow label (Model 1)	Narrow coverage of compliance criteria (Model 2)	Narrow coverage of product types (Model 3)	Narrow coverage of geographic origin (Model 4)
Probability (chose “narrow”)	0.345	0.133	0.189	0.535
Explanatory variables				
<i>Read labels</i>	−0.003 (0.017) ^a	−0.004 (0.013)	−0.008 (0.014)	−0.008 (0.017)
<i>Seen labels</i>	0.005 (0.008)	−0.007 (0.007)	−0.014* (0.007)	0.016* (0.009)
<i>Objective label knowledge</i>	−0.021*** (0.008)	−0.034*** (0.006)	−0.031*** (0.006)	0.004 (0.008)
<i>Subjective knowledge (base level = average knowledgeability about sustainability)</i>				
<i>Low</i>	−0.012 (0.018)	−0.005 (0.014)	0.012 (0.015)	−0.008 (0.018)
<i>High</i>	0.042* (0.025)	−0.003 (0.020)	0.046** (0.023)	−0.022 (0.026)
<i>Age (base level = 18–55 years old)</i>				
<i>55 years old or over</i>	−0.042** (0.017)	−0.032** (0.013)	−0.009 (0.014)	0.075*** (0.017)
<i>Female (base level = Male/other)</i>				
<i>Female</i>	−0.033** (0.017)	−0.014 (0.013)	−0.023* (0.014)	0.089*** (0.017)
<i>Household income (base level = less than \$100,000)</i>				
<i>\$100,000 and over</i>	−0.005 (0.018)	−0.010 (0.014)	−0.020 (0.014)	−0.032* (0.018)
<i>Education (base level = Below the University Degree)</i>				
<i>University Degree</i>	0.008 (0.017)	−0.026* (0.013)	−0.008 (0.014)	−0.097*** (0.017)
<i>Province (base level = Ontario)</i>				
<i>British Columbia</i>	0.011 (0.023)	−0.018 (0.018)	−0.031* (0.019)	0.079*** (0.022)
<i>Prairies</i>	−0.020 (0.021)	−0.014 (0.016)	−0.011 (0.017)	0.001 (0.021)
<i>Other</i>	0.000 (0.029)	−0.052*** (0.019)	−0.041* (0.021)	−0.019 (0.032)
Model Fit				
Log-likelihood	−2800.276	−1621.124	−2026.615	−2866.029
AIC	5626.552	3268.249	4079.230	5758.058
BIC	5709.525	3350.854	4161.834	5840.662
# of Participants	1413 ^b	1416	1416	1416

^aStandard errors are robust to intragroup correlation (i.e., the panel nature of the choice data), and are reported in parentheses.

^bDue to a technical issue in the survey administration, a few participants ($n = 3$) skipped the three scorecard questions, and a subgroup of respondents ($n = 99$) selected both the narrow and broad labels in at least one of the 3 scorecard questions. The random utility model (McFadden, 1974) allows for only one alternative that yields the greatest utility level to be chosen in a choice set (i.e., choosing either a narrow or broad label), thus these ties were treated as panel data. That is, this subgroup of respondents was treated as making choices at two time points, choosing a narrow label at one time and a broad label at the other time. We conducted a series of robustness checks to test whether our results are sensitive to how we treated these tie data. For example, we coded these ties as choices of a narrow label, and alternatively all as a broad label. Results, shown in Appendix C, suggest that different coding approaches yield negligible differences in coefficient estimates and interpretation of results.

*, **, *** denote 10%, 5%, 1% significance level, respectively.

labels certifying multiple eligible products (e.g., the Fair Trade label can be applied to coffee, honey, tea, cane sugar, etc., whereas the Bird Friendly label only applies to coffee).

Conversely, when it comes to the geographic origin of products covered by the label (model 4 in Table 6), slightly more than half of consumers (53.5%) prefer the narrow sustainable labels that certify products originating from a smaller range of areas/countries (e.g., the SPCA Certified label can only be used on products from Canada, whereas the Animal Welfare label can certify products sourced from both Canada and the US).

