International Food Marketing Research Symposium

Tromsø, Norway

June 18-20, 2024

Proceedings

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International Food Marketing Research Symposium 2024

Scientific Program

Tuesday, June 18

18.00-20.00	**Welcome Reception and Registration** Handelshøgskolen – UiT Breivangvegen 23, 9010 In the Foyer

Wednesday, June 19

	Venue: Handelshøgskolen – UiT Breivangvegen 23, 9010 Tromsø
08:00-09.00	**Registration**
09.00-09.15 The Auditorium "Perspektivet"	**Opening Session** *Klaus G. Grunert*, Aarhus University, Aarhus, Denmark *Kåre Skallerud,* UiT The Arctic University of Norway, Tromsø, Norway
09.15-10.15 The Auditorium "Perspektivet"	**Keynote session** **Presentation of Keynote Speaker** *Karen Brunsø* Aarhus University, Aarhus, Denmark **Greed and addiction in food consumption behaviour: Prospects for future research** *Svein Ottar Olsen* UiT The Arctic University of Norway, Tromsø, Norway
10.15-10.45 In the Foyer	***Coffee break***

10.45-12.15

The Auditorium
"Perspektivet"

Parallel Session 1-1: Sustainable Consumption I

Chair: Tove Christensen, University of Copenhagen

Emotion over information: How the affect heuristic shapes consumers' attitudes towards sustainable technological innovations
Marija Banovic
Aarhus University, Aarhus, Denmark
Nina Hasel, Fabian Buder
The Nuremberg Institute for Market Decisions (NIM), Nürnberg, Germany

When desired brand values might conflict; The diagnosticity of different packaging elements on brand sustainability and brand quality
Henk Roest, Sander Snoeren
Tilburg University, Tilburg, Netherlands

Exploring the impact of shopping practices on reusable bag consumption: A nationally representative study from Norway
Live Bøyum, Hanna Seglem Tangen
OsloMet, Oslo, Norway

Nudging can accelerate the transition among Danes towards more climate-friendly diets – behavioural experiments involving carbon footprint information and change of default meals
Tove Christensen, Sigrid Denver
University of Copenhagen, Copenhagen, Denmark
Jonas Nordström
Lund University, Lund, Sweden

Room 02.217
"Innovatøren"

Parallel Session 1-2: Meat reduction, Alternative Protein and Plant-based Food I

Chair: Daniela Moirano, TUM

Expected tastiness, moral satisfaction, life satisfaction and compensational behaviour of young people in different real life choice-no choice situations in the context of climate-sensitive food information.
Brigitte Schober-Schmutz
Klimaschloss Beilstein, Beilstein, Germany

Current, potential, and unlikely consumers of plant-based? A segmentation study to identify consumer groups to reduce meat and increase plant-rich diets
Jessica Aschemann-Witzel, Maartje Mulders
Aarhus University, Aarhus, Denmark
Meike Janssen
CBS, Copenhagen, Denmark
Federico JA Perez-Cueto
Umeå University, Umeå, Sweden

Don't bug it, till you try it: Consumer perceptions of edible insects with increased familiarity and use
Pernille Videbæk, Jessica Aschermann-Witzel
Aarhus University, Aarhus, Denmark

Feeding change: Explaining the adoption of sustainable healthy diets
Daniela Moirano, Jörg Königstorfer
TUM, Munich, Germany

12.15-13.15 ***Lunch***
In the Canteen

13.15-14.45

The Auditorium "Perspektivet"

Parallel Session 2-1: Consumer Behaviour and Seafood I

Chair: Julia Bronnmann, University of Southern Denmark

How do consumer segments respond to fish welfare issues?
Themistoklis Altintzoglou, Florent Govaerts
Nofima, Tromsø, Norway

Consumer intention to buy products containing fish with better welfare: The role of empathy in an extended value–belief–norm model
Florent Govaerts, Themistoklis Altintzoglou
Nofima, Tromsø, Norway

Regulatory or market-based incentives for sustainable production? The case of demersal seine fishing for Atlantic cod in Norway
Katrine Eriksen, Geir Sogn-Grundvåg
Nofima, Tromsø, Norway

Economic incentives for more sustainable fishing? The case of live haddock in coastal Norway
Julia Bronnmann
University of Southern Denmark, Odense, Denmark
Ingrid Kristine Pettersen, Geir Sogn-Grundvåg, Ove Johansen
Nofima, Tromsø, Norway

Room 02.217 "Innovatøren"

Parallel Session 2-2: Food Quality Perception I

Chair: Anne O. Peschel, Aarhus University

The effect of information on production characteristics on willingness to pay for broiler and pork products
Klaus G. Grunert
Aarhus University, Aarhus, Denmark
Line Ahm Mielby
Danish Technological Institute, Aarhus, Denmark

When ugly meets ugly: How "ugly bundling" can improve the attractiveness of imperfect produce
Guljira Manimont, Juliet Memery
Bournemouth University, Bournemouth, United Kingdom
Hyoje (Jay) Kim
University of Strathclyde, Glasgow, United Kingdom

Sensory delights: A study on traditional apple varieties in Spanish rural regions
Petjon Ballco, Azucena Gracia
Centro de Investigación y Tecnología Agroalimentaria de Aragón (CITA), Zaragoza, Spain

Trust is not enough: Blockchain verification requires consumer understanding
Anne O. Peschel, George Tsalis, Kristina Thomsen, Lars Esbjerg, Klaus G. Grunert
Aarhus University, Aarhus, Denmark

14.45-15.15 In the Foyer — ***Coffee Break***

15.15-16.45

The Auditorium "Perspektivet"

Parallel session 3-1: Healthy Eating

Chair: Maija Kantola, University of Vaasa

Instruments for promoting healthy food products – a mixed-method approach
Pawel Bryla
University of Lodz, Lodz, Poland

Conceptualization and item development for a healthy cooking scale
Jennifer Yang, Joerg Koenigstorfer
Technical University of Munich, Munich, Germany
Hans Baumgartner
Pennsylvania State University, State College, USA

Attitude strength and intention to consume functional food in Norway
Bjørn Tore Nystrand
Møreforskning, Ålesund, Norway.
Svein Ottar Olsen
UIT The Arcitc University of Norway, Tromsø, Norway

The moderating effect of consumption motivations on hedonic eating simulation and (un)healthy food experience
Maija Kantola, Harri Luomala
University of Vaasa, Vaasa, Finland
Terhi Junkkari
Seinäjoki University of Applied Sciences, Seinäjoki, Finland
Anu Hopia
University of Turku, Turku, Finland

Room 02.217
"Innovatøren"

Parallel session 3-2: Farming and Production

Chair: Javier Cantillo, Norwegian University of Science and Technology

From leaf to cup: Economic dynamics and safety aspects in the herbal tea supply chain
Roberto Carbone, Giuseppe Antonio Di Vita, Mario D'Amico, Daniela Ivana Spina
University of Catania, Catania, Italy

Describing sustainability: Triangulating the use of B Corp certification
Jackson Sturtevant, Neal Hooker
Ohio State University, Columbus, USA

Oregon's farm direct marketing law: Reimagined food safety regulations to expand regional marketing and food access
Christy Anderson Brekken, Lauren Gwin
Oregon State University, Corvallis, USA

Finding synergies between fish farmers and fish feed manufacturers to facilitate more sustainable choices
Javier Cantillo, Paritosh Deshpande, Tone Moe Samdahl
Norwegian University of Science and Technology, Trondheim, Norway

16.45-17.30

The Auditorium
"Perspektivet"

Session 4: Methodology I

Chair: Lisa Mohebati, University of Surrey

Harmonizing self-report measures in food consumer science
Morten Heide
Nofima, Tromsø, Norway
Liisa Lähteenmäki
Aarhus University, Aarhus, Denmark

Food and beverage content presented by influencers on TikTok
Andrzej Szymkowiak, Mateusz Badzian
Poznań University of Economics and Business, Poznan, Poland

How are different options relevant to food consumer science ranked by members of the public in terms of their public benefit? A multi-country exploration
Lisa Mohebati, Charo Hodgkins, Monique Raats, Lada Timotijevic
University of Surrey, Guildford, United Kingdom
Elisa Iori
University of Bologna, Bologna, Italy
Morten Haugaard, Violeta Stancu
Aarhus University, Aarhus, Denmark.
Javier de la Cueva
Javier de la Cueva Law, Madrid, Spain.
Patrik Rovny, Erik Jansto
Slovak University of Agriculture, Nitra, Slovakia
Clara Mehlhose, Alina Schafer, Isabelle Weiss
University of Göttingen, Göttingen, Germany

Thursday, June 20

09.00-10.30

The Auditorium "Perspektivet"

Parallel Session 5-1: Sustainable Consumption II

Chair: Anne-Katrin Kleih, Hochschule Geisenheim University

Recent consumer perspectives on organic food markets
Katrin Zander
University of Kassel, Kassel, Germany

Sustainable last-mile delivery: A systematic review of behavioural studies
Frode Alfnes, Jens Bengtsson
Norwegian University of Life Sciences, Aas, Norway
Nora Ytreberg
Cicero, Oslo, Norway
Marta Biancolin, Lucia Rotaris
University of Trieste, Trieste, Italy

Climate concerns and dietary habits go hand in hand – but the development towards climate-friendly food is slow. A study combining stated and observed preferences
Sigrid Denver, Tove Christensen
University of Copenhagen, Frederiksberg, Denmark

Sustainable and consumer friendly packaging for fresh potted herbs - initial findings from consumer focus groups
Anne-Katrin Kleih, Kai Sparke
Hochschule Geisenheim University, Geisenheim, Germany

Room 02.217 "Innovatøren"

Parallel Session 5-2: Consumer Behaviour and Seafood II

Chair: Siril Alm, UiT The Arctic University of Norway

The complexity of sustainable food production: The case of high-end haddock products
Ove Johansen, Geir Sogn-Grundvåg, Ingrid Kristine Pettersen
Nofima, Tromsø, Norway
Julia Bronnmann
University of Southern Denmark, Odense, Denmark

Rethinking and recovering the 3 R's (Reduce, Reuse and Recycle) for sustainable seafood
Mohammed Ziaul Hoque, Imtiaz Uddin Chowdhury, Samina Afrin
University of Chittagong, Chittagong, Bangladesh

Consumers' intention to buy low trophic aquaculture products: An exploratory study of European food-related lifestyle segments
Sezgin Tunca, Karen Brunsø
Aarhus University, Aarhus, Denmark
Mausam Budhathoki
University of Stirling, Stirling, United Kingdom

Seaweed – not only for food innovative consumers
Siril Alm
UiT The Arctic University of Norway, Tromsø, Norway
Bjørn Tore Nystrand
Møreforsking, Ålesund, Norway
Florent Govaerts
Nofima, Tromsø, Norway

10.30-11.00 In the Foyer	***Coffee break***
11.00-12.30 The Auditorium "Perspektivet"	**Parallel Session 6-1: Food Quality Perception II** Chair: Maria Frostling, Stockholm University

Consumers' preferences for Kosher pálinka: Insights from an economic experiment
Ágoston Temesi, Tamás Harci, Brigitta Unger-Plasek, Zoltán Lakner, Bendegúz László Nagy
Hungarian University of Agriculture and Life Sciences, Budapest, Hungary
Riccardo Vecchio
University of Naples Frederico II, Naples, Italy

Valuing the bond: Unravelling German consumer segments for 'cow-calf contact system' products from dairy farms via cluster analysis
Flora von Steimker, Sarah Kühl
Georg-August-University of Göttingen, Göttingen, Germany

Consumer trust in information about CBD and hemp food products
Jane Kolodinsky, Hannah Lacasse, Jeff Buzas, Heather Darby
University of Vermont, Burlington VT, USA
Rebecca Hill
Colorado State University, Fort Collins CO, USA
Tyler Mark, Will Snell, Jonathan Shepherd, Yuqing Zheng
University of Kentucky, Lexington, KY, USA

Distaste as a way of constructing identity – empirical observations from young adults in Stockholm
Maria Frostling
Stockholm University, Stockholm, Sweden

Room 02.217 "Innovatøren"	**Parallel Session 6-2: Meat reduction, Alternative Protein and Plant-based Food II** Chair: Stavroula Ziavras, The American College of Greece

Do ingredients matter? Exploring consumer preference for abstract vs. concrete descriptors of plant-based meat and dairy alternatives
Sophie-Dorothe Lieke, Ainslee Erhard
University of Göttingen, Göttingen, Germany
Stacia Stetkiewicz
University of Nottingham, Nottingham, United Kingdom

Beyond the ocean: Understanding consumer preferences, market challenges and policy implications for cell-cultivated salmon
Olesya Savchenko, Abhishek Rajan
University of Florida, Gainesville, USA
Kelly Davidson, John Bernard
University of Delaware, Newark, USA

Sensitive nudges to decrease meat consumption: Effectiveness of information treatments from a repetitive assessment trial
Antje Risius, Marlene Ohlau
University of Göttingen, Göttingen, Germany
Aspasia Werner
Thünen Institute, Braunschweig, Germany
Anja Köbrich-Leon, Janosch Schobin
University of Kassel, Kassel, Germany

Breaking bug! Exploring advertising strategies to overcome cultural barriers in entomophagy acceptance
Stavroula Ziavras, Georgia Miliopoulou, Athanasios Krystallis
The American College of Greece (ACG), Athens, Greece

12.30-13.30 ***Lunch***
In the Canteen

13.30-15.00

The Auditorium "Perspektivet"

Parallel Session 7-1: Local Food

Chair: Lijun Angelia Chen, University of Florida

Consumer preferences for pasture-raised local beef meat in restaurants: Are they willing to eat and pay and, why?
Azucena Gracia, Ana Isabel Sanjuán
Centro de Investigación y Tecnología Agroalimentaria de Aragón (CITA), Zaragoza, Spain

Connecting consumers with local produce: Insights for a local food provisioning app
Juliet Memery, Jeff Bray
Bournemouth University, Bournemouth, United Kingdom
Maxime Michaud, Fairley Le Moal
Institut Lyfe, Lyon, France
Esther Van Parys, Hans De Steur
Ghent University, Ghent, Belgium
Djamel Rahmani
CREDA (Centre for Agrofood Economics and Development
Vinko Lešić
University of Zagreb, Zagreb, Croatia
Ádám Tarcsi
ELTE, Budapest, Hungary
Barbara Ronge
Ronge & Partner, Baden, Austria

Is the juice worth the squeeze? Supply chain mapping and marketing margins for the Florida orange juice industry
Ikeoluwa Aregbe, Lijun Chen, Derek Farnsworth
University of Florida, Gainesville, USA

Buying into state affinity: The influence of affinity, egoistic, and altruistic considerations on behavioural intention toward state-sponsored marketing programs
Lijun Angelia Chen, Bachir Kassas, Kimberly Morgan
University of Florida, Gainesville, USA
Shuoli Zhao
University of Kentucky, Lexington, USA.
Alexandre Magnier
Florida Gulf Coast University, Fort Myers, USA

Room 02.217
"Innovatøren"

Parallel Session 7-2: Consumer Decision Making

Chair: Seda Erdem, University of Sterling

Politics, religion and produce: The effects of religion and religiosity on US consumers' perceptions and willingness to pay for imported produce from protagonistic and antagonistic countries of origin
David Just
Cornell University, Ithaca, USA
Amir Heiman
Hebrew University, Jerusalem, Israel
Elena Krasovskaia
Cornell University, Ithaca, USA

Strategic assessment of tiered private label programs
Mark Lang
University of Tampa, Tampa, USA
Peter Larmann
Saint Joseph's University, Philadelphia, USA
Jeffrey M. Campbell
College of Hospitality, Retail and Sport Management, The University of South Carolina, Columbia, SC, USA

Buzzworthy choices: Comparative insights into honey purchasing factors in Slovakia and Hungary
Peter Šedík, Titanilla Oravecz
Slovak University of Agriculture in Nitra, Nitra, Slovakia
Marián Čvirik
University of Economics in Bratislava, Bratislava, Slovakia
Kristína Predanócyová
Budapest Business University, Budapest, Hungary

Does mortality salience influence takeaway food preferences?
Seda Erdem
University of Stirling, Stirling, United Kingdom

15.00-15.30 In the Foyer — ***Coffee Break***

15.30-16.40

The Auditorium "Perspektivet"

Session 8: Methodology II

Chair: Ellen van Kleef, Wageningen University

Towards understanding the food related eco-guilt – a scale validation for measurement
Brigitta Unger-Plasek, Ágoston Temesi, Zoltán Lakner
Hungarian University of Agriculture and Life Sciences, Gödöllő, Hungary

Integrating affective computing into food marketing research: Understanding consumer emotions with machine-learning models
Taylor Jing Wen
University of South Carolina, Columbia, USA
Sar Sela
University of Illinois, Urbana-Champaign, USA
Joseph Yun
University of Pittsburgh, Pittsburgh, USA
George Anghelcev
Northwestern University in Qatar, Doha, Qatar

Understanding food consumer behaviour through simultaneous measurements of implicit measures and data integration
Ellen van Kleef, Yueh Meng, Hans van Trijp
Wageningen University, Wageningen, Netherlands

16.40-17.00

The Auditorium "Perspektivet"

Closing session

Karen Brunsø
Aarhus University, Aarhus, Denmark
Athanasios Krystallis
The American College of Greece, Athens, Greece

19.00-21.00

Closing Reception and Awards

Clarion Hotel The Edge
Kaigata 6, 9008 Tromsø

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Politics, religion and produce: The effects of religion and religiosity on U.S. consumer's perceptions and willingness to pay for imported produce from protagonistic and antagonistic countries of origin

David Just[1], Amir Heiman[2], Elena Krasovskaia[3]

[1]Cornell university, Ithaca, USA. [2]Hebrew University, Jerusalem, Israel. [3]Cornell University, Ithaca, USA

Abstract

This study examines the moderating role of religious beliefs on American residents' perceptions and willingness to purchase fresh produce that is imported from countries of origin (COOs) that may or may not be in conflict with the home country. Religious beliefs are an important part of cultural and group identities and, therefore are assumed to affect moral and ethical purchasing considerations. Despite the growing importance of religiosity, its effects on preference for local produce and imports from COOs with specific characteristics is an under researched area. Toward this end, we surveyed 10,049 US consumers. The survey measured consumers' willingness to pay for grapes, a commodity food product, which allows us to control for quality differences between countries when a country-of-origin label (COOL) is present. Responders were asked about their willingness to pay for grapes from the following countries: Canada, Mexico, the United Kingdom, Russia, Israel, and the Palestinian Authority. Prices were anchored with a base price for U.S.-grown grapes. In addition, we collected information about responders' demographics, religion, and intensity of religious beliefs and attitudes. We find significant differences in willingness to pay for grapes across origin countries. Furthermore, we find that religiosity modifies the relationship between willingness to pay for grapes and COO in ways that suggest moral judgments.

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The effect of information on production characteristics on willingness to pay for broiler and pork products

Klaus G Grunert[1], Line Ahm Mielby[2]

[1]Aarhus University, Aarhus, Denmark. [2]Danish Technological Institute, Aarhus, Denmark

Abstract

Subjects tasted three different samples of broiler meat, differing on parameters relating to space allowance, breed, feed and environmental enrichment. Samples were first tasted blind, and then with short accompanying texts describing the production protocol. Participants rated liking of different aspects of sensory appearance, overall liking, and moral satisfaction while eating the meat. Willingness to pay was measured by an anchored contingent valuation method. The design for the pork meat followed the same pattern. Preliminary results show that the information provided increased willingness to pay, whereas the type of meat had no influence. Serial mediation analysis shows that the effect of the information on willingness to pay is mediated by both sensory liking and moral satisfaction, and that the effect of the information on sensory liking is in turn partly mediated by moral satisfaction. The results underline the importance of information on how meat is produced for consumer liking and willingness to pay,

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Strategic assessment of tiered private label programs

Mark Lang[1], Peter Larmann[2], Jeffrey M. Campbell[3]

[1]The University of Tampa, Tampa, USA. [2]Saint Joseph's University, Philadelphia, USA. [3]College of Hospitality, Retail and Sport Management, The University of South Carolina, Columbia, SC, USA

Abstract

Private Label products remain an important merchandising strategy for supermarkets around the world. Retail executives constantly seek ways to leverage these Private Label programs. One way is tiered Private Label programs which have taken root in the United States following in the footsteps of successful tiered Private Label programs in Western Europe and Canada. Recent literature and industry reports have affirmed the adoption of these tiered Private Label programs among numerous retailers across the United States. In particular, tiered Private Label programs have been observed in literature and also cited as sources of future Private Label growth according to industry reports. There is, however, limited analysis in the literature of the effectiveness of these tiered Private Label programs in the scope of a total supermarket. This study presents analysis around the significant effects that these tiered Private Label programs have on measures of shopper loyalty and store performance. Shopper loyalty and store performance are at the core of a retail business. Two sets of analyses were completed. An ANCOVA model and an ANOVA model were both run in order to show the effects that upper tier Private Label has on determinant measures of shopper loyalty and store performance through different methods of household tier classification. Both analyses provided in this study utilize over 240,000 households of loyalty card POS shopping basket data to capture purchase behaviors from shoppers. The ANCOVA and ANOVA analyses both show the effect that upper tier Private Label has on determinant measures of shopper loyalty and store performance. This study presents strategic insight for retail executives to gauge the effectiveness of their own tiered Private Label programs and contributes to prior literature surrounding Private Label and its relationships with shopper loyalty and store performance.

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How do consumer segments respond to fish welfare issues?

Themistoklis Altintzoglou, Florent Govaerts

Nofima, Tromsø, Norway

Abstract

This study aims to identify consumer segments based on their involvement, social norms and subjective knowledge. The study defines how they differ in their attitudes, perceived attributes, and willingness to pay for fish with improved welfare.

This study is based on a consumer survey of a representative sample of 630 participants from Norway. A segmentation analysis took place to identify consumer groups regarding involvement, social norms and subjective knowledge. The groups were compared using one-way ANOVA to identify significant differences in their attitudes, perceived attributes, and willingness to pay for fish with improved welfare.

This study identifies three consumer groups: engaged (40%), conformist (46%), and detached (14%). The engaged group is most willing to pay for fish with better welfare and has the most positive perception of fish with better welfare. The engaged group is characterised by its higher animal welfare involvement, higher knowledge, and higher feeling of social pressure towards buying fish with better welfare. There are socio-demographic distinctions, with the engaged group having higher education levels. The engaged group consumes more fish, while the detached group consumes less fish and more red meat. The results highlight that consumer involvement, social norms, and knowledge they differ in willingness to pay and perceptions of fish welfare products.

The study suggests that increased public awareness about and involvement with fish welfare may lead to higher social norms and support for better welfare practices.

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Consumer intention to buy products containing fish with better welfare: The role of empathy in an extended value–belief–norm model

Florent Govaerts, Themistoklis Altintzoglou

Nofima, Tromsø, Norway

Abstract

A few studies have aimed at understanding behavior towards animal welfare. However, there are indications that consumers make an important distinction between land animals and fish. As no studies have attempted to explain the factors that influence consumer behavior towards the welfare of fish, this study aims to explain the behavior using the value–belief–norm (VBN) model. In addition, we extend the model by using empathy as a factor influencing the formation of personal norms. This study argues that by adding empathy in the model, we will improve the ability of the VBN to explain moral behavior. Practically, this study explores consumers' beliefs towards fish welfare and identifies consumers who are more likely to purchase products containing fish with better welfare based on their values.

The study is based on survey data from 416 Norwegian consumers. A structural equation modelling analysis with latent constructs is used to test the hypotheses.

The findings validate the ability of the VBN model to explain consumer intention to buy products containing fish with better welfare. We also showed that empathy and beliefs strongly influence personal norm. Consumers with biospheric values are strongly likely to have empathetic feelings towards fish suffering and believe that fish can feel pain. However, consumers with hedonistic values are significantly negatively related to beliefs and empathy.

By understanding the role of empathy, companies can develop marketing strategies that appeal to consumers' values, empathy, and beliefs and ultimately encourage them to make purchases that support fish welfare.

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Expected tastiness, moral satisfaction, life satisfaction and compensational behavior of young people in different real life choice-no choice-settings in the context of climate-sensitive food information.

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Abstract

Background

The number of vegetarians and vegans worldwide is 1.5 billion, most of them living in India. In Germany only about 12% of the people are vegetarian or vegan (BMEL, 2022). Another 18% of the German population considers itself as flexitarians (BMEL, 2022).

In our previous studies, using a sample of 718 young people (age 16 to 26), we had 27.4% vegetarians and vegans. This may indicate that the protein transition is mainly taking place in the segment of young people that are willing to reduce meat on a free will basis, but are not committed to change to the plant-based lifestyle (Schober-Schmutz,2022).

We also showed how important the possibility to choose the food components was to the young people (Schober-Schmutz, 2022). Therefore, it is very urgent to do research in school kitchens and community canteens that banned meat 100% from the menu and force the incoming people to eat vegetarian, no matter to which eating-style they are committed to. It is assumed that this action could block young people`s will to change to plant-based food and jeopardize the protein transition.

A real-life study with three different meal choice settings was experimentally administered: (1) mixed meat and plant-based food buffet (n=98), (2) vegetarian 1 meal buffet (n= 298), (3) vegetarian 2 meals buffet (n=318). The participants were young people in a gap year living in the castle for a one-week-coursework and their employer chose to order only vegetarian/vegan food for the whole week.

In the first setting, the designated meat-eaters had the choice to try vegetarian food, but were not forced to do so. In the second setting, there was only one vegetarian meal and no choice. In the third setting, they would have again no choice of meat, but could choose between 2 different vegetarian/vegan meals .

The fact that it is not possible to opt for meat can lead to the feeling of being deprived. Deprivation leads to cognitive dissonance (Festinger, 1975, Garms-Homolova, 2020) and reactance (Brehm 1966, Wicklund, 1974), trying to reinstate the loss of freedom by protesting and or by compensation with additional meat-consumption reactance can change into vegan-phobia (Rothgerber, 2018) due to group dynamics such as peer pressure. But it is not clear whether it is the mere lack of choice that the young people react negatively to, or the fact that no meat can be chosen at all. In order to find out, this study compares the setting two and three in regard of acceptance in the group of meat eaters and explored the number of compensational food purchases.

Furthermore, we tested how young people rated tastiness of vegetarian food in general and how they experienced the tastiness of the food presented to them, because taste is the major driver of food choice due to the immediate reward (Grunert,2023). Positive experience or expectation of tastiness of vegetarian food can enhance the learning of sustainable eating whereas negative expectation or experience can prevent from changing the eating-style to plant-based.

Being forced to eat vegetarian meals can also refute expectations that vegetarian meals can be tasty and thus inhibit the individual change to plant-based eating styles.

Methodology

In this study we provided three different lunch-buffet-constellations to a group of 718 participants aged 16-25, average 18.6 years old, 65% female und 24.5 % vegetarians or vegan.

Every person could order each meal component every day by filling out an online questionnaire with their own smart phone the day before. A survey was administered at the end of a 4 day stay to the following three groups.

1. Mixed meat and plant-based food buffet N= 98
2. Vegetarian 1 meal buffet. N= 298
3. Vegetarian 2 meals buffet N=318

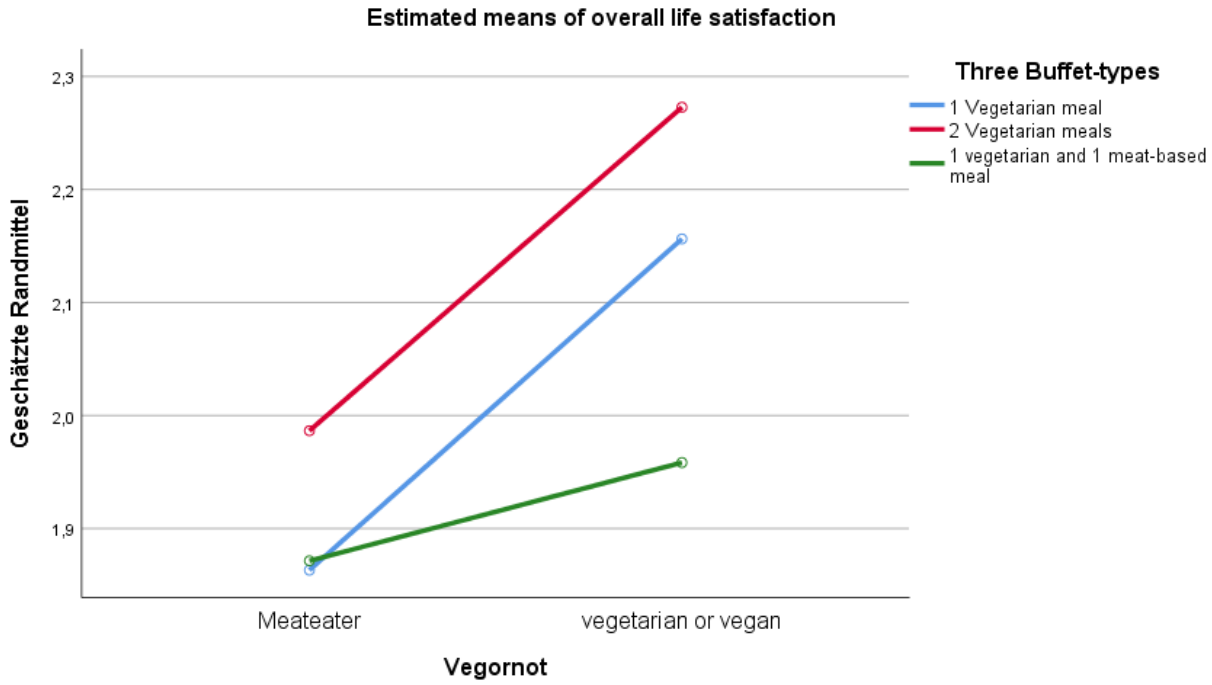
The incoming groups had a size of 22 -28 people and their weekly meal-plan was always the same from Monday through Friday.

The differences in *Expected tastiness of vegetarian food* in general (average of 2 Likert-scale items) and *Experienced tastiness of the food just consumed for the last week (4 Point Likert-scale), moral satisfaction and* Overall life satisfaction (5 point Likert-scale) were tested with ANOVAS for the two self-reported eating-styles (vegetarian/vegan and meat-based).

Results

We found that meat-eaters were buying additional meat/food significantly more than vegetarians (t=2,63, df 82,2, p=0,01). Some of them even bought additional expensive protein-rich shakes in the fitness studio. But all the differences between buffet-types were not significant.

In the sample of young people, who were forced to eat vegetarian lunches, individuals who classified themselves as vegetarians or vegans, were significantly more satisfied with life in general than individuals that were forced to change their eating-style for this very week (Chi2=15.696, df=6, p=0.015). The fact of two vegetarian meals did not increase their satisfaction with life.

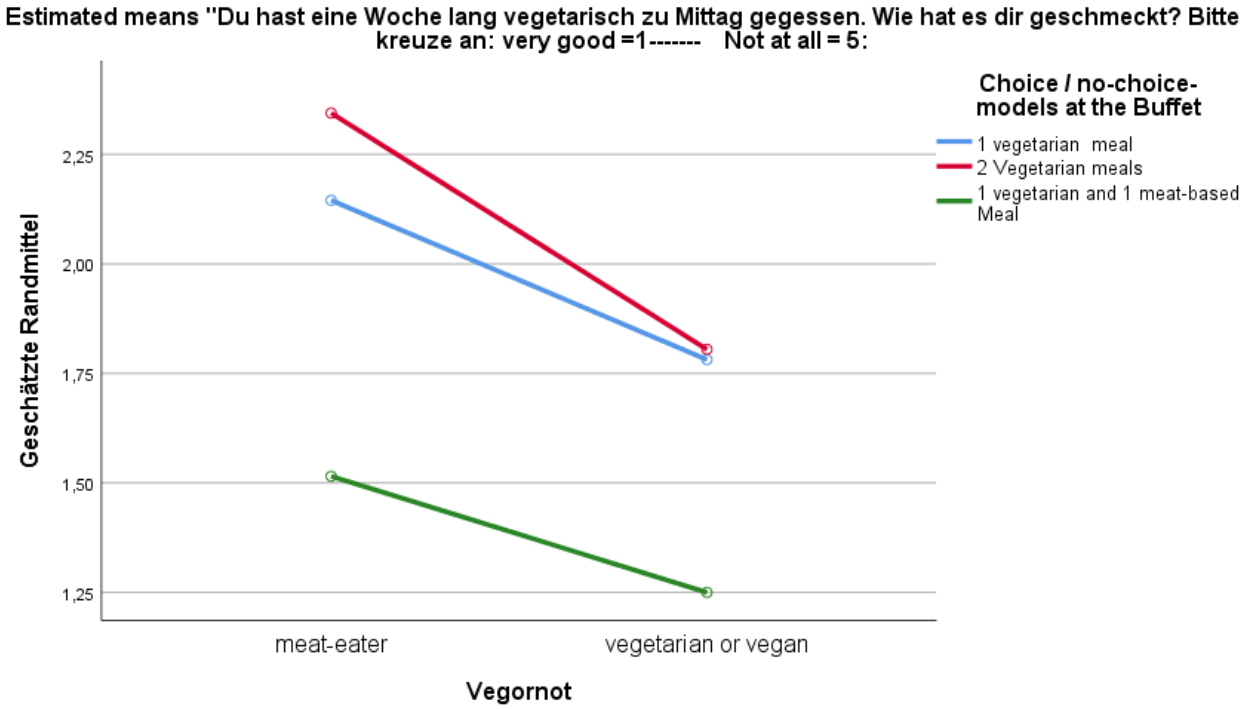


Test of inbetween subject effects Overall Life Satisfaction					
Dependent variable 1 very satified 5 not at all satisfied: Was würdest du sagen: Bist du mit deinem Leben im Allgemeinen zufrieden?					
Quelle	Quadratsumme vom Typ III	Df	Mittel der Quadrate	F	Sig.
Korrigiertes Modell	12,609[a]	5	2,522	2,861	,014
Konstanter Term	1612,573	1	1612,573	1829,427	,000
Vegornot	4,882	1	4,882	5,538	,019
Buffetangebot	3,125	2	1,562	1,773	,171
Vegornot * Buffetangebot	,637	2	,318	,361	,697
Fehler	588,818	668	,881		
Gesamt	3269,500	674			
Korrigierte Gesamtvariation	601,427	673			
a. R-Quadrat = ,021 (korrigiertes R-Quadrat = ,014)					

Post hoc tests Bonferroni and Tukey –HSD are all insignificant.

The actual taste experience

The experienced tastiness was significantly different between the mixed buffet and the vegetarian buffets. Meat-based probands reported they like their meal better in mixed buffets with a choice of meat and whether 2 or one vegetarian meal offered was no significant difference (t=7,433 df 392 p=0,00). The vegetarian guests seemed to have no significant better experience with the meals, when meat was served, but one or two vegetarian meals did not make a difference.



Test of in-between-subject effects of "experienced tastiness"					
Abhängige Variable: Du hast eine Woche lang vegetarisch zu Mittag gegessen. Wie hat es dir geschmeckt? Bitte kreuze an:					
Quelle	Quadratsumme vom Typ III	df	Mittel der Quadrate	F	Sig.
Korrigiertes Modell	64,979[a]	5	12,996	18,054	,000
Konstanter Term	1286,511	1	1286,511	1787,303	,000
Vegornot	14,942	1	14,942	20,758	,000
Buffetangebot	26,286	2	13,143	18,259	,000
Vegornot * Buffetangebot	1,435	2	,717	,997	,370
Fehler	470,753	654	,720		
Gesamt	3250,250	660			
Korrigierte Gesamtvariation	535,731	659			
a. R-Quadrat = ,121 (korrigiertes R-Quadrat = ,115)					

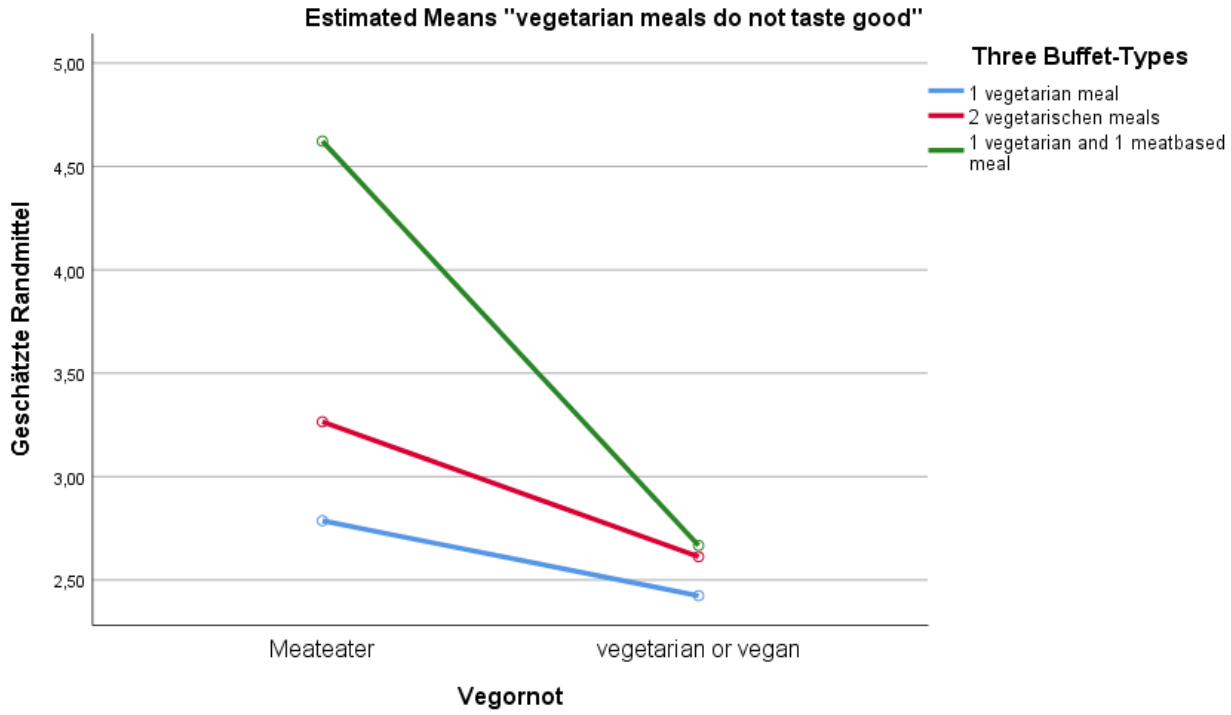
The vegetarians and vegans evaluated the tastiness of vegetarian meals as significantly better than the meat-eaters who had been forced into consuming vegetarian food (Ch2=15.058, df=4, p=0-05).

Even more significantly, the non-vegetarians expected vegetarian food generally to be less tasty. One could theorize that the fact of having a choice would lead to more positive taste experience or expectation of the tastiness of vegetarian food in general.

Expectations about the tastiness of vegetarian food differed between meat eaters and vegetarians, but also according to whether there was a choice or not (ANOVA, both main effects and interaction significant, all p's<.01). However, the fact that there were 2 vegetarian meals to choose from did not significantly change the expected tastiness of vegetarian food.

Vegetarians did not agree that vegetarian food is not tasty, no matter whether they had a meat/nonmeat-choice of food or not. The meat-eaters were - as expected - agreeing widely to the statement. However, in the case of compulsory vegetarian lunch the meat-eaters` expectation of tastiness of vegetarian food became significantly more positive. It seems that some of the negative expectations were adjusted on the basis of the actual experience.