It is possible that the preference for a “narrow” label in the context of geographic origin coverage may confound with the preference for “Canadian” or “local” products produced in Canada or in a specific province (e.g., British Columbia). The descriptive statistics from Table 2 for the percentage of respondents choosing a “narrow” or a “broad” label in each choice context illustrate this possibility. For example, as can be seen in Table 2, 58.3% of respondents chose the narrow label signaling products produced in “British Columbia, Canada” while the remaining 41.7% chose the broad label indicating products from “anywhere in the world” (choice set 7). However, when the geographic origin is more generic, respondents may prefer a label with a wider coverage. From Table 2 we see that about 29.1% of respondents chose the narrow label that indicates eligible products originate from “10 countries” while 70.9% preferred the broad label covering products from “60+ countries” (choice set 9). While the current survey design does not allow us to disentangle preferences for breadth of geographic origin from “Canada-specific” or “localness” preferences, we extend efforts by separately estimating models for each of the three choice sets pertaining to the geographic origin (see, Appendix D).

We examine the factors contributing to preferences for broad versus narrow sustainability labels.¹⁷ Results from four logistic regressions (Table 6) suggest that the extent to which respondents report reading food labels (*Read Labels*) and their exposure to existing sustainability labels (*Seen Labels*) was not associated with preferences for narrow versus broad labels. However, participants who correctly interpreted the meaning of a higher number of sustainable labels (*Objective Label Knowledge*) were more likely to prefer a broad label in all choice contexts, except for the geographic coverage of the label.

Relative to participants who claimed to have average knowledge about sustainability, participants who identified as more knowledgeable about the issue were more likely to prefer a targeted label covering a narrow range of products (model 3), along with a label focusing on a narrower set of sustainability dimensions (model 1), albeit at a lower level of statistical significance. Both female and older participants were more likely to choose a narrow label in the context of geographic coverage (model 4), but a broad label with respect to the dimensions of sustainability encompassed by the label (hypothetical scorecard question—model 1). Older participants were also more likely to prefer a sustainability label that complies with a broader range of compliance criteria (model 2). Income appeared to have little impact, while those with at least a university degree were more likely to prefer a sustainability label with a broader geographic coverage (model 4). Compared to Ontarians, participants from British Columbia were more likely to welcome a label with a narrow geographic focus (model 4), while participants from the Atlantic provinces and three territories (*Other*) were more likely to embrace a sustainability label with a broader set of compliance criteria (model 2).

In general, the regression results reveal considerable diversity in consumers’ attitudes toward sustainability labels, consistent with prior literature in different contexts (e.g., Janßen & Langen, 2017; Yang et al., 2020). Setting aside geographic coverage (which may also encompass preferences for domestic or local origin, see, Appendix D), there is a general preference for broader sustainability labels that cover more dimensions of sustainability (Scorecard Model), and in particular, a broader range of compliance criteria and a broader range of products (Pairwise Label Models).

While the preference for broad over narrow sustainability labels is stronger among some socio-demographic groups, the results for sustainability knowledge (subjective vs. objective) are particularly interesting. It seems that Canadians who rate themselves as more knowledgeable about sustainability (and for whom, therefore, sustainability may be a more important concept), tend to prefer targeted sustainability labels with a focus on one rather than multiple sustainability dimensions, and prefer labels with a focus on a specific rather than multiple products. Yet, respondents with a higher objective knowledge score (correctly identifying the meaning of specific sustainability labels) are less likely to prefer narrowly-defined

¹⁷ As noted by a reviewer, a limitation of the model is the absence of a control variable for respondents’ liking of each of the 15 sustainability labels. Although the survey did not explicitly enquire about respondents’ preferences for individual labels, we did evaluate their objective knowledge of each label. However, to minimize the survey burden on respondents, only four labels (with images) were randomly assigned to each respondent. Consequently, including “objective knowledge” of individual labels as control variables would introduce a significant amount of missing data. Therefore, we opted to use the overall “objective label knowledge” variable in the analysis. Despite this limitation, the salient design (which presented information on the number of compliance criteria, range of products, and geographic coverage, right next to the labels)—coupled with the universal low awareness and understanding of these 15 labels—gives us confidence that respondents’ choice decisions were primarily influenced by the breadth (narrow vs. broad) of these labels.

sustainability labels. This may be because of innate differences in self-reported versus actual knowledge of sustainability, or may reflect differences between a general knowledge of and interest in sustainability versus a deeper knowledge of the complexity of sustainability and experience with specific sustainability labels.

A full exploration of the relationship between subjective and objective knowledge is beyond the scope of the present analysis. Nevertheless, the correlation between self-reported subjective knowledge and objective knowledge (correctly identifying the meaning of four sustainability labels) is low (correlation coefficient of 0.082). A regression analysis (not reported here) with objective knowledge as the dependent variable and explanatory variables including subjective knowledge, whether a respondent had seen specific sustainability labels before, their general propensity to read food labels, and a set of socio-demographic variables suggests that respondents who are female, hold a university degree or higher, self-identify as knowledgeable about sustainability, and who recall having seen specific sustainability labels are more likely to have a higher objective knowledge score. Further research is needed to unpack the effects of subjective versus objective knowledge of sustainability on attitudes toward sustainability labeling and purchase behavior.

6 | CONCLUSIONS

Consumers are faced with a plethora of sustainability labels on food products from very broadly defined labels covering multiple dimensions of sustainability, based on multiple criteria, and applied to multiple products, to highly specific, focused sustainability labels. Our research seeks to better understand Canadian consumers' attitudes toward sustainability and knowledge of sustainability labels, and to explore how consumers respond to different types of sustainability labeling, specifically broad versus narrowly framed sustainability labels. Ideally, labeling the sustainability attributes of a food product reduces information asymmetry for consumers, allowing them to identify food products with attributes that align with their ethical preferences for specific sustainability outcomes. However, the complex, multifaceted nature of sustainability creates challenges in designing food labels that accurately communicate sustainability to consumers. From a policy perspective, a food labeling environment that informs rather than misleads consumers is desirable if labels are to be effective at reducing information asymmetry.

Our results suggest some confusion among Canadian consumers as to what constitutes sustainability in the context of agricultural and food production, and a relatively low awareness and understanding of many current sustainability labels in the marketplace. We find that some aspects of sustainability (such as food security and environmental impact) resonate more strongly with consumers than others (such as social welfare), but generally a fair degree of heterogeneity in which aspects of sustainability matter to different consumers. While one might expect a more focused, narrowly targeted sustainability label to have a greater impact on the sustainability outcome for that label (e.g., Bird Friendly Coffee), we identify a general preference for broadly defined sustainability labels in terms of the dimensions of sustainability captured by the label, and the breadth of criteria and products covered by the label. For policymakers or the Canadian agri-food sector seeking to better define the information landscape for sustainability labeling, this suggests that broader, more encompassing labels are likely to gain more traction with consumers than narrowly defined, targeted labels focusing on one dimension of sustainability or a limited number of criteria.

One caveat to our approach is that our pairwise comparison using actual labels does not explicitly control for labels that may be broad (or narrow) in more than one dimension (e.g., number of compliance criteria and types of products covered). While survey respondents were prompted to consider a specific aspect of the label in each pairwise question (e.g., compliance criteria in one comparison, type of products covered in another), it is possible that these two effects are confounded. Further research could examine the broad versus narrow distinction controlling for these differences using hypothetically derived labels.

Among the six dimensions of sustainability examined in the article, our finding that "food security" ranked as the most important dimension for the largest proportion of consumers (36.9% vs. 19.4% for environmental impact) was perhaps surprising given the predominance of environmental-oriented sustainability labels in the marketplace. In an era of rising food prices (note, these data were collected before the rapid food price inflation experienced in 2022), recognition among consumers of food security as a dimension of sustainability is noteworthy. Broadly defined sustainability labels that encompass food security goals, alongside environmental goals, are likely to gain more traction with consumers.

Further research could explore the relationship between subjective and objective knowledge of sustainability among consumers, and the extent to which this influences food purchase decisions in the presence of different types of sustainability labeling. The broad versus narrow distinction that we highlight across multiple dimensions of sustainability, multiple criteria, and multiple products, along with geographical scope, provides a useful point of departure for future research.