The buffet with 2 vegetarian meals again had only little and not significant bettering effects on the expectation of the tastiness of vegetarian food.



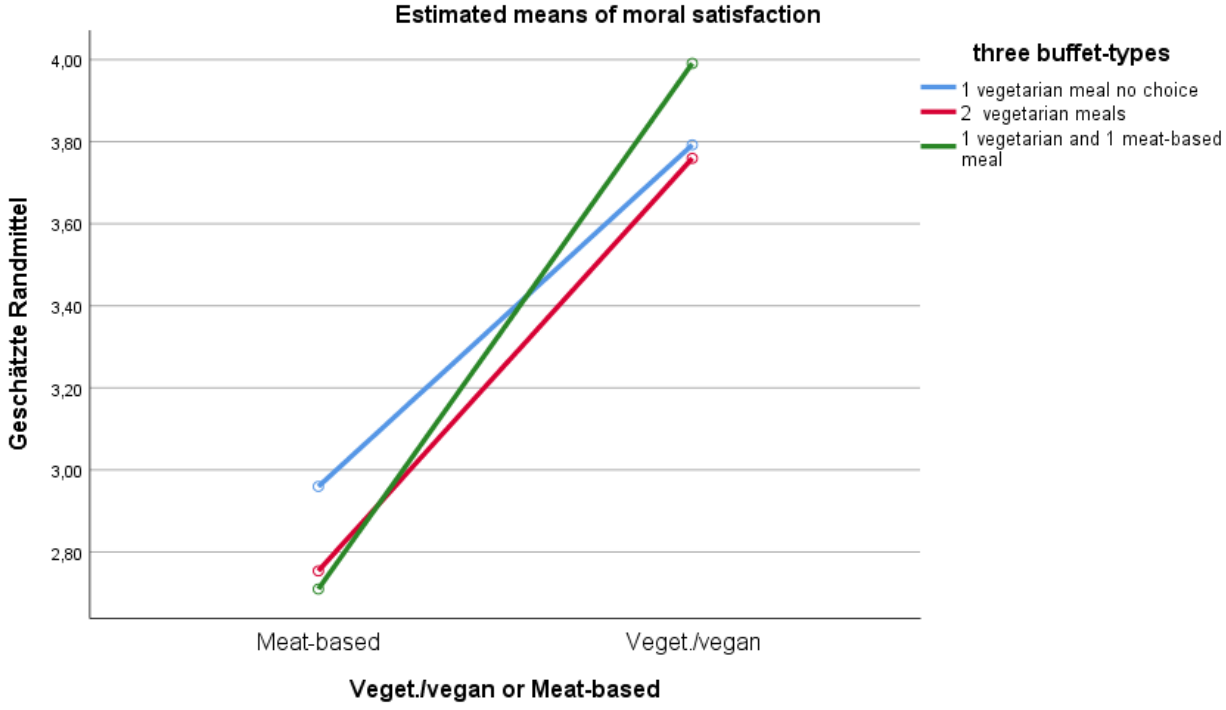
Tests of in-between-subject-effects					
vegetarian meals do not taste good: vegmealnotgoodtastenurvegbuffet					
Quelle	Quadratsumme vom Typ III	df	Mittel der Quadrate	F	Sig.
Korrigiertes Modell	97,915[a]	5	19,583	11,719	,000
Konstanter Term	773,024	1	773,024	462,587	,000
Vegornot	20,203	1	20,203	12,090	,001
Buffetangebot	19,309	2	9,654	5,777	,003
Vegornot * Buffetangebot	7,319	2	3,660	2,190	,113
Fehler	927,454	555	1,671		
Gesamt	5922,528	561			
Korrigierte Gesamtvariation	1025,369	560			

1. R-Quadrat = ,095 (korrigiertes R-Quadrat = ,087)

Moral satisfaction was as expected higher in the case of vegetarians and vegans than in the case of meat-eaters, but there was no significant difference in the meat-eater-group in the different buffet-settings.

As there was an informational impulse on nutrition and climate, we also had the possibility to compare groups with the climate input against those without. There was no significant effect

of moral satisfaction. Moral appellations in the context of climate information are not yielding at changes in food choice in favor of the protein transition.



Conclusion

This study is embedded in the big question of how we can enhance sustainable eating and the protein transition at the individual level.

Based on the results it is recommended to offer a no meat choice on the public kitchen on a regular basis, because only by being forced into the real experience of vegetarian food the meat eater change their expectation of the tastiness of vegetarian food to the positive and bring it to an attitudinal level.

Thereby a second vegetarian meal does not have significant impact on the change of the expected tastiness of vegetarian meals in future but there is a negative impact on the actual tastiness experience of the vegetarian buffet. It seems that only one vegetarian meal is bringing up the necessity of meeting the hunger but two vegetarian meals on the buffet are surcharging and emphasizing the vegetarian offer for the meat eaters. The compensational food purchases show that the meat-eaters go and buy meat, when offered vegetarian buffets no matter whether there are one or two meals offered.

As the young people in the study do not earn more than a pocket money the need for meat seems to be very substantial. The meat-eaters are not only in need of the meat taste, but they seem to have a subconscious impression of being under-nourished for the day. That is why more research should be done in the subconscious perception of being well fed and on the food illiteracy of young educated people on how to get i.e. proteins from plant-based food.

In the castle we think now about educating the young people with climate-friendly, CO2 labelled buffets on different topics such as: Health buffet with emphasis on vitamins, muscle-buffet focusing on proteins and power-food focusing on plant-based food with proteins of high value.

A second recommendation for buffet settings would be to offer a mixed meat- and plant-based buffet, but the meat would be an add on side order for extra pay. This brings about a separate decision-making process for the meat component and can be accompanied with separate information such as nutrients (protein) and carbon footprint origin of production and biological raising.

Further research has to be done in the psychological aspects of the saturation of individuals. Replacement of their meat and psychological satisfaction instead of deprivation with plant-based meals has to be achieved in new ways. This would not only help the individual but also the societal health costs due to malnutrition. (WHO 2024 and BMEL 2021)

The results on moral satisfaction should be implemented in nutritional communication campaigns. Moral appellation has to be tested against an appellation for health oder animalwelfare.

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Emotion over information: How the affect heuristic shape consumers' attitudes towards sustainable technological innovations

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Abstract

The affect heuristic posits that individuals frequently base their risk assessments on emotional reactions rather than detailed knowledge, especially when encountering new technologies. This idea diverges from the prevalent belief in innovation studies that risk perceptions are mainly informed by factual understanding, not feelings. This research investigates the influence of the affect heuristic on how consumers perceive sustainable technological innovations, revealing that emotions significantly influence evaluations of risks and benefits. Technologies that trigger strong emotions, whether positive or negative, lead to more intense risk and benefit assessments. Interestingly, personal knowledge about technology amplifies this effect, paradoxically affecting efforts towards sustainability. This study broadens our comprehension of consumer evaluations of sustainable technological innovations through the affect heuristic, provides valuable implications for marketing strategies, and suggests new avenues for investigating sustainable technology advancements.

Key Contributions

This study examines the role of affect heuristics in shaping consumers' initial attitudes towards sustainable technological innovations, specifically how emotional responses and subjective knowledge influence perceptions of risks and benefits. It highlights the significant impact of affect heuristics on the evaluation process, marking a departure from traditional models that prioritize cognitive over emotional assessments. By exploring the interplay between emotion, knowledge, and risk-benefit perception, this research offers a deeper insight into consumer decision-making. This contributes to a broader understanding of how emotional and cognitive factors combine to form attitudes towards new technologies, emphasizing the overlooked yet crucial role of emotions in risk assessment.

From a managerial standpoint, this research underscores the importance of crafting marketing strategies for sustainable technologies that tap into consumers' emotional responses. Emotionally driven marketing can enhance positive perceptions and foster the acceptance and adoption of sustainable innovations. However, marketers must be cautious of inducing overly positive biases that could skew consumer perception. Ensuring a balanced approach in promoting sustainable technologies is crucial for genuinely advancing sustainability goals. Furthermore, these insights can aid policymakers and governmental bodies in designing effective social marketing campaigns and policies that support sustainable development objectives, by understanding the pivotal role of emotions in consumer acceptance of sustainable innovations.

Motivation and Background

Sustainable Technology Innovations in Food Systems

Sustainable development aims to reduce negative impacts from food and beverage production on the environment, economy, and society (Capozzi, Fragasso, & Bimbo, 2021; United Nations, 2022). Facing challenges like population growth, increased nutrient demand, and shrinking agricultural land, sustainable technology innovations are crucial for creating more efficient and environmentally friendly food systems (FAO, 2022; McClements, 2020). Sustainable technology innovation, as precision fermentation, shows promise for revolutionizing food production by creating animal-free dairy products using genetically modified organisms (GMOs), highlighting the potential for such technologies to transform food systems (Tubb & Seba, 2021; Banovic & Grunert, 2023). However, the success of these innovations ultimately hinges on consumer acceptance, as perceptions and decisions regarding new food technologies play a critical role in their market viability (Banovic & Grunert, 2023; Conroy & Errmann, 2023; Just & Goddard, 2023).

The Affect Heuristic in Consumer Decision-Making

The investigation into the affect heuristic's role in evaluating sustainable technology innovations, particularly those involving GMOs, stems from an increasing acknowledgment of its importance in consumer decision-making (e.g., Nagaya & Shimizu, 2023; Banovic & Grunert, 2023). Research highlights that emotional reactions, traditionally underestimated in risk assessments, are pivotal in forming opinions about new technologies (e.g. King & Slovic, 2014). This research direction is vital for a deeper understanding of consumer behavior towards sustainable innovations and for tailoring marketing strategies to align with consumers' emotional responses. Foundational studies by Fischhoff et al. (1978), Slovic (1987), and further work by Alhakami and Slovic (1994) and Finucane et al. (2000) underline the impact of emotions on risk and benefit perceptions, emphasizing the affect heuristic's role in consumer attitudes towards sustainable technologies.

Conceptual Framework

This research posits that when evaluating sustainable technology innovations, consumers may base their assessments of risks and benefits on their emotional reactions, thereby developing more favorable views on technologies they perceive as less risky and more beneficial (RQ1). This dynamic could be amplified or diminished by the individual's subjective understanding of the technology's sustainability (RQ2, as illustrated in Figure 1). Consequently, the study examines how emotional considerations might influence initial risk-benefit evaluations and subsequently affect overall attitudes towards sustainable technologies.

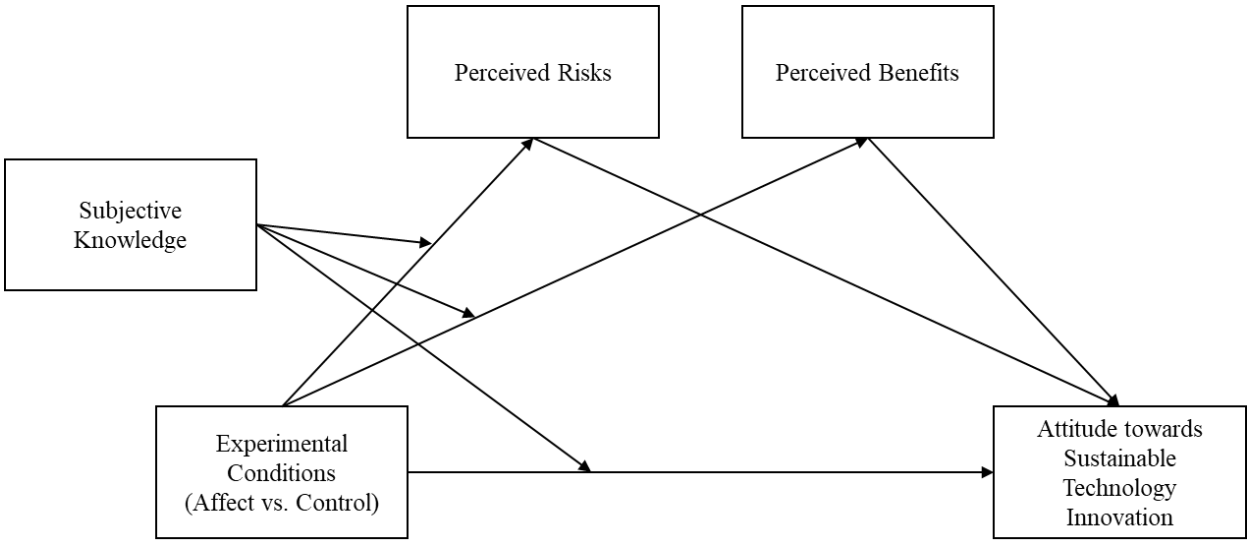

Figure 1. Conceptual framework.

Studies

Study 1

Method**:** In Study 1, participants (N = 365; 54% female; average age 43) were divided into two groups for an online experiment to evaluate a sustainable technology innovation: one group was exposed to an emotionally charged ad (affect heuristic condition) and the other to a control condition. This setup was designed to investigate the impact of the affect heuristic on participants' assessments of risks and benefits, as well as their attitudes towards a technological innovation. The study focused on precision fermentation technology, specifically its use of GMOs, due to its innovative yet controversial nature - balancing efficiency and sustainability against safety and ethical concerns. Participants' perceptions of risks and benefits were measured with two scales adapted from Banovic and Grunert (2023), and their overall attitude towards the technology was assessed on a three-item, seven-point scale (bad/good; unfavorable/favorable; negative/positive), aiming to understand the influence of emotional reactions on their evaluations, as guided by the affect heuristic.

Results**:**The results show significant correlations between perceived risks and benefits of technology innovation, both generally and within each specific condition. In the control group, the negative correlation between risk and benefits was stronger (-0.37, $p < 0.001$) compared to the affect group (-0.18, $p < 0.001$). Further analysis showed notable differences in risk and benefit evaluations across the two conditions, with risk evaluations lower (Mcontrol = 4.89, Maffect = 4.13, $t(363) = 4.87$, $p < 0.001$) and benefit evaluations higher in the affect condition (Mcontrol = 3.04, Maffect = 5.20, $t(363) = -20.30$, $p < 0.001$). Consequently, attitudes towards the technology were less favorable in the control condition (Mcontrol = 3.69) compared to the affect condition (Maffect = 5.54, $t(363) = -11.92$, $p < 0.001$).

Discussion**:** Study 1 validated the hypothesis that the affect heuristic plays a significant role in shaping initial risk and benefit evaluations of sustainable technology innovations. It was anticipated that the correlation between risk and benefit perceptions would differ based on the experimental conditions, with participants in the affect heuristic condition relying more on their emotional responses to form these judgments. This reliance on emotional evaluations resulted in smaller negative correlations and larger disparities between the perceived risks and benefits, highlighting the influence of affect in early judgment processes.

Study 2

Method**:** In Study 2, participants (N = 288; 50% female; average age of 46) underwent the same procedure as Study 1, being divided into affect heuristic and control groups. After viewing the sustainable technology ad, their risk and benefit perceptions were assessed using the same items from Study 1, followed by an evaluation of their attitude towards the technology. Additionally, their subjective knowledge about the technology's potential to reduce carbon emissions was determined using nine items (i.e., product categories) on a 100-point scale. This aimed to understand if perceived sustainability knowledge would influence their reliance on emotional evaluations when forming attitudes towards the technology, mediated by their risk and benefit perceptions.

Results**:** The results (Process, Hayes Model 1) show that the affect heuristic significantly influences attitudes towards sustainable technologies ($b = 2.66$, $t = 9.27$, $p < 0.001$), with participants exposed to emotional content showing a stronger preference for the technology ($M_{affect} = 6.06$ vs. $M_{control} = 3.65$). This effect is further enhanced by subjective knowledge about the technology's sustainability, which, when combined with emotional reactions ($b = 0.15$, $t = 2.38$, $p = 0.018$), leads to a stronger reliance on affect in evaluating the technology, thus introducing a positive bias. Additionally, the impact of the affect heuristic on attitudes is mediated by changes in risk and benefit perceptions, with risks being downplayed ($b = -0.83$, $t = -4.31$, $p < 0.001$) and benefits accentuated ($b = 2.00$, $t = 20.31$, $p < 0.001$) in the affective condition. Further, subjective knowledge not only strengthens the link between emotional reactions and attitudes but also influences how risks and benefits are perceived, thereby affecting attitudes towards the technology through a mediated moderation effect (risks: mediated moderation index = -0.01 CI 95% [-0.0161, -0.0043]; benefits: mediated moderation index = 0.01 CI 95% [0.0020, 0.0198]).

Discussion**:** Study 2 confirmed that the affect heuristic significantly influences both the assessment of risks and benefits and the overall attitudes towards sustainable technology innovations. This influence is further magnified by subjective knowledge about the sustainability of technology, which intensifies the reliance on affective evaluations in forming initial judgments. However, this interaction leads to a positive bias, indicating a complex relationship between emotional responses, subjective knowledge, and the promotion of sustainability.

Conclusion

The presented studies underscore the pivotal role of the affect heuristic in influencing consumers' initial evaluations of sustainable technology innovations. Study 1 revealed that exposure to an emotionally charged ad led to more favorable perceptions of the technology compared to a control group, highlighting a stronger reliance on affective reactions that diminished negative correlations and amplified differences in perceived risks and benefits. This effect was more pronounced when

the technology elicited strong emotional responses, intensifying risk, and benefit assessments. Study 2 corroborated these results and further demonstrated that the affect heuristic directly shapes positive attitudes towards sustainable technologies. It also found that subjective knowledge about a technology's sustainability strengthens this effect, encouraging a reliance on emotional evaluations which introduces a positive bias that could potentially undermine sustainability efforts. Additionally, subjective knowledge appeared to deepen the reliance on affective evaluations in making initial risk-benefit judgments. In summary, these studies clarify the significant influence of emotional reactions and the complex role of subjective knowledge in forming attitudes towards sustainable technology innovations. This challenges traditional views in innovation research and risk perception, suggesting a need for a deeper, more nuanced appreciation of how consumers navigate judgments about novel sustainable technologies.

Limitations & Further Research

The study highlights several limitations while opening avenues for future research. Firstly, the internal validity is established, but the applicability of these findings in real-world purchasing scenarios remains untested. Field experiments could offer valuable insights into the affect heuristic's impact in actual consumer settings. Secondly, further investigation is needed on how affect-driven attitudes influence consumer behaviors, such as purchasing decisions for products made using sustainable technologies. Thirdly, the studies did not account for cross-cultural differences, which could significantly affect perceptions of risk and benefit in new technologies. Fourthly, exploring strategies to counteract the positive bias from affective evaluations towards sustainable innovations presents another research opportunity. Lastly, examining other heuristics, like the representative or availability heuristic, could enrich our understanding of consumer attitudes towards sustainable technologies.

Implications for Theory and Practice

This study significantly contributes to understanding how the affect heuristic influences consumer evaluations of sustainable technologies, highlighting the interplay between emotional and cognitive assessments of risk and benefit, and their impact on attitudes. It challenges traditional risk-assessment models by emphasizing emotional reactions, a crucial oversight in earlier research. Moreover, it integrates the role of subjective knowledge, noting how it can introduce positive bias into consumer evaluations, offering a nuanced view of how consumers approach sustainable technology innovations.

For marketers and policymakers, the findings suggest that leveraging emotional appeals in communication strategies can enhance consumer receptiveness to sustainable technologies, though it's vital to balance these with credible information to avoid inducing overly positive biases. This approach can aid in marketing sustainable innovations more effectively, ensuring that emotional messaging does not compromise the accurate presentation of technological benefits and risks.

Furthermore, the insights from this research could assist government bodies and policymakers in crafting social marketing initiatives aimed at bolstering consumer acceptance of sustainable innovations, crucial for the widespread adoption and success of such technologies, including those involving GMOs for sustainability purposes.