ACKNOWLEDGMENTS

This work was supported by the Canada First Research Excellence Fund (CFREF) grant that established the Plant Phenotyping and Imaging Research Centre (P2IRC) project.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Yang, Y., Hobbs, J. E., Fulmes, M., & Smyth, S. J. (2024). Signaling sustainability: Do Canadian consumers prefer broad or narrow food sustainability labels?. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, 72, 411–439. <https://doi.org/10.1111/cjag.12366>

APPENDIX A: ROBUSTNESS CHECK OF “TOO FAST” RESPONSES

In total, 1502 respondents participated the online survey which took 15 min on average to complete. Respondents who sped through the survey within 5 min ($n = 86$) were excluded from the analyses to ensure the quality of data. The “too fast” respondents were more likely to be younger males with lower incomes, a lower level of objective knowledge about sustainable labels, who read food labels less frequently, and were more likely from Ontario but less likely from the Prairies.

To check if the exclusion of “too fast” respondents influences our results, we re-run the rank-ordered probit model using the full sample ($n = 1502$). Table A.1 shows similar results to the model reported in the main body of the article ($n = 1416$, Table 5).

TABLE A.1 Marginal effect estimates for the rank-ordered probit model ($n = 1502$).

Explanatory variables	Environmental impact	Economic impact	Social welfare	Animal welfare	Food security	Climate change
Probability (ranked 1st)	0.192	0.132	0.069	0.112	0.367	0.128
<i>Subjective Knowledge (base level = Average Knowledgeability about Sustainability)</i>						
Low	−0.031** (0.015) ^a	0.009 (0.013)	0.008 (0.007)	−0.002 (0.011)	0.024 (0.022)	−0.008 (0.012)
High	0.061** (0.024)	−0.034** (0.015)	0.023** (0.012)	0.008 (0.015)	−0.052* (0.028)	−0.006 (0.017)
<i>Age (base level = 18–55 years old)</i>						
55 years old or over	0.013 (0.015)	−0.043*** (0.011)	−0.037*** (0.007)	−0.017 (0.010)	0.107*** (0.021)	−0.023** (0.011)

(Continues)

TABLE A.1 (Continued)

Explanatory variables	Environmental impact	Economic impact	Social welfare	Animal welfare	Food security	Climate change
<i>Female (base level = Male/other)</i>						
<i>Female</i>	0.064*** (0.014)	−0.076*** (0.012)	−0.010 (0.007)	0.034*** (0.010)	−0.012 (0.020)	−0.000 (0.011)
<i>Household Income (base level = less than \$100,000)</i>						
<i>\$100,000 and over</i>	0.004 (0.015)	0.001 (0.012)	−0.006 (0.008)	0.016 (0.011)	−0.005 (0.022)	−0.011 (0.012)
<i>Education (base level = Below the University Degree)</i>						
<i>University Degree</i>	0.037** (0.014)	−0.010 (0.012)	0.009 (0.007)	−0.050*** (0.011)	−0.020 (0.021)	0.035*** (0.012)
<i>Province (base level = Ontario)</i>						
<i>British Columbia</i>	0.001 (0.021)	0.004 (0.014)	−0.004 (0.010)	−0.003 (0.014)	0.009 (0.028)	−0.007 (0.017)
<i>Prairies</i>	−0.030* (0.017)	0.077*** (0.016)	−0.005 (0.009)	−0.012 (0.012)	0.044* (0.025)	−0.074*** (0.012)
<i>Other</i>	−0.056** (0.023)	−0.007 (0.018)	0.002 (0.013)	0.068*** (0.024)	0.010 (0.037)	−0.018 (0.021)
Model Fit						
Log-likelihood	−8977.698					
AIC	18083.4					
BIC	18423.53					
# of Participants	1502					

^aStandard errors are reported in parentheses.

*, **, *** denote 10%, 5%, 1% significance level, respectively.

APPENDIX B: SCORECARD QUESTIONS

For the scorecard questions, respondents were assigned to **three** scorecard questions based on the three most important sustainability dimensions identified by the respondent in a previous survey question. The scorecard questions for all six sustainability dimensions are displayed below (narrow followed by broad), along with the instructions provided to respondents.

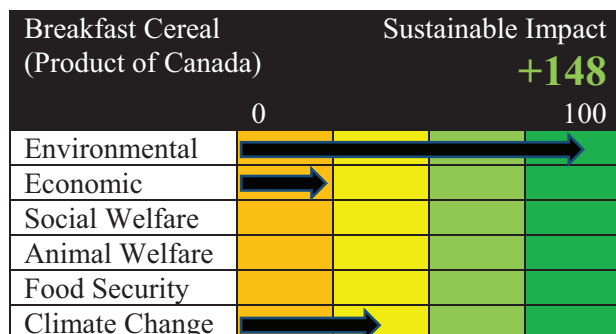
In this section of the survey you will be shown a new type of sustainability food label.

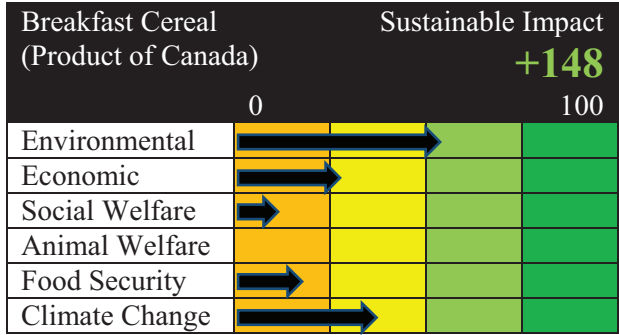
How to Read the Label:

The length of the black arrows shows the sustainable impact score for the product for the category of sustainable impact to its left. Rows with no arrow indicate a sustainable impact score of zero (0) for that category. The total sustainable impact score for the product is shown in green at the top right of the label.

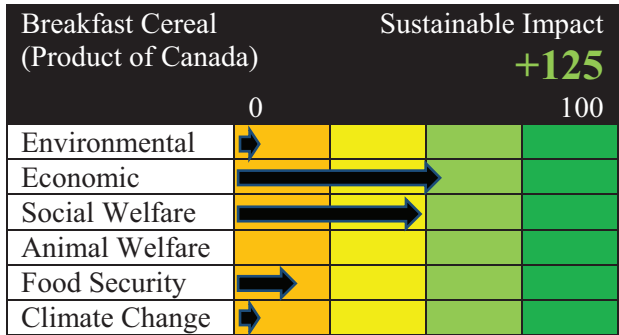
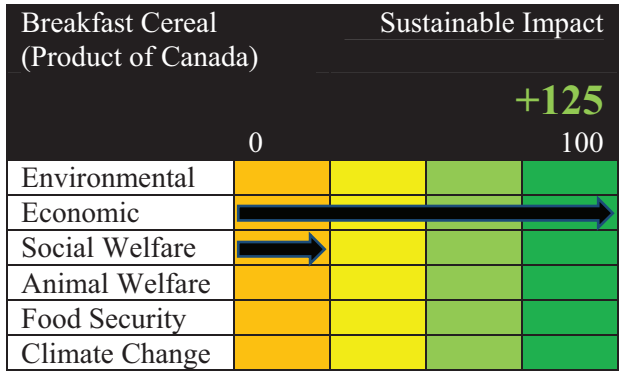
Please click on the label that would most positively influence your decision to purchase a Canadian-made breakfast cereal with that label.