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Regulatory or market-based incentives for sustainable production? The case of demersal seine fishing for Atlantic cod in Norway

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Abstract

To ensure sustainable and ethically produced seafood throughout the supply chain it is important that fishers use fishing gears with low carbon emission and impact on the ecosystem, and that these are used in ways that promote good fish welfare and quality. Compared to demersal bottom trawling, demersal seine fishing has lower carbon emissions, provides better fish welfare and quality, and has lower impact on the seabed and habitat. In addition, the very high catch rates compared to other gears such as gillnets and longlines favor demersal seines which has increased in popularity around the world. However, with high fish density very large hauls have been reported resulting in poor fish welfare and quality, and loss of dead and injured fish should the seine net burst. Catch limiting technology is available but is voluntary to use in Norway. However, the authorities consider making it mandatory—apparently without considering market-based incentives for adoption. This study shows how price-based incentives can be investigated applying a mixed-effects model with data including haul sizes for Atlantic cod catches and prices, while accounting for other factors that may influence prices, as well as seller and buyer heterogeneity. The findings show only a weak association between haul sizes and prices, indicating that regulations are required to promote more sustainable and ethical fishing practices through the adoption of catch limiting technology.

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When desired brand values might conflict; The diagnosticity of different packaging elements on brand sustainability and brand quality

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Abstract

Introduction

Trying to avoid price competition, companies invest in creating a distinct brand identity which is becoming more important in today's crowded marketplace. According to Jevons et al., (2005), a brand identity involves everything that gives the brand meaning and distinction, including the moral image, purpose and values that collectively define its distinctiveness.

In order to be effective, the brand identity needs to resonate with what customers think is important for them (Aaker and Joachimsthaler, 2000). Earlier studies on this topic have focused on the effect of marketing mix variables and brand element manipulations (e.g. changes in the brand logo, its color scheme, the packaging, or tone of voice) on brand attitude. Following, Fishbein and Ajzen (1975), brand attitude has been typically conceptualized and measured by academics as the overall averaged mean of the consumer's multiple product attribute beliefs.
More recent research has shown, however, that (1) what consumers value and find important in brands might be more than just its product attributes and (2) brand attitudes may not be specific enough for managing a brand's identity in a more demanding market.

(1) According to Tsai (2005), marketers have traditionally defined a brand's perceived value from an economic utilitarian approach only, limiting perceived value to the product attributes of a given brand. More recent studies have shown that consumers value brands not just for their functional attributes but also for the sensory pleasure and potential self-expression they may experience when buying and using the brand (e.g., Kwon et al., 2016; Gupta et., 2020). As such, consumers appear interested in both the expected functional and the emotional values (benefits versus costs) of the brand, instead of simply the product attributes on which some of these values might be based. These so called brand values might include concepts like brand quality (e.g. Mitra and Golder, 2006), brand credibility (e.g. Erdem and Swait, 2004), brand likeability (e.g. Nguyen et al., 2015), brand authenticity (e.g. Oh et al., 2019), brand transparency (e.g. Grimmelikhuijsen and Meijer, 2014), brand status (e.g. Chen et al., 2020), and brand sustainability (e.g. Gidakovic et al., 2022).

(2) Consequently, managers need more research on those brand values that are relevant to and align with the personal values of their target audience (He, et al., 2018) and they need better recommendations how to manage these specific brand values more precisely. This becomes especially important when choices in the marketing mix or brand elements have different or even conflicting effects on different brand values. In experiments by Saddlemyer (2016) and Saddlemyer and Bruyneel (2016), for example, the visual saliency of two brand logo's was manipulated: full color versus black-and-white. The results showed that the black-and-white logo's positively affected the brand values brand credibility and brand status, but also negatively affected the brand values brand likeability and brand conspicuousness. The full color logo showed the oppositive effects. Therefore, a brand that wants to signal credibility should choose for a black-and-white logo, whereas managers

who want to satisfy customers conspicuous consumption needs should better opt for a full color brand logo. Note that when the focal concept had been (overall) brand attitude, no effects would have been found since brand attitude would have averaged out the positive and negative effects of the different brand values.

Trying to provide brand managers with more comprehensive insights into how the brand can strengthen its identity and better connect with its target audience, the purpose of this study is to further expand our knowledge on the impact of different brand management choices (e.g. package design) on different but important brand values (e.g. sustainability and quality).

Theoretical Background

Brand sustainability

The brand value sustainability is reflecting the belief that the brand acknowledges the importance of meeting the needs of the present generation of consumers without compromising the ability of future generations to meet their own needs (Elsawy and Youssef, 2023). Sustainability is of growing importance to a large pool of consumers (Carillo-Hermosilla et al., 2019) as they become more aware that production and consumption may cause concerning environmental degradation. A report from the World Economic Forum (2021), for example, shows that over the past five years online searches for sustainably produced goods have risen by 71 percent, illustrating that consumers are demanding brands to act sustainable. Consequently, many consumers are pursuing a more sustainable lifestyle and are looking for diagnostic cues like packaging material and graphics that signal the extent a brand is sustainable (e.g. Steenis et al., 2017). More and more companies respond to this sustainability trend and have adjusted their marketing mix and branding efforts accordingly. Also, marketing communication plans that signal the brand's care and consciousness about the environment are becoming increasingly common (Tollin et al., 2015).

Brand quality

Brand quality is the customers' overall perception of how well the brand meets their performance requirements and expectations and signals the level of excellence that a brand is perceived to have by its customers (Morelli, 2011). Brands with a high perceived quality can command higher prices, as customers are willing to pay more. It also gives a brand a competitive advantage over other brands (Zhang and Zhang, 2007). Therefore, companies invest heavily in quality improvement initiatives and share quality information to boost consumer perceptions of brand quality. Extensive research has shown that consumers use, for example, pricing (Kopalle and Lehmann, 2006) and packaging cues to infer brand quality (Magnier et al., 2016; Teas and Agarwal, 2000). Van Ooijen et al., (2017), for example, found that packaging color (darker versus lighter) is an important diagnostic cue for the assessment of perceived quality, especially for PCG products. Also, box packages (regardless of color) signal higher carrot quality to consumers whereas plastic bag packages are typically associated with carrots of lower quality (Oleson and Giacalone, 2018)

Packaging

One of the marketing mix elements that has been successful in signaling brand identity and brand values, is packaging. Although the main task of packaging is to hold, protect and preserve food against potential damage and transit hazards, packaging can also drive consumer behavior. It may even have a better reach than advertising (Agariya, et al., 2012), especially for PCG's (Bloch, 1995; Orth and Malkewitz, 2008) and in self-service shopping environments where sales are heavily

dependent on both the visual and informational communication abilities of the product itself. Trying to communicate the 'right' brand values to consumers, it is important that both aesthetic and functional elements of the packaging are chosen carefully (Farhana, 2012).

Methodology

In this study, the effects of different packaging elements on different brand values will be studied for pasta products. Despite the natural co-occurrence of different diagnostic cues in every purchase situation, the conclusion of a meta-analysis by Majer et al. (2022) is that yet little is known about how these cues work together. Therefore, data was collected via an online experiment using a rating based conjoint analysis methodology. The advantage of conjoint analyses is that it combines real product offerings with advanced statistical techniques making it possible to measure the value that consumers place on different product attributes simultaneously. The packaging attributes in this research differ in (a) material usage (cardboard or plastic or both cardboard & plastic), (b) packaging color (green or white or red), (c) graphic image (with basil leaves or without), and (d) eco-label (100% Recycled Packaging or Environmental Friendly Packaging or without); see appendix.

The first eco-label (type 1) is monitored and awarded by an independent third party. The second label (type 2) is self-declared and unregulated. No (existing) brand names were used since these may cause confusing inferences. For this same reason we also excluded packaging cues that are typical for certain brands in the pasta category, e.g. blue = Barilla and yellow = Grand'Italia. The10 selected profiles (including 1 holdout) consisted of different images of penne packaging with different attribute stimuli levels. 165 Dutch consumers rated these packages on brand sustainability and on brand quality.

Analyses and Results

Brand sustainability

As can be seen in figure 1 and 2, the most important packaging element for respondents when assessing the brand value sustainability is the informational label. Packages without an informational cue score much lower on this brand value than profiles with an eco-label. No significant difference is observed, however, between brand sustainability ratings of '100% Recycled Packaging' (type 1) and 'Environmental Friendly Packaging' (type 2). The second most important element appears to be the packaging material attribute. Respondents' sustainability beliefs are lower for 'Plastics' than for 'Cardboard', but interestingly appear significantly higher for 'Cardboard & Plastics' than for 'Cardboard' alone. The third most important attribute is product color. While no differences are observed for 'White' versus 'Green' packages, the difference between 'Green' (preferred) and 'Red' packages is significant. Finally, respondents' sustainability ratings consistently are higher for packages with 'Imagery' than for packages without basil leaves on the pasta package.

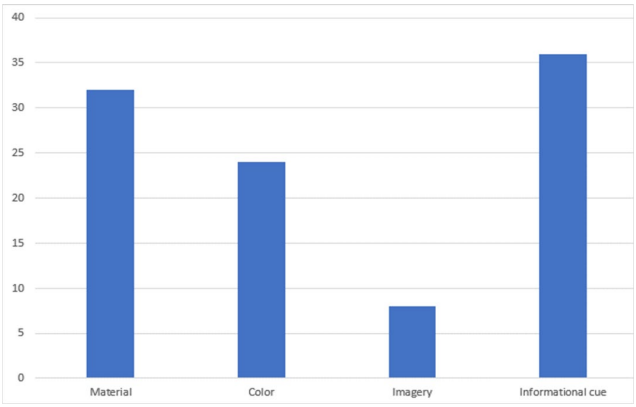

Figure 1. Attribute importances brand sustainability.

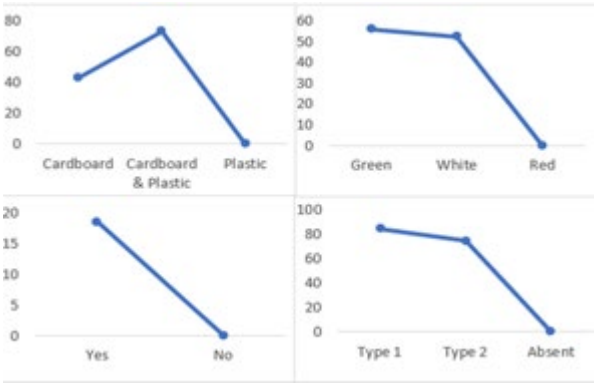

Figure 2. Rescaled part-worths brand sustainability (sum up to 400).

Brand quality

As can be observed in figure 3 and 4, the most important attribute for respondents when assessing the brand value product quality is by far the type of packaging material used. The analyses show that respondents' quality ratings are high when they observe that the packaging is made from 'Plastic' and are even higher when it is a combination of 'Cardboard & Plastics' instead of 'Cardboard' alone. The second most important attribute is packaging color. Respondents consistently rate brand quality significantly higher when 'White' packages are used. The results also indicate that 'Green' is a better indicator of high brand quality than 'Red' for pasta products. Respondents consistently associate higher quality with a basil image than packages without. Finaly, the least important diagnostic cue for assessing brand quality appears to be the eco-label and the label 'Environmental friendly Packaging' signals the highest brand quality.

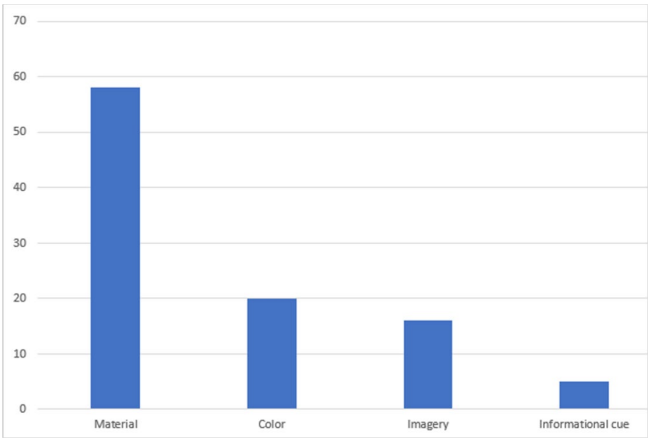

Figure 3. Attribute importances brand quality.

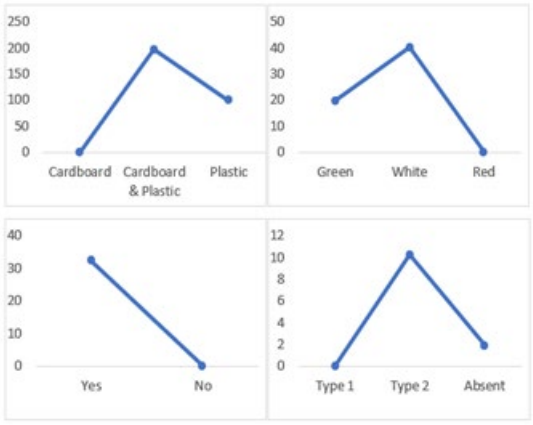

Figure 4. Rescaled part-worths brand quality (sum up to 400).

Discussion and Implications

This study shows that consumers who prefer high quality especially look at the material of which the (pasta) package is made and value the use of 'Cardboard & Plastic' more than either 'Plastic' or 'Cardboard'. Color, imagery and label appear to be less diagnostic for assessing the brand value quality, with a general preference for the color White, the use of a (basil) Image, and the Environmental Friendly Packaging label (type 2). This is unexpected, since these unregulated and "free" type 2 eco-labels are often associated with greenwashing whereas the (third-party verified) type 1 eco-labels are not (Shahrin et al., 2017).

Different from brand quality, consumers prefer the use of multiple packaging signals when trying to assess the brand value sustainability. Informational cue, material used, and the color of the package itself appear almost equality relevant for this. Also different from assessing the brand value quality, consumers associate the brand value sustainability with the color 'Green' and the label '100% Recycled Packaging' (type 1).
Most remarkable, but consistent with between-subjects experiments by Sokolova et al. (2023), people perceive the use of 'Cardboard & Plastic' as more sustainable than a package made of only

'Plastic' or when it is entirely made of 'Cardboard' and **even** when the different alternatives are presented all together as shown in our conjoint study (within-subjects design).

Consequently, brand managers who want to target pasta consumers who are especially interested in high quality have less options to convince consumers that their brand excels on this brand value than when they want to differentiate on sustainability. This study shows that material used is the leading packaging cue for the assessment of the brand value quality, and that 'Cardboard & Plastic' is associated with the highest quality. Surprisingly, this material combination is also perceived as the most pro-environmental choice by consumers and consequently this urges for "wake up campaigns."

The big difference with the brand quality value, however, is that managers have alternative options when they decide to reject Plastic and use Cardboard only (maybe also trying to avoid greenwashing issues). In that case, the product will lose some sustainability value but this loss may be recovered easily by adopting the 'Type 1' econ label and/or choosing the 'White' packaging color and/or adding a natural image on the package.

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Appendix

Profile example

Profile 8: cardboard & plastic window / red / with basil image / type 1 label

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When ugly meets ugly: How "Ugly Bundling" can improve the attractiveness of imperfect produce

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Abstract

Every day, food retailers discard edible fruits and vegetables. One factor that contributes to the disposal of edible food by food distributors is the aesthetic standards imposed on fruits and vegetables by retailers. In the UK, about 9.5 million tonnes of food waste are disposed of annually, posing significant economic losses and environmental impacts, including biodiversity loss and resource depletion[1,2]. To address this type of food loss, literature suggests factors that may increase acceptance of imperfect produce by consumers. Such proposals include, anthropomorphised imperfect produce[3, 4], marketing message framing [5,6], and reduced pricing[7].

This research contributes to this line of thought by investigating the effect of bundling multiple imperfect produce items together (what we call "ugly bundling") on increasing the attractiveness of imperfect produce to consumers. In an experimental study, 150 participants were recruited at a large state university campus in the UK for a food evaluation study. The participants were randomly assigned to one of three imperfect produce package types: 1) produce A only, 2) produce B only, or 3) produce A+B bundle. Produce used was potatoes (produce A) and carrots (produce B). Participants were provided with the respective produce package and asked to rate the attractiveness of the produce on three item measures (attractive, appealing, likeable; r = .93), on a seven-point scale (1 = "not at all" and 7 = "very much"). The results suggest significant main effect of package type (F (2, 147) = 4.92, p = .009). Planned contrast tests showed that participants in the bundled package condition (M = 5.75, SD = 1.01) reported the produce to be more attractive than in the produce A only package (M = 4.97, SD = 1.36; F(1, 147) = 9.75, p = .002) and the produce B only package (M = 4.31, SD = 1.83; F(1, 147) = 3.29, p = .072) conditions. The findings offer initial insights into how packaging type can be leveraged to improve attractiveness of imperfect produce.

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Sensory delights: A study on traditional apple varieties in Spanish rural regions

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Abstract

Fresh fruits grown in traditional regions are attracting consumers' attention due to their environmental and social benefits, alongside their sensory attributes such as taste and texture. This study focuses on two varieties of apples - Golden and Reineta - produced in the Aragón region of Spain, along the Ebro River, and in the rural hilly area of Manubles, which has a longstanding tradition of apple production. We assess consumers' preferences for apples grown in these rural areas using a between subject design Discrete Choice Experiment (DCE) with two treatments. In treatment A, participants (n=96) selected apples based on provided information regarding the rural area and cultivation characteristics. In treatment B, participants (n=96) first visually examined the apples along with their accompanying information, subsequently tasted them, and finally chose their preferred apple for purchase. Methodologically, we furthered our analysis by measuring stated and inferred Attribute Non-Attendance (ANA) for the various attributes and estimated three mixed logit models: i) a full attendance model, which assumes participants valued all presented attributes 'equally'; ii) a stated ANA model, wherein participants selected the attributes they considered post-DCE task; iii) and an inferred ANA model.

Results from the full attendance model revealed no significant differences in utility or Willingness-To Pay (WTP) values between the two treatments. Notably, consumers attached higher utility to the Golden variety, followed by apples originating from the Manubles area. Conversely, stated ANA results indicated that participants who claimed to have considered the attributes attached greater utility on the production origin (Manubles) than the apple variety. Furthermore, utilities for participants acknowledging to have considered the attributes were higher in treatment A than in B. Participants who admitted having ignored some attributes in treatment A indeed assigned no utility to them. However, post-tasting in treatment B, they attributed positive utilities, with the Golden variety receiving the highest value. These participants exhibited low price sensitivity post-tasting, resulting in higher WTPs. Inferred ANA results aligned with the full attendance model, yet the stated ANA model demonstrated a superior model fit.

The study reveals crucial insights for marketers aiming to promote apple varieties. Consumers showed a strong preference for the Golden variety, indicating it should be prominently featured in marketing campaigns. Additionally, consumers placed significant value on the origin of the apples, favouring those from the Manubles area. This highlights the importance of emphasizing the traditional and rural origins of the product to enhance its perceived value. The study also highlights how post-tasting experiences influence consumer preferences and willingness to pay, suggesting that offering tasting experiences could enhance perceived product quality and value. Lastly, addressing price sensitivity by highlighting the superior taste and sensory characteristics of the product can justify higher price points.

These preliminary findings underscore the significance of sensory analysis and the inclusion of ANA in choice experiments, highlighting that product information may increase consumer expectations, which can subsequently shift post-tasting. Additional models need to be estimated to accommodate consumers' heterogeneity in preferences, thereby yielding more precise results.

Keywords: Apples, choice experiment, attribute non-attendance, Golden, Manubles, Spain, willingness-to-pay.