Environmental

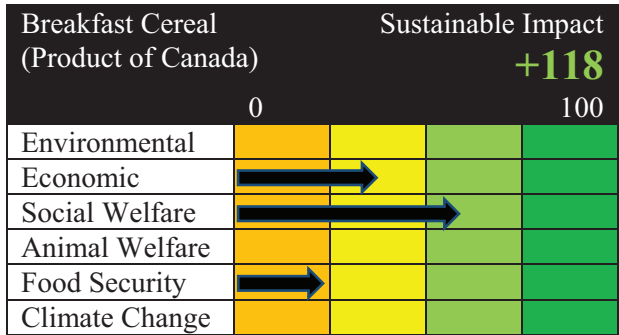


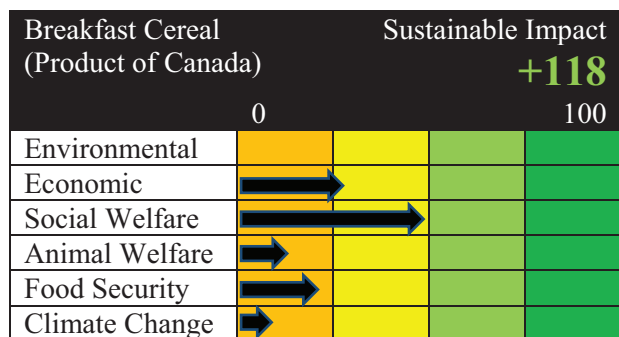


Economic

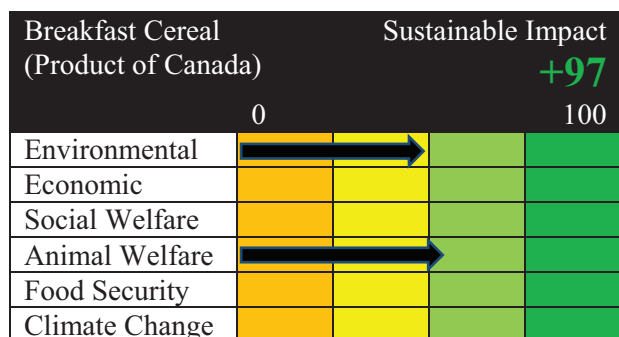
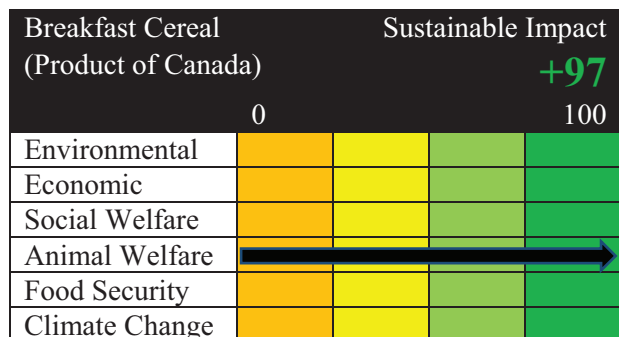


Social Welfare

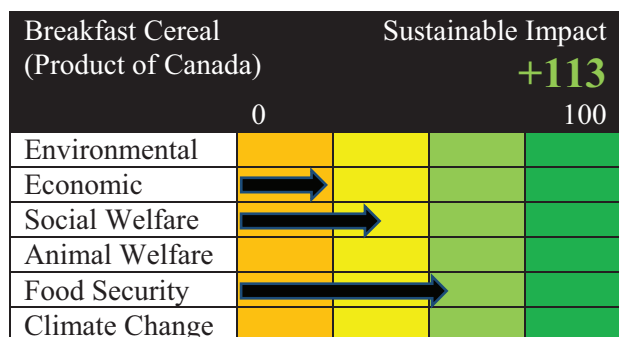


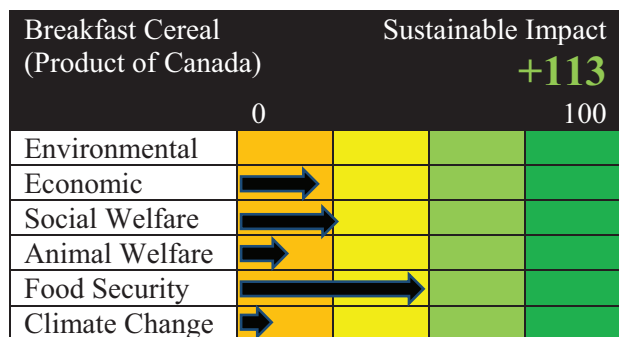


Animal Welfare

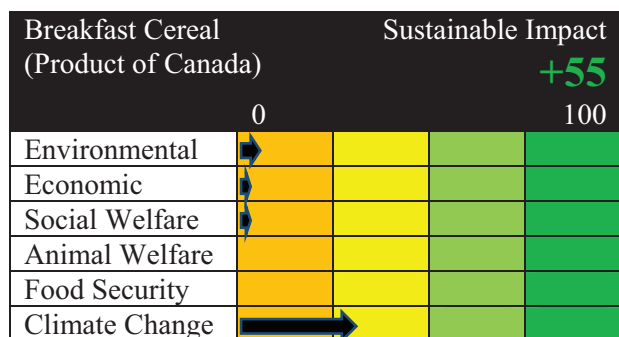
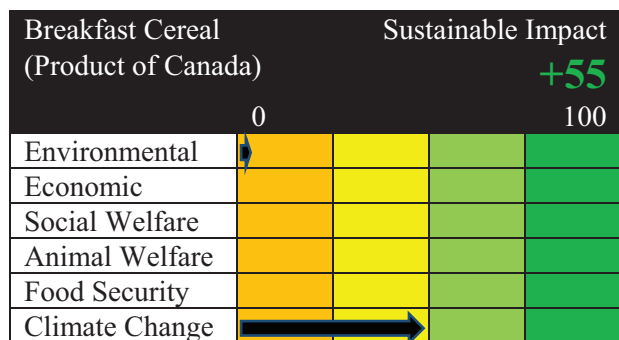


Food Security





Climate change



APPENDIX C: ROBUSTNESS CHECK OF CODING METHODS IN SCORECARD QUESTIONS

Due to a technical issue, a few respondents ($n = 99$) chose both the narrow and broad labels in at least one of the three scorecard questions. We adopted different coding strategies to model these responses in a logistic model: (1) treating them as panel data, that is, choosing a narrow label in one set but a broad label in another set; (2) modeling ties as choosing narrow labels; and (3) modelling ties as choosing broad labels. The results of this robustness check indicate that the coding strategy has little impact on the estimation results (Table C.1).

TABLE C.1 Marginal effect estimates under different coding methods.

Explanatory variables	Treatment of ties in scorecard questions		
	Ties are panel data (column 1 in Table 6)	Ties are narrow labels	Ties are broad labels
Probability (chose "Narrow")	0.345	0.356	0.325
Read Labels	−0.003 (0.017) ^a	−0.003 (0.018)	−0.003 (0.017)
Seen Labels	0.005 (0.008)	0.006 (0.009)	0.004 (0.008)
Objective Label Knowledge	−0.021*** (0.008)	−0.026*** (0.008)	−0.013* (0.008)
<i>Subjective Knowledge (base level = Average Knowledgeability about Sustainability)</i>			
Low	−0.012 (0.018)	−0.009 (0.019)	−0.018 (0.019)
High	0.042* (0.025)	0.047* (0.026)	0.039 (0.026)
<i>Age (base level = 18–55 years old)</i>			
55 years old or over	−0.042** (0.017)	−0.048*** (0.018)	−0.036** (0.018)
<i>Female (base level = Male/other)</i>			
Female	−0.033** (0.017)	−0.041** (0.018)	−0.023 (0.017)
<i>Household Income (base level = less than \$100,000)</i>			
\$100,000 and over	−0.005 (0.018)	−0.007 (0.019)	−0.002 (0.019)
<i>Education (base level = Below the University Degree)</i>			
University Degree	0.008 (0.017)	0.009 (0.018)	0.006 (0.018)
<i>Province (base level = Ontario)</i>			
British Columbia	0.011 (0.023)	0.006 (0.024)	0.019 (0.024)
Prairies	−0.020 (0.021)	−0.021 (0.022)	−0.021 (0.021)
Other	0.000 (0.029)	0.005 (0.031)	−0.011 (0.031)
Model Fit			
Log-likelihood	−2800.276	−2739.139	−2661.632
AIC	5626.552	5504.279	5349.265
BIC	5709.525	5586.856	5431.842
# of Participants	1413 ^b	1413	1413

^aStandard errors are robust to intragroup correlation (i.e., panel nature of the choice data), and are reported in parentheses.

^bDue to a technical issue in the survey administration a small number of participants ($n = 3$) skipped the 3 scorecard questions.

*, **, *** denote 10%, 5%, 1% significance level, respectively.

APPENDIX D: A DEEPER LOOK AT THE PREFERENCE FOR GEOGRAPHIC COVERAGE OF SUSTAINABLE LABELS

To disentangle the preference for broad versus narrow geographic coverage in sustainability labeling from a preference for “Canadian” or British Columbia produced products, we estimated the three choices in the pairwise questions separately. Specifically, we run three logistic regressions to model preferences for the broad versus narrow geographic labels, two of which are specific to Canada and one of which is generic: (i) “British Columbia, Canada” versus “Anywhere in the world” (Choice Set 7 in Table 2); (ii) “Canada” versus in “Canada or the USA” (Choice Set 8 in Table 2); and (iii) “10 countries” versus “60+ countries” (Choice Set 9 in Table 2). Table D.1 presents the marginal effects estimates from the three logistic models, along with the “aggregate” model that treats these three pairwise questions as repeated choices made by respondents (column 4 in Table 6).