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Exploring the impact of shopping practices on reusable bag consumption: A nationally representative study from Norway

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Abstract

From both climate and environmental perspectives, there is an urgent call to reduce the consumption of plastic bags. This reduction is critical to lowering greenhouse gas emissions, preserving natural resources and energy, and combating littering. In 2022, the EU Commission presented a proposal for a new packaging regulation. This regulation requires member countries to limit the number of plastic bags sold per inhabitant to a maximum of 40 bags per year by the end of 2025. Consequently, alternatives to plastic bags, such as reusable shopping bags, must replace the use of plastic bags. A recent life cycle analysis, based on Norwegian conditions, shows that a reusable shopping bag only needs to be used 8 times to be more environmentally friendly than a plastic bag. However, this analysis doesn't take into account whether consumers already possess reusable shopping bags. Therefore, this study will examine the extent of consumer access to reusable shopping bags and subsequently analyze the factors influencing their use. Previous research has shown that both contextual factors and individual factors can influence the use of reusable shopping bags. However, there are limited research on how shopping practices affect the use of reusable shopping bags.

In this article, we therefore investigate to what extent people's shopping practices, such as how people transport themselves to the physical store, how often people shop, and how much they shop influence the use of reusable shopping bags for grocery shopping. Moreover, we also investigate how contextual factors such as the price of plastic bags, store density and distance to the physical store, and the availability of plastic bags in the store influence shopping practices and the use of reusable shopping bags. We have conducted a nationally representative survey to map the use of reusable shopping bags and factors that influence the use of reusable shopping bags in Norway. Our findings indicate that shopping practices significantly impact the choice of carry alternatives. The results also showed that contextual factors, such as place of residence, handling of residual waste, price of carry alternatives, and characteristics of grocery stores, have an impact on the choice of carry alternatives. In addition to this, it turns out that almost all households own at least one reusable shopping bag, which means that the opportunity to use reusable shopping bags instead of plastic bags exists for most households. The findings suggest that measures aimed at shopping practices are needed to increase the use of reusable shopping bags. We argue that both political measures and measures from grocery stores can increase the use of reusable shopping bags.

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Trust is not enough: Blockchain verification requires consumer understanding

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Abstract

Blockchain technology is promoted for increasing trust in the value chain through increased transparency. Against the initially high hopes of revolutionizing value chain networks, however, major blockchain initiatives are already being phased out. We argue that blockchain technology can only increase consumer trust, if the concept is understood, which poses a challenge that marketing needs to overcome. We conduct a discrete choice experiment with 3000 consumers across six European countries to highlight the role of trust and understanding in consumers' choice behavior for pork and broiler meat. We conduct semi-structured interviews with value chain actors to qualify our findings from a managerial perspective. We find that understanding of blockchain technology increases utility for at least some sustainability attributes. Trust on the other hand is not affected by blockchain verification and is associated with a preference for conventional production systems. Blockchain verification reduces the importance of price and increases the importance of sustainability attributes. Blockchain familiarity is found to be rather low. From a theoretical perspective, we discuss the role of familiarity, subjective and objective understanding as a link between transparency and trust. From a managerial perspective, we suggest well-designed marketing education campaigns, involving employee training, explaining the concept of blockchain technology to consumers when implementing blockchain technology. Investments to reach the right consumers through the right channels will enhance familiarity with blockchain technology, the objective understanding of the concept and in the end the utility of the provided transparency, with a lower focus on price. These marketing efforts have so far been neglected but can support the successful implementation of blockchain verification.

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Harmonizing self-report measures in food consumer science

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Abstract

Across various scientific disciplines, complex frameworks and methodologies have emerged to organize and understand the factors related to eating behaviours (Chen & Antonelli, 2020). Most of these frameworks differentiate between three primary factors that impact food choice: the food, the consumer, and the context. To comprehend food choices fully, we must seek answers to questions related to "who" (=consumer), "what" (=food), "when", "where", "with whom" (= context) and "why". The crucial final question can be explained by understanding how all these factors are interrelated and influence consumer behaviour (Rozin, 2007).

Food Consumer Science (FCS) is a multidisciplinary discipline that requires an understanding of all the factors influencing food choice. Researchers in FCS come from diverse scientific backgrounds, including psychology, sociology, sensory science and marketing. This rich diversity has provided FCS with multiple viable approaches and paradigms that researchers can adopt while seeking answers to their research questions. However, the very richness of FCS also leads to fragmentation. Numerous studies conducted across different countries provide snapshots of specific food choices made by consumers in particular geographical areas at specific times. These studies employ varying theoretical frameworks and concepts, making it challenging to generalize findings or compare results. To move toward a more comprehensive understanding of factors influencing food choices and related behaviours, harmonizing methods and approaches becomes crucial. Harmonization also facilitates the generation of comparable data across various research studies. This allows for aggregating and integrating data on a larger scale.

In the EU project COMFOCUS, one of the objectives was to harmonize the most commonly used self-reported measures in surveys studying factors related to food choices. The harmonization process involved two distinct steps. First, commonly recognized and frequently used concepts were thoroughly mapped. Subsequently, the most relevant concepts were chosen and incorporated into the harmonization process. In the second step, a comprehensive review of the literature pertaining to the selected concepts was conducted. The focus was on understanding how these concepts have been operationalized and measured. As a result, a background paper was generated for each concept. These papers outline the rationale behind selecting the harmonized measure and provide guidance on its application. This systematic approach ensures consistency and facilitates meaningful comparisons across studies.

In total, 53 self-report constructs have been harmonized. The constructs are within socio-demographics (8), psycho-social characteristics (20), product and food experiences (9), consumer behaviour as an outcome (7) and consumers as agents in the food system (9). The COMFOCUS community's objective is to encourage the adoption of these harmonized measures in FCS studies. However, it's essential to recognize that these measures may evolve over time, and there could be newer, more practical alternatives to replace the current selections in the future. To address this, a guideline has been developed for describing concepts and harmonizing new measures.

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Buzzworthy choices: A comparative insight into honey purchasing factors in Slovakia and Hungary

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Abstract

Introduction

Currently, the honey market offers a wide range of honey from different countries, produced by various producers, providing consumers with options across different price ranges, colors, flavors, consistencies, and packaging choices. Therefore, there is an increasing emphasis on investigating the factors that determine the purchase and consumption of honey. One of the key factors determining the choice of honey is the quality of honey (Oravecz et al., 2020), which is often associated with its origin, producer, location, type of honey, safety, health aspect, or other features characterizing its quality, such as various certifications and trademarks (Cela et al., 2019; Kehagia et al., 2007; Oravecz et al., 2020; Pocol et al., 2022; Šánová et al., 2017; Šedík et al., 2023; Wu et al., 2015). Many consumers believe that high-quality honey is offered at higher prices (Völckner and Hofmann, 2007), and therefore price can be considered another significant factor in the purchase and consumption of honey (Khaoula et al., 2019). Sensory attributes of products also have a significant impact on consumers, such as colour, aroma, taste, appearance or consistency of honey (Isamaiel et al., 2014; Oravecz and Kovács, 2019). However, consumers are also influenced by various marketing activities of producers, including aspects like product packaging, its appearance, shape, information on labels, manufacturer's brand and its reputation, or advertising (Bou-Mitri et al., 2020; Nguyen et al., 2020; Ribeiro et al., 2019; Yeow et al., 2013). In the context of the above, the aim of the paper was to identify the key elements determining the purchase of honey in Slovakia and Hungary and to point out the different evaluation of the examining determinants between Slovak and Hungarian consumers. Based on the aim of the paper, the following research question was formulated: How do the selected purchasing elements in the honey market differ in their levels of importance?

Methodology

Consumer study is based on primary data acquired via online questionnaire survey conducted in 2022. In total, 1 228 honey consumers participated in Hungary while in Slovakia the research sample comprised 630 honey consumers. Respondents evaluated the following 20 elements when purchasing honey: quality, country of origin, type of honey, consistency, colour, recommendations, point of sale, price, family budget, discount, brand, producer, awards, packaging size, packaging materials, ecological aspect, local aspect, label design, bottle shape, advertisement. Respondents used 7 points scale (1 – the least important element, 7 – the most import element). Statistical testing was carried out by using XLSTAT 2022.4.1 (Addinsoft, NY, USA). To measure statistically significant differences both Friedman test and multiple pairwise comparisons using Nemenyi's procedure were

applied.

Results

The results showed statistically significant differences in respondent´s evaluation among selected factors both in Slovakia (p-value = <0.001) and Hungary (p-value = <0.001). In Slovakia, the most important factors which are considered during honey purchase were both quality and country of origin, followed by producer, local aspect, type of honey, recommendations, consistency and colour. The lesser importance was obtained by group of factors involving point of sale, material of packaging, ecological aspect, price and package size. As the least important factors were evaluated advertisement, label design and bottle shape followed by discount, awards, brand, family budget. The similar situation occurred in Hungary however, we identified few differences. The most important factor was quality followed by type of honey, consistency, country of origin and producer. The lesser importance was acquired by group of factors such as colour, price and recommendations followed by point of sale, family budget, discount, packaging size and packaging material. Honey advertisement was evaluated as the least important factor followed by label design, bottle shape, brand, awards, ecological aspect, and local aspect.

Conclusion

Obtained results provides preliminary insights into consumer decision-making process when purchasing honey. Nevertheless, we aim to further explore in next studies the interrelation and associative dynamics among honey purchasing factors in the respective contexts of Slovakia and Hungary. These forthcoming studies will further explore and clarify the complex interconnections and potential correlations among the various determinants influencing purchasing behavior in the honey market.

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Current, potential, and unlikely consumers of plant-based? A segmentation study to identify consumer groups to reduce meat and increase plant-rich diets

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Abstract

There is a growing trend towards plant-based diets among consumers in Europe, mainly driven by climate and environmental concerns. In Denmark, for example, animal-based foods constitute 30% of the average diet but contribute to 75% of the diet´s GHG emissions. Recently though, the number of citizens that report eating lunch respectively dinner 3-4 times per week without meat has doubled from 8.2% to 16.8% between 2017 and 2021. To further the plant-based market and how to approach current as well as potential consumers, market actors need to better understand the different consumer groups in terms of their beliefs, behaviours, and sociodemographic profiles.

This paper uses a segmentation analysis of representative consumer survey data in Denmark to characterize segments that differ in psychographic drivers or barriers of meat reduction (perception of conflict about plant vs. meat, number of people one knows who have reduced their meat consumption, importance of other persons who reduce meat consumption, beliefs about the benefit of reducing meat consumption, beliefs about animal production, environmental concern). We find eight segments, of which three are already part of the niche, three emerge as opposed to plant-based, but two are potential next consumers. Results allow to derive marketing and policy recommendations for behaviour change towards eating more plant-rich for each segment. In particular, interventions drawing on mechanisms of social norms, identity and peer effects have the potential to trigger tipping points when it comes to plant-based dietary change.

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Economic incentives for more sustainable fishing? The case of live haddock in coastal Norway

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Abstract

To ensure sustainable and ethically produced seafood throughout the supply chain it is important that fishers are incentivized to use fishing gears and practices with low carbon emissions and impact on the habitat while also maintaining good fish quality and welfare. The two main economic incentives driving fisher behavior are costs and revenues. Low costs can be achieved by using catch efficient fishing gear and focus on large hauls for trawls and demersal seines or long soaking time for gillnets and longlines. This may however result in poor fish quality and welfare and lead to lower prices. High prices may be achieved by providing fish of high quality and given that the additional costs of the gentler fishing practices required for better quality are not larger than the sales revenues, this may provide an economic incentive for more sustainable fishing practices.

This study focuses on price incentives for demersal seines which have become a very popular fishing gear in coastal Norway and many other fisheries around the world. Their popularity is due to factors such as large catch rates, low carbon emissions, good fish welfare and quality, and a low ecosystem impact compared to other gears such as trawls. It is also the gear that is used for capture-based aquaculture of cod due to high survival rates during the capture process and onboard storage. Demersal seines are also used for live delivery of haddock, which in turn is slaughtered and filleted at onshore filleting factories. Recent research indicates that the proportion of high-value products (loins) from a catch of live haddock can be increased from 16% to 48% compared to conventionally landed haddock. The price difference between high and low value products (remaining parts of the fillet after the loin has been removed, and whole gutted fish) is substantial, indicating a boost in revenues in onshore processing and a more sustainable use of the scarce haddock resource. However, because catching and landing live haddock is more costly and imply lower catch rates, economic incentives in the form of higher prices compared to conventional fishing are probably necessary to promote increased landings of live haddock.

We apply hedonic price models on ex-vessel data to examine whether price premiums for live versus conventionally landed haddock is present. The statistical models control for the influence of other factors that might influence prices such as fish sizes, catch sizes, quality (regular or downgraded), and seasonality (weeks). Preliminary findings show that price premiums for live haddock are low or non-existent, indicating that more sustainable haddock fishing is not supported by economic incentives.

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The complexity of sustainable food production: The case of high-end haddock products

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Abstract

The point of departure for this study is this: When demersal seiners land live haddock to filleting plants in Norway, the share of high-end loins increase from 16% to 48% compared to conventionally landed haddock caught with the same gear. With substantial price differences between high and low-end products this indicates a massive boost in revenue in onshore processing. This imply enhanced value adding in vulnerable coastal communities and a more sustainable utilization of the limited haddock resource. However, live landings of haddock have been stable around 1,000 tons yearly constituting only about 10% of the haddock quotas available for large seiners. Moreover, examination of ex-vessel prices indicates that live haddock obtain similar prices as conventionally landed haddock by seiners.

These observations give rise to several interesting questions with implications for a sustainable value chain such as why fillet producers are not paying higher prices to incentivize fishers to increase their landings of live haddock? This is an interesting question because the huge jump in revenues indicate a substantial potential to incentivize fishers. Is it possible that the market for high-end fresh loins is too "thin" to absorb larger quantities during the relatively short period of this fishery during early summer? Or could it be that the few and large fillet producers use their market power to keep prices low? A highly relevant question for the demersal seiners is what the fishing costs associated with capturing, storing, and landing live haddock are compared to conventional landings? And, what price levels are required to increase live landings?

To examine these related questions, we draw on insights from research focusing on fisher behavior, as well as market organization. The latter is important because research has shown that the ex-vessel markets for fresh groundfish in Norway is characterized by extensive use of market power. Interview guides were developed, and in-depth interviews conducted with skippers and vessel owners, managers of filleting factories, as well as fish exporting companies.

Preliminary findings indicate that the filleting factories possesses substantial market power because they are few and located close to the best fishing grounds for haddock. The market for high-end loins is also perceived to be thin by exporters. Despite lower catch rates, fishing costs associated with live landings are not very different from conventional haddock fishing. This is explained with costly onboard bleeding and gutting of many fish which may well exceed 50,000 per day with conventional fishing. With live onboard storage of fish this is avoided as is the production of ice to chill the fish. Because haddock is a delicate fish that require careful handling during the catch operation there is also a risk that the powerful buyers will downgrade the fish should the quality be poor resulting in large price reductions. In sum, these factors may explain why fishers accept relatively low prices for live haddock and indicate the complexity of developing sustainable value chains for high-end seafood.

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Nudging can accelerate the transition among Danes towards more climate-friendly diets – behavioural experiments involving carbon footprint information and change of default meals

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Abstract

Globally, there is an increasing focus on the importance of reducing the consumption of red meat for environmental as well as for health reasons. In the present study, we have assessed to what extent consumers are prepared to replace beef with other protein sources with a smaller carbon footprint when nudging tools in terms of changing the default alternative and providing information about carbon footprint are used combined.

The study is based on a representative survey answered by almost 2,000 Danish respondents in 2022. In the survey, consumer preferences for meals with five different protein sources representing high carbon footprint (ground beef), medium carbon footprint (chicken, pork and fish) and low carbon footprint (a plant-based steak) were tested. The respondents were divided into two splits, defined by whether the default meal included a ground beef or a plant-based steak. As the first step in a two-step approach, respondents were asked to rank all five protein sources, including their default alternative, according to their preferences. In the second step, the respondents were provided with information about the carbon footprint of all protein sources and asked to rank them again. Only analyses of the protein source that a respondent ranked highest ('the respondent's first choice') have so far been carried out. Data from the two steps were analysed in a logistic regression model.

We found that significantly more respondents chose ground beef for their meal when it was served as the default alternative than when a plant-based steak was the default alternative. Moreover, information about carbon footprints of the different protein sources reduced the share of respondents choosing ground beef regardless of whether beef or plant-based steak were presented as defaults. Like the result in Faccioli et al. (2022), the study showed that the double nudge reduced the carbon footprint substantially more than when each of the nudges was carried out individually. However, we also found that a share of consumers in the sample were not affected by the nudges, which is in line with Hilema and Lund (2021).

To sum up, our results indicate that a significant behavioural change towards less beef can be obtained among some consumer groups through information provisions about carbon footprints and by changing the default alternative while other groups of consumers need to be reached by other (or additional) channels in order to replace the beef with a more climate-friendly alternative.

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Rethinking and recovering the 3 R's (Reduce, Reuse and Recycle) for sustainable seafood

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Abstract

In the field of seafood, specifically in aquaculture, sustainable supply chain management (SCM) has a great impact, because overconsumption of natural resources and environmental pollution are critical problems. Sustainable aquaculture could be effective in overcoming such problems and aquaculture production needs to reduce costs by minimising production waste and maximising the recycling waste and reuse of water. Having a fair price, these initiatives help to care for the natural environment and ensure the quality of life and animals as well as producers. Further, to make it sustainable and effective, aquaculture production needs to formulate and improve strategies and policies with suppliers and should be verified with the consumers. However, little is known about how and to what extent consumers prefer the fish produced by reducing GHG, reusing water, and recycling waste and how the value of 'rethink'[1] and 'recovery'[2] affect their preferences. Therefore, the objective of this research is to fill in the knowledge gap. The study aims to help in formulating effective fisheries and aquaculture policy by examining the consumer value of rethinking and recovering the 3 R's for sustainably farmed fish.

To achieve the objective, the data were collected by questionnaire surveys employing a discrete choice model regarding consumer preferences in the aquaculture production process. The data were analysed employing the exploratory factor analysis and the generic multinomial and conditional logit model. The outcomes revealed that a high level of GHG emission and a low level of waste recycling in the production decline the utility of farmed fish towards consumers and they want to pay less for these characteristics. However, the impact of reusing water in the production process on their fish preferences is insignificant. Again, the interaction effect of the global sustainability (ASC) label and consumers' 'rethink' is negative and significant meaning that they are substituted for each other. Such findings indicate that those consumers who consider their actions to affect the environment are less likely to prefer sustainability-labelled farmed fish. On the other hand, though insignificant, the interaction between ASC label and 'recovery' is positive meaning they are complementary. Consumers who practice putting waste products to use in their lifestyle are more likely to prefer sustainability-label farmed fish. The outcomes of the study will help to get consumers' preferences on sustainable SCM of seafood that will help to formulate policy regarding aquaculture directed to customers perceive the value of sustainability.

[1] Rethink is about considering how one actions affect the environment.

[2] Recover is the practice of putting waste products to use.

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Recent consumer perspectives on organic food markets

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Abstract

General political, economic and social conditions have experienced important changes in recent years. These changes affected the market for organic food in a somehow different manner than conventional food markets. The restrictions caused by the Covid-19 measures led to a sharp rise in demand for organic food in Germany. An important driver of this development was the closure of the catering industry, which urged people to buy almost exclusively from the food retail. Consumers reacted to the large offer of organic food and often decided for the organic food alternative. When the Covid measures came to an end in 2022, people returned to their jobs and leisure activities. Eating-out activities re-increased and at home consumption decreased with a marked effect on private spendings on organic food. Overall prices started to increase already by the end of 2021 and were accentuated by the consequences of the Ukraine war. This contribution aims to analyse the effects of these changed framework conditions on consumer preferences for organic food in Germany.

The data is based on a quantitative online survey of 829 consumers conducted in Germany in May 2023. Development of the questionnaire and data analysis was with the author while data collection was outsourced to a private market research agency. The results show that main reasons for buying organic products are support for organic farming, less pesticide residues, environmental protection and nature conservation, high animal welfare standards, fewer additives and naturalness of the products. Support of organic farming, naturalness and less food additives became more important compared to earlier research, while the relevance of animal welfare, health and taste decreased (Brümmer and Zander 2019). The main argument against buying organic food are too high prices, to be too often packaged in plastic and too often imported. An analysis of the relative importance of the attributes 'organic' and 'local' when buying food shows that, on average, local production is more appreciated by respondents than organic production. This higher preference for local increased compared to results from 2019 (Brümmer and Zander 2019). While local food is associated with ‘short transport’, ‘freshness’, 'transparency', 'reasonable price' and 'sustainability', organic food goes along with ‘low pesticide residues’, ‘animal welfare’ and ‘healthy food’. The respondents' additional willingness to pay was elicited for various products (bread, milk, potatoes, minced meat and pasta). It turned out to be rather high and varied between 41% (milk) and 73% (potatoes). Respondents were also asked for their price expectation for the same product groups. Interestingly, in all cases price expectations were, on average, about 20% higher. This may serve as a proof for the high price image frequently observed for organic food. When asked for the adaptations of their purchasing behaviour due to increasing costs of living, almost 30 % answered to replace organic by conventional food, another 30% stated to look for cheaper organic food and one quarter did not change their purchasing behaviour.

Consumers’ preferences for organic food remain stable, although the motivations to buy organic food are changing over time. Local origin is becoming more important since it increases transparency and trust. Activities to reorganise local food chains are highly needed and will be appreciated by consumers given that they are accompanied by well targeted communication activities.

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Sustainable last-mile delivery: A systematic review of behavioral studies

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Abstract

This systematic literature review examines thirty articles that study the effect of sustainability attitudes, information, and service attributes on consumer choices in last-mile delivery. The studies are published between 2018 and 2024 and are conducted in Europe, Asia, North America, and South America. They mainly focus on sustainable delivery time, delivery mode, and delivery place. The review shows promising findings on green nudging for sustainable delivery time choice and emerging literature on the effect of sustainability information related to pick-up points and delivery lockers. There is also emerging behavior literature on sustainable delivery choices using cargo bikes, crowdshipping, robots, and drones. However, many studies lack methodological rigor and use small sample sizes. We only found two revealed preference studies, no sales data, and seven discrete choice experiments. The review summarizes the literature in this rapidly evolving field, highlighting its limitations, identifying research gaps, and proposing avenues for further research. At the IFMRS 2024 conference, we will focus on relevant results for the food market.

Introduction

The explosion of e-commerce has revolutionized the retail landscape, bringing the challenges and opportunities of last-mile delivery to the forefront of sustainable business practices. In the food industry, these challenges are compounded by the perishability of goods and the growing consumer demand for swift, convenient delivery services. This dichotomy between convenience and sustainability raises critical questions about consumer behavior, preferences, and the potential for green nudging in last-mile delivery choices. As food marketing professionals grapple with these complexities, understanding the behavioral underpinnings of sustainable delivery choices becomes paramount. This study seeks to bridge this gap by comprehensively reviewing existing research on how sustainability attitudes, service attributes, and information influence consumer choices in the context of last-mile delivery. Many of the findings are highly relevant for stakeholders in the food market, and we aim to shed light on specific challenges and opportunities that can guide future last-mile delivery strategies towards sustainability.

Methodology

This study employed a systematic literature review methodology, leveraging the Scopus database to aggregate and analyze peer-reviewed articles published between 2018 and 2024. The search criteria were meticulously designed to capture studies that offer insights into consumer behavior related to sustainable last-mile delivery, focusing on surveys and experiments that present new consumer data. The initial search yielded a broad range of publications, which were then screened based on relevance to the study's objectives. This process resulted in the selection of thirty articles that form the core of this review. Our methodology emphasizes the diversity of research designs, geographic focus, and thematic areas within the selected articles, providing a comprehensive overview of the

state of research in sustainable last-mile delivery. Through a detailed analysis of these studies, we extracted key themes, identified gaps in the literature, and synthesized findings relevant to the development of sustainable last-mile in e-commerce.

Results

Countries and samples

The systematic review revealed a diverse geographic spread of studies across Europe, Asia, North America, and South America, illustrating a global interest in sustainable last-mile delivery research. However, the distribution of research is uneven, with a significant concentration in Europe. This geographic disparity suggests the need for more comprehensive studies in underrepresented regions to capture a wider array of consumer behaviors and preferences. Additionally, the sample sizes and representativity of the studies varied. Future research should aim for larger, more representative samples to enhance the generalizability of findings.

Methods and theories

Most studies employed survey-based methods to explore consumer attitudes and preferences towards sustainable last-mile delivery. While these studies provide valuable insights, there is a noted lack of experimental and revealed preference studies that could offer a more nuanced understanding of actual consumer behavior. The theoretical frameworks used, such as the Technology Acceptance Model and Theory of Planned Behavior, underscore the complexity of consumer decision-making processes. However, the application of these theories is often limited to specific contexts, suggesting the potential for broader application in future research.

Products of delivery

The review highlighted that most studies did not specify the types of products delivered, which could influence consumer preferences for sustainable delivery options. The few studies that did specify products often focused on general categories such as food, clothing, or general parcels. This lack of specificity limits the ability to draw detailed conclusions about consumer preferences for sustainable delivery options across different product types. Future research should consider the impact of product type on delivery preferences to provide more tailored recommendations for businesses and policymakers.

Time of delivery

The timing of deliveries plays a significant role in sustainable last-mile delivery preferences. Studies showed promising findings on the potential of green nudging to influence consumer choices towards more sustainable delivery times. However, the research also indicated a lack of willingness among frequent online shoppers to accept longer delivery times, even when presented with sustainability information. This suggests a gap between consumer attitudes towards sustainability and their willingness to compromise on convenience, highlighting the need for innovative solutions that balance both aspects.

Mode of delivery

The mode of delivery emerged as a critical factor in achieving sustainable last-mile delivery. Studies exploring the use of electric vehicles, cargo bicycles, and crowdshipping presented mixed findings on consumer acceptance. The limited attention given to these alternative modes in the literature suggests an opportunity for further exploration, particularly in understanding the barriers to consumer acceptance and the potential for policy interventions to encourage more sustainable delivery modes.

Place of delivery

The choice of delivery location, including home delivery versus collection points such as lockers or in-store pick-up, significantly impacts the sustainability of last-mile delivery. The literature indicates a growing consumer willingness to use collection points when the environmental benefits are clearly communicated. However, the convenience of home delivery remains a strong preference for many consumers, underscoring the challenge of encouraging more sustainable choices without compromising on consumer convenience.

Willingness to pay

Consumer willingness to pay for sustainable delivery options varies widely across studies. While some consumers are willing to pay a premium for environmentally friendly delivery methods, others require incentives or compensation to consider alternative options. This variability in willingness to pay underscores the complexity of consumer decision-making and highlights the need for targeted strategies to encourage sustainable delivery choices.

Climate offsets for deliveries

The inclusion of climate offsets as an attribute in choice experiments provided insights into consumer willingness to pay for the environmental impact of their delivery choices. The findings suggest that consumers value the opportunity to offset the carbon footprint of their deliveries, although the willingness to pay varies. This presents an opportunity for businesses to integrate climate offset options into their delivery services, potentially enhancing their appeal to eco-conscious consumers.

Conclusion

The systematic review of behavioral studies on sustainable last-mile delivery unveils a complex landscape of consumer preferences, behaviors, and attitudes. The findings point to significant opportunities for innovation and intervention to promote more sustainable delivery choices. Addressing the identified gaps in the literature, particularly in terms of geographic representation, methodological diversity, and the exploration of innovative delivery modes, will be crucial for advancing the field. As e-commerce continues to grow, understanding and influencing sustainable last-mile delivery choices will become increasingly important for businesses, policymakers, and researchers alike.

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Don't *bug* it, till you try it: Consumer perceptions of edible insects with increased familiarity and use

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Abstract

Introduction

In the Anthropocene era, any change we can make in order to minimise our impact on the environment is important to consider (Rockström et al., 2009). One of the major contributors to climate change is our diet. A third of greenhouse gas emissions stem from food production and consumption (Crippa et al., 2021), and a change to our food systems could potentially have a massive impact on lowering our emissions. The need for a shift in our dietary habits is evident, and a move away from (red) meats to a more sustainable diet would be optimal (Godfray et al., 2018). Such a move necessitates alternative protein sources, and here edible insects have been suggested. They are more sustainable to produce compared to traditional livestock bred for consumption, and they are healthy to eat, as they are high in protein and other micronutrients (Van Huis et al., 2013). In theory, edible insects are an optimal alternative protein to increase the overall sustainability of our diets.

In practice, however, Western consumers have been very hesitant towards these novel insect products and have in many instances downright rejected them (Wassmann et al., 2021). Novel products often fail soon after they have been launched and novel food products experience an extra barrier to successful adoption because these products come under harsher scrutiny by consumers, as they are ingested (Rozin & Fallon, 1987). A multitude of studies have been done on consumer acceptance of insect food products, but in-depth intervention studies are lacking, as well as more qualitative work in this area, in order to understand the hesitation and the barriers for acceptance among Western consumers.

The aim of this study is therefore to understand the perception of insect products, in order to understand the potential barriers or drivers of acceptance. This will be done through a qualitative intervention study, where participants will receive actual insect products and familiarise themselves with them over time. The research question of the study is as follows:

RQ**:** How are consumer perceptions of insect products when observed with participants that interact with these over time with increased familiarity and use?

This research aims to contribute to the existing entomophagy literature in a broadening of the understanding of the barriers to and drivers of acceptance of insect food products by Western consumers. We aim to inform practitioners and the industry, in order to advance the market. We propose four future scenarios, outlining how edible insects might be a part of our diets going forward and the steps necessary to take in order to make it happen.

Method

This study is based on data from 28 in-depth, repeated interviews with 10 consumers (ranging from 25 to 71 years old) conducted in Denmark. Recruitment of participants was done through social media (Facebook) and snowball sampling, utilising the network of the authors and project partners. The recruitment aimed to reach adults (18+). All participants except one was female. Two of the participants were not native Danish speakers so those interviews were conducted in English. The data collection was carried out in the summer of 2023.

The study is a qualitative intervention design with several interview rounds per participant. This design makes it possible for participants to try the insect products over an extended period of time, and for them to be able to reflect more deeply on their experiences with them. We followed an abductive approach, where theoretical concepts guided us in structuring the interview guides, but also had the aim of theory development from the data analysis (Dubois & Gadde, 2002).

The interview procedure was divided into stages. Each participant had a short introductory interview, where their food habits and choices were discussed as well as their expectations to the products. Then, the insect products were sent to them. After having had a chance to familiarise themselves with the products, the second and main interview was conducted, focussing on their experiences and opinions. Lastly, a short follow-up interview was done, in order to probe for further thoughts on the topic.

The product stimuli used were chosen based on key criteria from the literature. Degree of processing was varied among the products given to the participants, as this has been found to affect acceptance in previous studies (Halonen et al., 2022; Wassmann et al., 2021). It was a priority to have both whole insects as well as products with insects as ingredients as stimuli, with a high degree of variety among the products. All products were purchased via online stores that the participants themselves could buy from, should they wish to do so. In the end, seven different insect products were sent to the participants.

The analysis was divided into several steps. First, a research assistant transcribed the interviews verbatim and wrote up summaries of the characteristics of each participant. Second, the interview data was analysed and coded by the first author using the qualitative analysis software NVivo. Analysis followed Braun and Clarks (2006) approach to thematic analysis. Regular meetings were held where data was discussed between the authors, and meaning and coding was debated until agreement was reached.

Main results

Actual trial and testing of insect food products in this study highlight the many associations that colour the expectations (and to some extent the experience) with the novel food. The perception of insect food products bleeds into other areas with connections and associations to nature, insects in nature, climate, social influences, and insects as a future food.

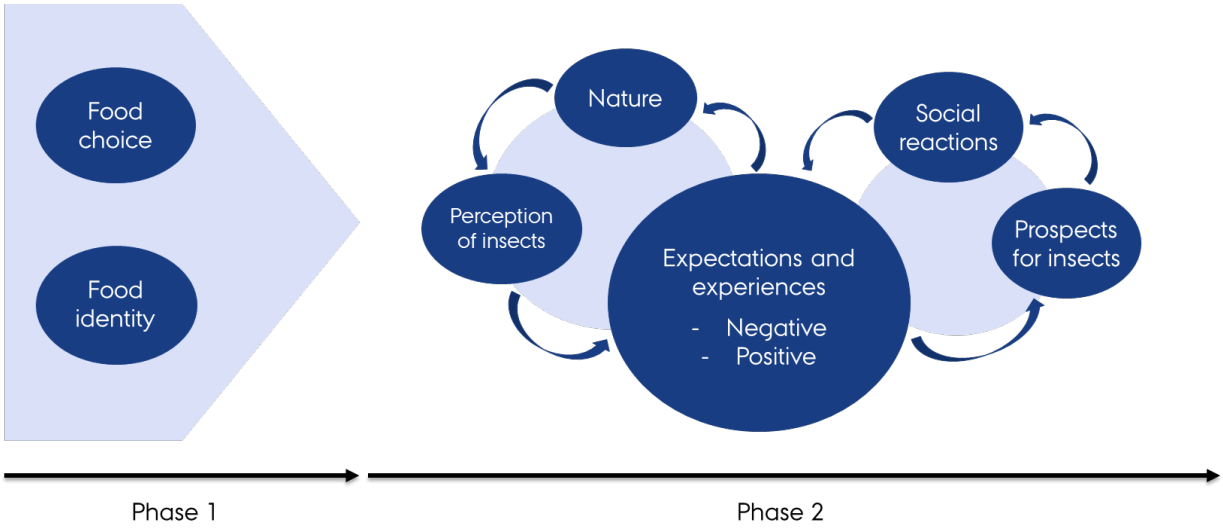
These connections are visualised in figure 1. The model is divided in two phases, which are separated by the point of the respondent receiving the products: Phase 1 is before they have received the insect products by mail, and Phase 2 is after. The two phases is of course a representation of how the interviews were conducted and how the study was set up, but more abstractly, they also represent a move deeper into the topics and the experience with insects for the participants, as well as a movement from the present to the future – a future far beyond this study.

In Phase 1, the emphasis is on the current food reality of the participants: what food choices are being made, what are the preferences, what is avoided, and to what extent are these choices a reflection of a food identity. These baseline understandings of food choice and food habits make up the reality with which the experience of the insect products are happening in, which is illustrated by the arrow moving towards phase 2.

In Phase 2, the key code is the expectations and experiences with the insect products. Through two overall themes, the other codes form clusters in connection with this central code. The first theme refers to the closeness of insects in nature and insects in food or the lack of distinction between insects that are found in one or the other. Often, eating insects accidentally and trying out insect products are connected in the same line of thought, and participants often jump from telling about one to the other. The way that insects in nature are seen and described, is the same way that they are described when talked about as food. Even when the insect products are being discussed, nature is not far away, as many participants talk about a fear that the whole insects used in food will come alive and move around again. The animalness of the whole insects are palpable, but even the products where they are used as ingredients, the animal stands out, as either a picture on the packaging or as a specific insect name on the product. The way participants think about insects in nature, is therefore carried over into how they view them as food.

The second theme is that of the embedding of insects into the consumers' current social reality and their future. For many of the participants this is still quite a foreign way of thinking about food, and several of them describe it as unfamiliar and unnatural. The social circles of the participants are almost all very sceptical and display a high level of disgust. Still, many participants see this as the future and some even talk about it as being inevitable that insects will be a part of our diet. Future insect eaters are also almost exclusively talked about in very positive terms. In trying the insect products, both the participants and their social surroundings become less disgusted and often times consuming them in a social setting helps to overcome an initial barrier. Still, the gap between the present and the future is deep, and seem to demand extraordinary effort from the participants to overcome.

Figure 1**:** Conceptual model



Discussion

How can these consumer perceptions inform us on edible insects and their adoption? The conceptual model opens up for different future scenarios or pathways for insects going forward. We present four different propositions of how insects as food could be furthered in the coming future. Each of the overall themes presented above point in two directions. First, two scenarios extracted from the theme of future are discussed, followed by a discussion of the two scenarios drawn from the theme of nature.

The future is coming

Several participants are talking about edible insects as if it was something inevitable. They also say that they might not themselves be ready at this moment to buy them, but it is coming. This creates a gap between the current situation and the future, a gap that is hard to bridge. Because in order to get to that future, somethings will have to change in the present – because if nothing changes, nothing changes.

One way to bridge this gap is to make products that are relevant for consumers now, and to make them more familiar with them.

Social reactions and norms

The social reactions to edible insects were in some cases quite severe. Even if some consumers can withstand this type of social pressure, most consumers will probably not want to stand out like this. Especially not when the reactions to it are disgust and a general lack of understanding.

One way to overcome this is to continue to tap into the narratives of edible insects as sustainable, healthy, and a good source of alternative protein. The positive narrative of edible insects as a natural way forward could overcome some of this negative bias.

Hide the edible insects

One of the most consistent comments from the participants of this study is that they do not mind when insects are used as an ingredient – “If I can´t see it, it does not matter”. In order to make insects more appealing, they should be hidden. They do not seem to have a place on the packaging (even the image of an insect is disgusting to some), they do not like the names of them (Buffalo beetle does not sound appealing), they do not like the look, taste, feel of whole insects (they are afraid they will move again as if they were still alive).

Hide them behind Latin names, behind drawings of insects instead of pictures on packaging, and reduce them to a name on an already long ingredient list. Mix it with familiar products, and hide it as a function in a food (for instance enriched with protein). Anything, so that consumers are not confronted with what they are actually eating. Then it is more likely that acceptance for insects as food will increase.

This is a balancing act, though. Perhaps the confrontation with what we are actually eating is a stepping stone to changing food habits.

Insects as friends, not foes

Making consumers more familiar with insects in general and all the good that they do could increase the attitude towards them and bring them closer to a friend rather than a foe. Many of the participants in the study already associate insects in nature with biodiversity, and this beneficial role could be emphasised more. At least it could be a way to reduce the "terrified" response many have to insects they come across in the wild. Currently, insects are seen as something very distant and foreign to us, and this distance is making it less likely that they will be considered as food (Rozin & Fallon, 1987). If consumers were made more familiar with them, they could become more comfortable with them and potentially lessen the hesitation with incorporating them into our diets and ourselves (i.e. eating them) (Rozin & Fallon, 1987).

Conclusion

This study set out to examine consumer perception of edible insect products and how these are with increased familiarity and use. The major themes emerging from the interview data revealed that consumers were associating insect products with nature and insects found there and that even if they saw insects as a future food, they were not themselves currently prepared to change their food habits. This could potentially be detrimental to for adoption. Four scenarios should be considered when trying to enhance the level of acceptance, in order for insect products to find their way from the future to the present Western consumer diets.

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Climate concerns and dietary habits go hand in hand – but the development towards climate-friendly food is slow. A study combining stated and observed preferences

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Abstract

There is increased focus on the climate impact of the food we consume. Danes are reducing their meat consumption but at a slower pace than other European citizens (Fagt, 2023). While many studies have shown that organic consumers often consume less meat and more vegetables than non-organic consumers, fewer studies have examined the interlink between attitudes towards climate change, organic consumption and the development of the dietary composition.

In this study, we focus on two consumer groups that differ substantially from each other in relation to their organic consumption. We investigate differences between the groups with respect to 1) awareness of climate change 2) perceived responsibility for reducing own emissions 3) knowledge about climate impact of specific food types and 4) observed development in the consumption of specific food types.