Overall, we found that the preference for a “narrow” label identified in the “aggregate” model reported in the main body of the paper (column 1)—where the probability of choosing a narrow label was 0.535— was mainly driven by the preferences for a local label (column 2, “British Columbia, Canada”) and a “Canadian” label (column 3, “Canada”). However, when it comes to more generic labels, respondents showed preference for a “broad” label (column 4, “60+ countries”). The “aggregate” model represents an “average” preference across the three choice contexts.

We are also interested in examining the impacts of contributing factors to preferences for “narrow” labels captured across choice contexts. Results of the “aggregate” model (column 1) and the “generic” geographic coverage model (column 4) were very similar, except for the variable “British Columbia”. Unsurprisingly, relative to Ontarians, respondents from British Columbia were more likely to choose the narrow sustainability label that certifies local products produced in “British Columbia, Canada” rather than the label that applies to “Anywhere in the world” (column 2). This strong preference for local products among respondents from British Columbia also dominated in the “aggregate” model (column 1). However, this effect was not present when labels were “generic” (column 4).

TABLE D.1 Marginal effect estimates for logistic models—coverage of geographic origin.

Explanatory Variables	Narrow coverage of geographic origin			
	Aggregate model (column 4 in Table 6)	“British Columbia, Canada” (vs. “Anywhere in the world”)	“Canada” (vs. in “Canada or the USA”)	“10 countries” (vs. “6.0+ countries”)
	(1)	(2)	(3)	(4)
Probability (chose “Narrow”)	0.535	0.583	0.732	0.291
<i>Read Labels</i>	−0.008 (0.017) ^a	−0.038 (0.026)	0.014 (0.024)	0.000 (0.025)
<i>Seen Labels</i>	0.016* (0.009)	0.004 (0.013)	0.044*** (0.013)	0.001 (0.012)
<i>Objective Label Knowledge</i>	0.004 (0.008)	0.015 (0.011)	0.003 (0.011)	−0.006 (0.011)
<i>Subjective Knowledge (base level = Average Knowledgeability about Sustainability)</i>				
<i>Low</i>	−0.008 (0.018)	−0.018 (0.028)	0.026 (0.025)	−0.033 (0.026)
<i>High</i>	−0.022 (0.026)	−0.047 (0.039)	−0.021 (0.037)	0.004 (0.038)
<i>Age (base level = 18–55 years old)</i>				
<i>55 years old or over</i>	0.075*** (0.017)	0.126*** (0.026)	0.029 (0.024)	0.071*** (0.025)
<i>Female (base level = Male/other)</i>				
<i>Female</i>	0.089*** (0.017)	0.111*** (0.025)	0.084*** (0.024)	0.073*** (0.024)
<i>Household Income (base level = less than \$100,000)</i>				
<i>\$100,000 and over</i>	−0.032* (0.018)	−0.067** (0.027)	−0.011 (0.025)	−0.016 (0.026)

(Continues)

TABLE D.1 (Continued)

Explanatory Variables	Narrow coverage of geographic origin			
	Aggregate model (column 4 in Table 6)	“British Columbia, Canada” (vs. “Anywhere in the world”)	“Canada” (vs. in “Canada or the USA”)	“10 countries” (vs. “6.0+ countries”)
	(1)	(2)	(3)	(4)
<i>Education (base level = Below the University Degree)</i>				
<i>University Degree</i>	−0.097*** (0.017)	−0.109*** (0.026)	−0.086*** (0.024)	−0.095*** (0.025)
<i>Province (base level = Ontario)</i>				
<i>British Columbia</i>	0.079*** (0.022)	0.257*** (0.032)	0.010 (0.032)	−0.027 (0.032)
<i>Prairies</i>	0.001 (0.021)	0.031 (0.032)	−0.040 (0.029)	0.012 (0.030)
<i>Other</i>	−0.019 (0.032)	−0.040 (0.045)	−0.019 (0.043)	0.000 (0.042)
Model Fit				
Log-likelihood	−2866.029	−890.6909	−798.9546	−835.3503
AIC	5758.058	1807.382	1623.909	1696.701
BIC	5840.662	1875.705	1692.232	1765.023
# of Participants	1416	1416	1416	1416

^aStandard errors are robust to intragroup correlation (i.e., panel nature of the choice data), and are reported in parentheses.

*, **, *** denote 10%, 5%, 1% significance level, respectively.