Insight is gained from using a combination of stated and observed preference data. Stated preferences were elicited using a survey from 2022 with 2,000 Danish respondents while observed preferences were based on household purchases reported to GfK by a balanced panel of around 1,700 consumers from January 2020 to December 2023. In both data sets, we defined 'dedicated users' as the 10% of the consumers with the highest organic consumption and 'non-users' as the 10% with the lowest organic consumption. Regression models and descriptive statistics were used to analyze differences between the user groups, with focus on specific food types (vegetables, beef, pork, chicken, fish, dairy products). Development in consumption of the different food types was investigated using observed budget shares as indicators.

Compared to non-users, dedicated users were more aware about climate change and felt more responsible for reducing their own emissions. Moreover, they were typically more optimistic regarding the reductions in carbon footprint in shifting from meat to vegetables as they often associated vegetables with lower emissions and animal products with higher emissions than non-users did. However, both groups underestimated the emissions of cheese and butter and overestimated emissions of pork – a lack of knowledge, which could hamper substitutions towards more climate-friendly diets.

The dedicated users spent a little less of the total food budget on meat but more on vegetables - thereby revealing a tendency to eat slightly more climate-friendly than non-users (similar results are found in e.g. Nordström and Denver, 2024). The dedicated users spent substantially more of the meat budget on fish and less on pork than the non-users did. In accordance with the official dietary guidelines, an increasing trend in the consumption of chicken was seen. Contrary to the guidelines, we found a decreasing trend in fish consumption, and only minor trends towards reduction in beef consumption. As this is ongoing work, we will also include analyses of consumed quantities to account for relative price changes.

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Sustainable and consumer friendly packaging for fresh potted herbs - Initial findings from consumer focus groups

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Abstract

Introduction

In recent years, there has been a noticeable shift in consumer preferences towards environmentally sustainable packaging options, driven by a growing awareness of the problems associated with the use of plastics (Ketelsen et al., 2020). Concurrently, dissatisfaction with plastic packaging has become evident among consumers (Herrmann et al., 2022). To put this into perspective, each person in Germany generates approximately 41 kg of plastic waste annually (Eurostat, 2023). While the contribution of packaging for fresh kitchen herbs to this waste stream may seem modest, it holds significant importance in terms of sales, being one of the primary items in the vegetable assortment in Germany (AMI, 2020). Fresh culinary herbs possess a unique characteristic – they can continue to grow in households after purchase, thus making their packaging particularly challenging.

Traditionally, packaging for potted herbs consists of plastic pots and bags, serving as a medium for plant growth and providing protection, information and communication to consumers. However, with increasing concern about plastic waste, novel packaging solutions have emerged. These include post-consumer recycled (PCR) pots, bioplastic pots suitable for industrial composting, and home compostable pots. Similarly, alternative packaging options such as paper bags or mixed paper and plastic bags have gained attention.

Consumer expectations play a pivotal role in the successful adoption of environmentally friendly packaging. Research by Hao et al. (2019) highlights that consumers prioritize practical characteristics such as ease of use, reusability, and protective function over price and appearance when considering "green" packaging options. Despite heightened awareness of plastic-related environmental issues (Heidbreder et al., 2019; Ketelsen et al., 2020), there remains a lack of knowledge about environmentally friendly packaging materials (Hao et al., 2019; Dilkes-Hoffman et al., 2019; Ketelsen et al., 2020), leading to continued reliance on plastic packaging (Heidbreder et al., 2019). Moreover, there is a notable dearth of knowledge concerning the purchase and use of potted herbs.

In light of these observations, our study aims to explore the challenges and perceptions surrounding potted herbs and their packaging in domestic settings, while also exploring consumer preferences for future changes. By elucidating these aspects, we seek to contribute valuable insights to the ongoing discourse on sustainable and consumer-friendly packaging practices.

Methods and Materials

To address this research gap, three online consumer focus groups were conducted. Participants were recruited through social media announcements, advertisements on an online classifieds portal in Germany, and an announcement within the University of Geisenheim. Participants from previous

studies were also contacted. As an incentive, participants received a 10€ voucher that could be redeemed in over 500 online shops. A total of 16 people was willing to participate, but seven people canceled their participation at short notice or did not show up. The average age of the participants was 45, the gender was balanced with four men and five women, and the household type was balanced with four single households and five multi-person households.

The consumer focus groups lasted approximately two hours each and were recorded. They were divided into three consecutive segments.

1) First, consumers were asked to evaluate different types of packaging: plastic pots, PCR pots, bioplastic pots, several home compostable pots, paper bags, plastic bags, paper bags with plastic window. They were given pictures of these packaging types and asked to write down what comes into their mind. For analysis, the given answers were summarized.

2) Second, an open discussion about challenges with potted herbs and their packaging were held. The contributions of the participants were written down on an online whiteboard. The analysis was based on the qualitative content analysis (Kuckartz & Rädiker 2022) by developing main- and sub-categories from the discussion and sorting each contribution to these.

3) Third, new ideas for packaging potted herbs were collected using the 6-3-5 method. The 6-3-5 method is a variation of brainwriting. It is used to collect many ideas in a short time without evaluating them. An online whiteboard was prepared beforehand. The participants' task was to come up with ideas for more sustainable and user-friendly packaging for potted herbs. Each participant posted three ideas per round on the online whiteboard. One round lasted three minutes. For a new round, each participant added three more ideas to those already written down by their neighbor, either by using them as inspiration or by developing them further. Typically, three rounds were conducted. For analysis, the ideas were summarized and categorized. Figure 1 displays the principles and process of the 6-3-5 method.

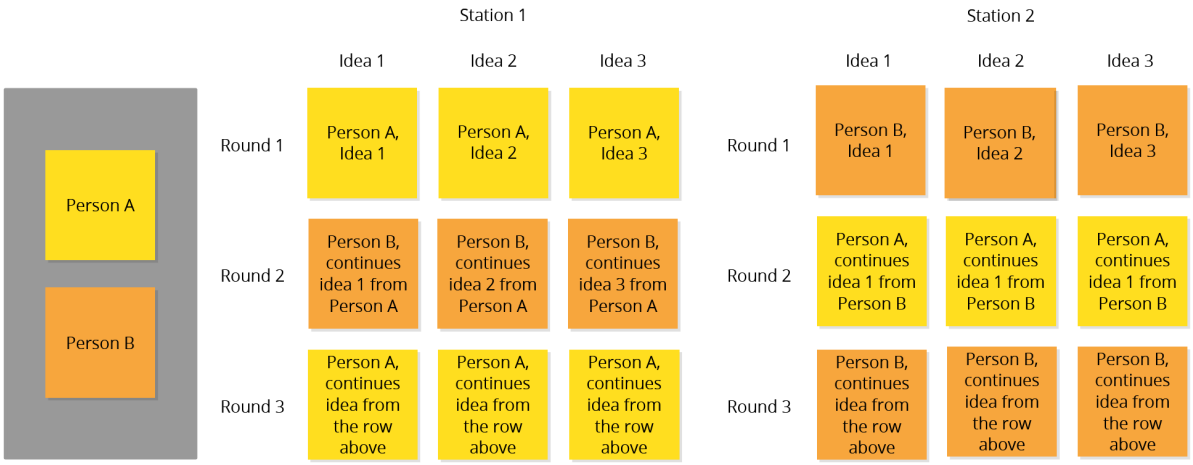

Figure 1. Principle of the 6-3-5 method with two persons on an online whiteboard.

Results and Discussion

Results of 1), the evaluation of the different types of packaging: *Plastic pots* were rated negatively for environmental friendliness, e.g. with statements such as “the worst possible packaging”, “unnecessary waste”, “try to avoid plastic”, “harmful to the environment”. But they were positively rated for practicality, e.g. “practical”, “easy to produce”, “reusable”, “stackable”. The *PCR pot* was rated better than the plastic pot in terms of environmental friendliness, and also positive in terms of practicality. However, recycling would cost too much energy. *Home compostable pots* were rated positively in terms of environmental friendliness, e.g. “super”, “practical”, “sounds good”, “sustainable”. However, there was a lot of uncertainty about functionality, e.g. “material?”, “how effectively do roots grow through?”, “compostable?”, “short lifespan if not planted?”, “moisture resistance?”, “dry substrate?”. Different home compostable pots were rated differently due to their appearance, e.g. in terms of compostability and stability. The *bioplastic pot* was rated positively, especially in terms of environmental friendliness, e.g. “innovative”, “environmentally friendly”, “sounds sustainable and recyclable”. However, there was uncertainty about compostability, reusability and recyclability. *Paper bags* are the best solution for some consumers, due to their supposed environmental friendliness, e.g. “best option”, “favorite”, “functional”, “super”, “very easy to produce”, “inexpensive”, “easy to print on”, “compostable if necessary”. However, certain features were rated less good, e.g. “plant not visible (people tear it up to look at it)”, “often unsightly after watering”, “sufficient for transportation”, “must be removed at home”, “lower herb quality”. *Plastic bag*s have a bad reputation in terms of environmental friendliness: “bad for the environment”, “harmful to the environment”, “not good”, “not particularly sustainable”. In contrast, the functionality of plastic bags is viewed positively, e.g. “best protection”, “hygienic”, “waterproof”, “practical”, “best quality”, “high transparency”. *Mixed bags* were rated better than plastic bags, e.g. “looks nice”, “see-through window good idea”, “good marketing”, “herb quality can be visually assessed”, “better than pure plastic bag”. On the other hand, the mixing of materials poses challenges to the consumer, e.g. “disposal difficult due to mixed materials”, “must be separated for recycling”, “transparent window unnecessary”. Summarizing the results of the evaluation of the different types of packaging, it can be said that the versions with plastic are disliked and the solutions without plastic are viewed positively, but their functionality is often questioned. These findings are consistent with the results of other studies reviewed by Ketelsen et al. (2020), who found that consumers are well aware of the problems associated with plastic packaging, but know little about environmentally friendly packaging.

Results of 2), the open discussion about challenges with potted herbs and their packaging: From the open discussion, five categories could be identified: "Packaging", "Herbs", "Transportation", "Information on Packaging", "Disposal & Recycling". Figure 2 provides an overview of the categories.

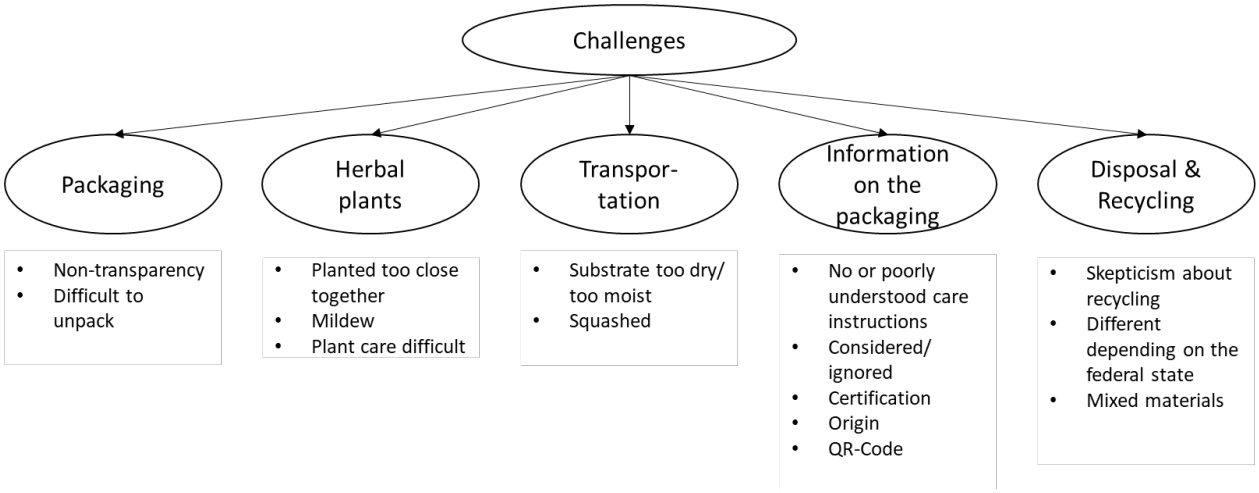

Figure 2. Categories of challenges consumers discussed.

The category "packaging" refers to the problems that consumers encountered directly with the packaging. These were the opacity of the bags, which prevented the quality of the herbs from being observed, and the difficulty of removing the bags without damaging the herbs. The category "Herbal Plants" summarizes the challenges related to the plants themselves, such as plant diseases and herbs planted too close together so that they do not last long. In addition, some complain that herbs are difficult to care for and require a lot of knowledge to keep them alive. The category "Transportation" includes the difficulties that occurred when transporting the herbs from the place of purchase to the home, which were either crushed herbs or dirty transportation vehicles. The category "Information on the packaging" includes statements about the different information that is printed or not printed on the bags, e.g. care instructions, origin or certifications, and whether they were considered or not. Most participants said they would not pay attention to this information, but some would consider certain organic certifications and herb origins. In addition, most respondents said they would not typically use a QR code, but suggested a QR code for additional information such as the length of the production journey, sustainability information, recipe suggestions, care instructions, harvesting instructions. The "Disposal & Recycling" category refers to end-of-life messages. Participants questioned whether the recycling process was a closed loop and that it was difficult to dispose of products properly because of different regulations in different countries. In addition, consumers were unsure where to dispose of mixed packaging and complained about the extra effort required to separate the materials. The results of the discussion give important hints on how to improve the user-friendliness of packaging for potted herbs and show the importance of developing packaging that is close to consumer needs and behavior.

Results of 3), the development of new ideas for more sustainable and user-friendly packaging for potted herbs: Consumers' ideas for more sustainable packaging often related to reusing the packaging after its first primary use, even with a different function (upcycling), or to a closed-loop system. Other ideas were to reduce packaging (e.g. smaller pots, potless) or make it easier to use (e.g. bag with handle). An overview of the ideas is shown in table 1.

Table 1. Categories and summary of consumer ideas for more sustainable and user-friendly packaging for potted herbs.

Category	Content
Pots	
Upcycling	Pot as pencil holder, drinking glass, bird feeder, possibly offer additional lids
Other materials	Clay pot, glass pot, waste paper/cardboard, compostable
Without a pot	Just using a bag
Return system/ deposit system	Packaging return machine, collection points, returning to large garden centers
Pot and plant size	Smaller pots, larger pots so that the plant lasts longer, offer different pot sizes on the market, plant tetris in a larger container that can be used in a variety of ways, different herbs in one unit
User-friendly aspects	Pots with saucer/planter function, integrated watering system, water collection tray, water level indicator, with lighting, pot with handle without bag, wider rim for easier gripping, pot as a decorative object: improve appearance
Other ideas	Wooden sticks & paper bag: Wooden sticks for further use (e.g. other purposes in the kitchen, flower plugs), frame that stabilizes the plant, scaffolding made from waste paper
Bags	
Upcycling	Craft project (in daycare), printing craft ideas on bags, showing craft ideas at the market
Other materials	Non-plastic films, bags made from fly repellent material, mixed materials: paper on top, plastic on bottom (with separation option)
Bag replaces pot	Triangular bags with soil (without pots), possibility to cut off the upper part of the bag and use the lower part as a pot
Without bag	unpackaged, decide at the supermarket if packaging is needed (as with loose fruits & vegetables), instead of a bag, a ring to hold the plant together
User-friendly aspects	Detailed care instructions, harvesting instructions (also on plug or QR code), easy to remove bag, holes for watering, bag with handle on top

It is clear that some of the consumer ideas do not solve the plastic packaging problem on a large scale, such as craft projects for bags; other ideas are not necessarily more sustainable or very costly, such as pots with lighting or integrated watering systems. Some of the consumer ideas would require major changes in the potted herb value chain, such as a return system. However, there are also new and innovative ideas, such as transporting and selling fresh herbs without a bag or pot, and it shows that it is important to develop such new solutions with the consumer.

Conclusion

In conclusion, our study on sustainable and consumer-friendly packaging for potted herbs offers valuable insights into consumer preferences, challenges, and potential solutions. The evaluation of different packaging options revealed a clear consumer preference for environmentally friendly

alternatives over plastic-based packaging. However, concerns regarding functionality, compostability, and recyclability persist among consumers, highlighting the need for innovative solutions that address both sustainability and practicality. The open discussions identified challenges in packaging, transportation, information availability, and disposal/recycling processes, highlighting the need for consumer-aligned solutions. Moreover, consumers' ideas for more sustainable packaging solutions such as upcycling and reduced packaging, show promise but may face practical hurdles.

However, our study had some limitations. First, we had a very small sample of nine participants. Future research could verify the findings on a larger scale, e.g. with quantitative methods. Second, the sampling method, wherein participants volunteered for participation, might have introduced a self-selection bias. However, this potential bias was minimized by not initially disclosing the specific focus of the study, namely sustainable packaging. Third, the evaluation of the different packaging types was based on pictures and without a market context, which means that the expressed perceptions may not translate into respective purchase behavior.

Overall, our study highlights the complexity of the potted herb packaging landscape and emphasizes the importance of collaboration between stakeholders to develop holistic solutions that balance environmental concerns with consumer preferences and practical considerations. Moving forward, continued research and innovation efforts should focus on translating consumer insights into actionable strategies for sustainable packaging design and implementation within the potted herb industry.

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From leaf to cup: Economic dynamics and safety aspects in the herbal tea supply chain

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Abstract

This study explores the global rise of the Herbal Tea (HT) supply chain, with a focus on the European market. Historical origins date back to 1606 in Europe, but its popularity has witnessed a substantial increase worldwide in the last decades. Particularly, the “tea time” culture has played a significant role in shaping HT industry, influenced by consumers’ habits and preferences. HTs are appreciated for their medicinal properties. Moreover, they have turned into convivial and recreational occasions, being available in different forms such as single-dose sachets, loose leaves and ready-to-drink soluble options. This research brings to light different aspects of HT, that should be better explore in the future. Leveraging a systematic literature review, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, we selected relevant papers for analysis. Furthermore, employing VOSviewer software, we examinated the chosen papers to discern recurring themes and connections within the literature. The first aspect revealed concerns HT-related safety.

Indeed, adverse reactions have been reported, often attributed to contaminants such as fungi and mycotoxins. A knowledge gap about the consequences of using herbal teas is present, as well as a lack of regulatory standards to ensure complete consumer safety have emerged. In the context of the rapidly growing HT market and the search for new flavors, specific attention needs to be paid to sustainable production practices. Accurate consumer information on all aspects of production and consumption can contribute to the perceived value of herbal teas, encouraging a greater willingness to pay for a certified safe products.

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Consumer preferences for pasture-raised local beef meat in restaurants: are willing to eat and pay and, why?

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Abstract

Beef cattle production is associated with high greenhouse gas emissions and animal welfare concerns, related to housing conditions and breed usage. Pasture-raised cattle production is seen as a potential solution to improve sustainability in livestock production because it is the most natural system offering benefits for animal welfare, human health, and the environment. In this extensive system, farmers prefer to use traditional breeds because they are better adapted. However, producing meat under higher animal welfare and environmental standards incurs greater production costs, potentially increasing consumer prices if not subsidized by the government. Thus, understanding consumer preferences and willingness-to-pay (WTP) is crucial to ensure the viability of this extensive production system.

The aim of the study was to investigate consumers' preferences and WTP for pasture-raised beef meat from local breeds, focusing on the autochthonous breeds from the Aragonese Pyrenees, using a natural field experiment in a restaurant setting. We studied the factors that explain the choice and the WTPs for the pasture-raised beef when eating in a full-service restaurant. The research was conducted in the capital city of the region.

Participants were recruited in a previous experiment where they received a €20 voucher to dine at a well-known restaurant. In this experiment, participants could choose from two menus offering a starter, main and dessert, where the main dish offered either a regular beef steak or a pasture-raised beef steak from a local breed. On the menu, the pasture-raised steak was offered with a supplement price (one per treatment, €2, €4 or €6) that participants should pay at the end of the lunch/dinner in case they chose the pasture-raised steak. After dining, participants completed a questionnaire covering their steak choice, hedonic preferences, beef consumption habits, perceptions of pasture-raised beef meat, stated WTP, and socio-demographic characteristics. The choice of the pasture-raised steak was analyzed using a probit model, and the stated WTP using a censored Tobit model at 0 and 6 (minimum and maximum stated WTP).

Results revealed that the probability of choosing pasture-raised beef meat depends on the supplement to pay (€2, €4 or €6), consumer's characteristics such as age and household size, and consumer's perceptions of taste and price for the pasture-raised beef meat relative to other beef meat. The probability of choosing the pastured-raised steak is the highest for a supplement of €2. Younger consumers and those living in smaller households were more likely to choose the pasture-raised steak. The perception that this beef meat is tastier than other beef meats had a positive influence on the probability of choosing while the perception of being more expensive had a negative effect. Factors influencing stated WTP included the previous steak choice, the supplement paid, hedonic preferences, gender, and perceived benefits of consuming pasture-raised meat. Participants who chose the pasture-raised steak, participated in higher supplement treatments,

showed higher hedonic valuations, and perceived higher benefits, stated higher WTP, while being female also favored a higher stated WTP.

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Instruments for promoting healthy food products – a mixed-method approach

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Abstract

Introduction

Epidemiological studies reveal a steady increase in the percentage of people with excessive body weight. Obesity, called the epidemic of the 21st century, implies many serious health consequences and is a risk factor for non-communicable chronic diseases. Social awareness of the threats of civilization diseases and the importance of their prevention is gradually increasing. Nutrition is one of the modifiable elements of lifestyle, significantly affecting health. Increasing health awareness and care for health create demand for products from the segment of the so-called healthy food (Ciabiada and Bryła, 2018).

In the context of the increasing burden of diet-related diseases, the World Health Organization has highlighted the importance of nutrition as a risk factor. The concept of informed food choice has become synonymous with encouraging consumers to choose healthier products by providing nutritional information. Labeling plays an important role in identifying products that comply with the recommended diet and in assessing the healthiness of the product. At the same time, health-related information provides significant marketing incentives, providing the food industry with opportunities to differentiate a product based on health-related positioning. Bublitz and Peracchio (2015) examined the promotional efforts of hedonic foods as compared to healthy foods, which enabled to reveal marketing practices that can be adapted for healthy alternatives. Healthy food marketing strategies at the point of purchase include increased availability of healthier "target" products, prime shelf-placement and call-out promotion signs, and reduced availability of regular "comparison" products (Glanz et al., 2020). Retailers increasingly often use social media marketing to promote healthy food (Samoggia et al., 2019). Further investigation into healthy food promotion is needed to determine how marketing techniques could be used to improve dietary behavior (Folkvord and Hermans, 2020).

This paper aims to: 1) to investigate the importance attached by consumers to various instruments of promoting food products with health claims and nutrition claims, and 2) to identify best practices in marketing healthy foods on the basis of selected case studies of producers and distributors.

Method

A mixed-method approach was adopted, with both quantitative and qualitative studies (Bryła, 2020). This paper reports selected findings of a survey questionnaire in a nation-wide sample of 1051 Polish consumers. The sample of consumers was representative, taking into account the structure of the general population according to gender, age, level of education, place of residence (urban-rural division) and region (voivodeship). The following variables were assessed, among others: the

quantity, understandability, credibility and meaning of health and nutrition claims on food packaging. The types of health-related information that matter most have been identified. The importance of selected marketing communication instruments on this market and the expected increase in their importance in the next three years was also determined, as well as what types of messages are most important in marketing communication regarding products with claims. Descriptive statistics, t-tests, ANOVAs, Pearson correlation coefficients, and multiple regressions were applied.

We also analyzed the marketing strategies of selected producers and distributors of the so-called healthy foods on the basis of in-depth interviews with their CEOs or marketing managers (or specialists appointed by the company's management) and the construction of their websites and social media profiles. The in-depth interviews were semi-structured. On the basis of the conducted case studies, we identified numerous patterns of marketing activities used by companies offering the so-called healthy food, which can be a valuable inspiration for other entities operating in this market segment (benchmarking). They have been classified according to the classic 4P concept of the marketing mix, including Product, Price, Promotion, i.e. marketing communication, and Place, i.e. distribution. In addition, good practices at the level of the overall strategy of the company and its marketing strategy were taken into account. Due to the specificity of the topic, examples of good labeling practices were also distinguished (it is an element of the product in the 4P concept).

Results

Consumers were asked to assess the importance of selected marketing communication instruments on the market of food products with health and nutrition claims. According to the respondents, the most important tools for promoting this type of products are recommendations from family or friends (word-of-mouth marketing), recommendations from a dietitian (opinion leader) and product packaging (silent salesman). The biggest difference in the answers of women and men concerned the importance of food blogs, more frequently favored by women.

We compared the assessment of the importance of the analyzed types of marketing communication on the food market with health and nutrition claims in the perspective of 3 years. According to consumers participating in the study, the most important will be recommendations from family or friends, dietitian recommendations, product packaging and consumer opinions on social media. These results indicate the need to strengthen cooperation between producers and distributors with opinion leaders, in particular dietitians, as well as the need to introduce the possibility for consumers to comment and rate products on social media profiles of producers and stores. The biggest expected changes concern mobile applications, profiles of producers and stores in social media, and culinary blogs. Therefore, in the near future, digital transformation will leave its mark on marketing communication in this market in the opinion of the surveyed consumers.

The respondents were asked to determine the importance of selected information regarding food products that can be used in marketing communication. It turns out that of the eight types of information analyzed, the health effects of consuming a given product are the most important for the surveyed consumers, even ahead of information about the low price. The third position included information about the product's suitability for a specific diet. These results indicate a very important role of health-related information on the food market. They confirm the need to emphasize this issue in the marketing communication of enterprises operating in the agri-food industry. The relatively least important information concerns support for producers (e.g. farmers). Among the surveyed women, the most important information is about the health effects of consuming a given

product, and then about the suitability of the product in a specific diet. For men, information about the low price is most important, but information about health effects comes close behind. Differences between genders reached statistical significance for five types of information analyzed: concern for the natural environment, support for producers, health effects of consuming a given product, suitability of the product in a specific diet and above-average quality of the product.

The respondents were asked directly whether they pay attention to health and nutrition claims. The majority of respondents confirmed that they pay attention to this element of marketing communication, with 8% definitely paying attention to this type of information, and 48% rather paying attention to it. Almost 1/3 of respondents were unable to answer this question, and only a dozen or so percent of the survey participants stated that they do not pay attention to health and nutrition claims. Women declared that they paid more attention to health and nutrition claims than men. This difference was statistically significant at $p<0.001$.

The attention paid to health and nutrition claims depends on a number of demographic variables. It varies according to the age of the respondent. In the analysis of variance (ANOVA), the differences between age groups turned out to be statistically significant at the level of $p=0.005$. The highest level of interest in statements was declared by people aged 25-34, and the lowest - by 45-54. The number of children in the respondent's household significantly ($p=0.031$) varies the level of attention paid to health and nutrition claims. Respondents with one child pay the most attention to these issues , and parents with three children pay the least attention. People with secondary and higher education pay more attention to health and nutrition claims than respondents with primary and basic vocational education. These differences are statistically significant ($p=0.010$). The most interested in health and nutrition claims are white-collar workers, and the least interested are blue-collar workers. Professional activity significantly differentiates the level of interest ($p=0.013$). Being on a special diet for health reasons significantly increases the level of interest in health and nutrition claims ($p<0.001$).

Moreover, it was found that attention paid to health and nutrition claims strongly correlates with self-assessment of health ($r=0.933$; $p<0.001$), assessment of one's nutritional knowledge ($r=0.956$; $p<0.001$) and assessment of the healthiness of one's diet ($r=0.958$; $p<0.001$). Interest in health and nutrition claims also depends on the selected shopping habits of consumers. People buying dietary supplements, organic food, functional food and fair trade products pay significantly more attention to claims (in all cases $p<0.001$).

The study participants were asked a series of questions about the effectiveness of various forms of health-related information. This question provided four answer options and asked which information had a greater impact on purchase intention. It turns out that indicating what part of the daily nutritional norm constitutes the content of a given ingredient significantly (over 6 times) increases the impact of information on consumer behavior compared to information containing only the amount of a given ingredient. Relating the content of a given ingredient to the Recommended Daily Intake is more effective for women than for men, but the expected relationship was confirmed in both gender groups.

Then, two forms of information were analyzed - a graphic symbol containing text and the same information only in text form. Half of the respondents said that information in the form of a graphic symbol attracted their attention more, and ¼ - in the form of plain text. Every fourth respondent stated that both forms attracted their attention to the same extent. The answers of women and men to this question were very similar. These results indicate the need to use graphic elements in marketing communication regarding health and nutrition claims. They may take the form of symbols referring to specific health effects, e.g. heart, liver, bone, tooth.

We determined which combination of information is more effective: combining the nutrition claim with the manufacturer's brand or with the distributor's brand. The vast majority of respondents believed that the first option had a stronger impact on their willingness to buy. The answers of women and men were similar. The obtained results may be related to consumers' belief in the greater credibility of manufacturer's brands in terms of respecting the declarations on the packaging regarding the product composition. However, it should be remembered that only one type of product and one type of claim were assessed (strawberry jam without added sugar), which indicates the need to be cautious in generalizing the obtained results.

We assessed the effectiveness of information emphasizing the positive effects of consumption of a given product or the negative effects of lack of consumption. This is a dilemma as to whether messages should focus on emphasizing benefits (promotion-focused) or threats (prevention-focused). In the opinion of women, the belief in the effectiveness of the statement that the product helps in the proper functioning of the circulatory system slightly prevails, while in the opinion of men, the message that the product reduces the risk of circulatory system disorders is more effective. In the entire sample, the belief that this second form of health claim was more effective prevailed. According to over 40% of respondents, both pieces of information influence the willingness to buy to the same extent.

The vast majority of the surveyed consumers share the opinion that the use of unreliable health and nutrition claims is a serious problem. Less than 5% of respondents disagreed with this assessment of the situation, while almost 1/3 were unable to respond to it. The answers were similar for health and nutrition claims. It should be noted that despite skepticism as to the reliability of health and nutrition claims used in Poland, consumers declared a large impact of health-related information on their purchasing decisions. It can be assumed that if consumers' doubts about the reliability of statements were limited, their impact would be even stronger. An information campaign on procedures regarding the use of claims on the food market may serve to dispel these doubts.

Variables that turned out to be statistically significant in simple regressions were entered into a multiple regression model to assess their simultaneous impact on the dependent variable, i.e. the assessment of the importance of health-related information (health claims and nutrition claims) on food packaging. This model includes 25 independent variables and an intercept. It is statistically significant at the $p<0.0001$ level and explains over 1/3 of the variance in assessments of the importance of health-related information ($R^2=0.362$). In the multiple regression model, 10 independent variables have a statistically significant ($p<0.05$) impact on the dependent variable. It should be emphasized that only 1 of these 10 variables is demographic (gender), while the remaining 9 can be characterized as psychographic and behavioral. The strongest impact on the assessment of the importance of health-related information, as indicated by the β coefficient, was observed for the assessment of the credibility of information on labels, concern for the natural environment as an element of marketing communication on the food market and the assessment of the understandability of information on labels. The importance of health-related information also depends on communicating the suitability of a product for a given diet, communicating its above-average quality, convincing consumers that health and nutrition claims are unreliable, buying functional foods, not buying fair trade products and reading back-of-pack information at home.

Regarding the perspective of producers and retailers, three entities were qualified as case studies : Cinna Produkt Zdrowia, Bio Planet and Primavika. On the one hand, all these companies operate in the healthy food segment, but on the other hand, they are diversified in terms of the specificity of the assortment and marketing strategies. Cinna specializes in the sale of products with an innovative ingredient with health properties (functional food), Bio Planet is the Polish market leader in the production and distribution of organic food, and Primavika focuses on products for vegetarians and

vegans. Such a set of cases allowed for the formulation of numerous recommendations included in the catalog of good practices.

On the basis of in-depth interviews with company managers and Internet content analysis, over 100 good practices in the area of healthy food marketing were identified. Particular attention should be paid to: positioning in the segment of the so-called healthy food; acting in a cooperation network of partners sharing specific values and promoting a specific lifestyle; offering products with a unique ingredient with health properties; offering products used in specialized diets; putting such health-related information on labels that is allowed; placing information on labels in graphical form; use of references to the daily nutritional norm; emphasizing the recommendations of research centers; raising consumer awareness; participation in health-related events and healthy food fairs; cooperation with nutritionists and culinary bloggers; presenting the offer on the Internet in a convenient way for consumers, facilitating comparisons of various products; the ability to rate, review and comment on the company's offer in social media.

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Feeding change: Explaining the adoption of sustainable healthy diets

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Abstract

Theoretical background

In line with the Sustainable Development Goals formulated within the Agenda 2030, there has been an increased focus on sustainable healthy diets. The Food and Agriculture Organization of the United Nations subsumes the health aspect into sustainable food consumption and proposes that sustainable healthy diets (SHD) promote health and minimize the environmental impact of food production and consumption (Burlingame & Dernini, 2010). Yet, as of now, it is largely unknown what factors determine whether individuals adopt SHD or not. The present study aims to test whether the determinants postulated in the Comprehensive Action Determination Model (CADM) help explain the adoption of SHD. The study also aims to extend the model by including determinants of attitude toward SHD. The identification of additional determinants helps assess how attitudes are formed.

The CADM developed by Joanes et al. (2020) combines psychological theories from Ajzen (1991), Schwartz (1977), and Stern (2000) to simultaneously assess the relevance of various distinct determinants of pro-environmental consumer behavior. To our knowledge, the model has not yet been applied to the adoption of SHD. Until now, single theories have been used to explain the adoption of sustainable (or organic) food consumption (Emekci, 2019; Testa et al., 2019; Wang et al., 2022). Thus, there is a gap in research that the present study aims to fill.

Awareness of need, awareness of consequences, and ascription of responsibility, as lent from Stern (2000), are integrated into the CADM. The respective variables that will be considered in the present study are awareness of need, perceived consumer effectiveness (PCE), and self-efficacy; all of them are assumed to activate personal norms. To not only explain personal norms, but also attitude, the present study identifies four relevant antecedents of attitude: positive and negative emotions, health consciousness, and environmental concern.

Emotions play an important role in food choice behavior (Martini et al., 2023). In agreement with the reasoning put forward by Taylor et al. (2016), emotions are expected to relate to attitude toward SHD. We postulate that there is a positive relation for positive emotions and a negative relation for negative emotions (Penz & Hofmann, 2021; Xie et al., 2023). H1a and H1b are formulated as follows:

H1: Positive emotions are positively (a) and negative emotions are negatively (b) associated with attitude toward adopting SHD.

Health consciousness reflects the importance that health plays in an individual's daily activities. (Testa et al., 2019). Consumers with higher levels of health consciousness are more likely to consume sustainable and organic food (Tan et al., 2022). Environmental concern also matters in this context (Paul et al., 2016; Tan et al., 2022). Consumers with higher levels of environmental concern might form attitudes based on these beliefs. This leads to H2 and H3:

H2: Health consciousness is positively associated with attitude toward adopting SHD.

H3: Environmental concern is positively associated with attitude toward adopting SHD.

Three normative variables are integrated into the CADM. They are assumed to activate personal norms. In the present study, PCE, awareness of need, and self-efficacy are considered. First, we consider beliefs that capture an individual's awareness of the consequences of their own behavior for others (Schwartz, 1977): PCE. It refers to whether consumers believe that adopting SHD helps alleviate negative environmental impacts (Emekci, 2019). PCE is expected to activate both attitude and personal norms (Schwartz, 1977). Second, awareness of need refers to the general perception of a need to action and specifically to the awareness of negative impacts when not engaging in SHD (Schwartz, 1977; Stern, 2000). Lastly, ascription of responsibility refers to "the individuals' feelings of responsibility for the negative consequences caused by not performing environmentally friendly behaviors" (Wang et al., 2022, p.4), that is, whether people believe that the responsibility is ascribed to themselves and that they can act to reduce the environmental threat (Stern, 2000). This concept was captured via self-efficacy, which "involves beliefs that the individual can engage in the required action and that carrying out the behavior will have the intended impact" (White et al., 2019, p. 28). In our context, self-efficacy captures an individual's confidence in their capability to adopt SHD to have a positive impact on existing environmental problems, with positive downstream consequences (e.g. (Wang et al., 2022), (Joanes et al., 2020)). H4-H7 are postulated as follows:

H4: PCE is positively associated with attitude toward adopting SHD.

H5: PCE is positively associated with personal norms of adopting SHD.

H6: Awareness of need is positively associated with personal norms of adopting SHD.

H7: Self-efficacy is positively associated with personal norms of adopting SHD.

Social norms are defined as "the perceived social pressure to perform or not to perform the behavior" (Ajzen, 1991, p. 188). They determine what is socially accepted in a social context (White et al., 2019). It is of personal importance how the personal environment judges certain behaviors (Falke et al., 2022). Golob et al. (2018) studied organic food consumption and found a positive influence of social norms on both personal norms and the intention to engage in environmentally conscious purchase behavior. Further studies support the positive association of social norms and the intention to engage in pro-environmental behavior (Canova et al., 2023; Carrión Bósquez et al., 2023; Falke et al., 2022). Alam et al. (2020) show that social norms have the strongest effect of all personal factors on sustainable food consumption. H8 and H9 are as follows:

H8: Social norms are positively associated with personal norms of adopting SHD.

H9: Social norms are positively associated with intention to adopt SHD.

Personal norms are defined as "feelings of moral obligation or responsibility to perform, or refuse to perform, a certain behavior" (Ajzen, 1991, p. 199). In other words, personal norms refer to the personal sense of duty to act in accordance with one's own values (White et al., 2019). They can be seen as important predictor for sustainable food consumption (Moser, 2015; Onel, 2017). There is a positive association of an individual's sense of responsibility and the intention to engage in sustainable behavior (Canova et al., 2023; Golob et al., 2018; Söderberg et al., 2022; Wang et al., 2022). Based on the findings from previous research, H10 is as follows:

H10: Personal norms are positively associated with intention to adopt SHD.

Attitude is defined as the "degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (Ajzen, 1991, p. 188). Attitude is a well-established predictor of the willingness to engage in pro-environmental purchasing behavior (Emekci, 2019). Studies investigating the consumption or purchase behavior of sustainable or organic food show a positive association between attitude and intention (Alam et al., 2020; Canova et al., 2023; Falke et al., 2022; Paul et al., 2016; Synodinos et al., 2023). H11 is formulated as follows:

H11: Consumer's attitude is positively associated with intention to adopt SHD.

Perceived behavioral control (PBC) refers to an individual's perception of resources and barriers in performing a behavior and the perceived probability of achievement (Ajzen, 1991). Although the concept of PBC builds on Bandura's definition of self-efficacy, "the major difference between the two concepts is that self-efficacy focuses on factors internal to the individual, whereas perceived behavioral control is assumed to reflect external factors […] as well as internal factors […]" (Ajzen & Timko, 1986, p. 262). In our context, PBC is defined as the individual's perception of difficulty to adopt SHD (Canova et al., 2023). Although a few studies have found a negative or no effect of PBC on intention (Emekci, 2019; Onel, 2017), the majority of studies revealed a positive association of PBC and intention to purchase organic food (Canova et al., 2023; Carrión Bósquez et al., 2023; Falke et al., 2022; Paul et al., 2016; Synodinos et al., 2023). H12 is formulated as follows:

H12: PBC is positively associated with intention to adopt SHD.

Figure 1 provides an overview of the hypothesized relationships.

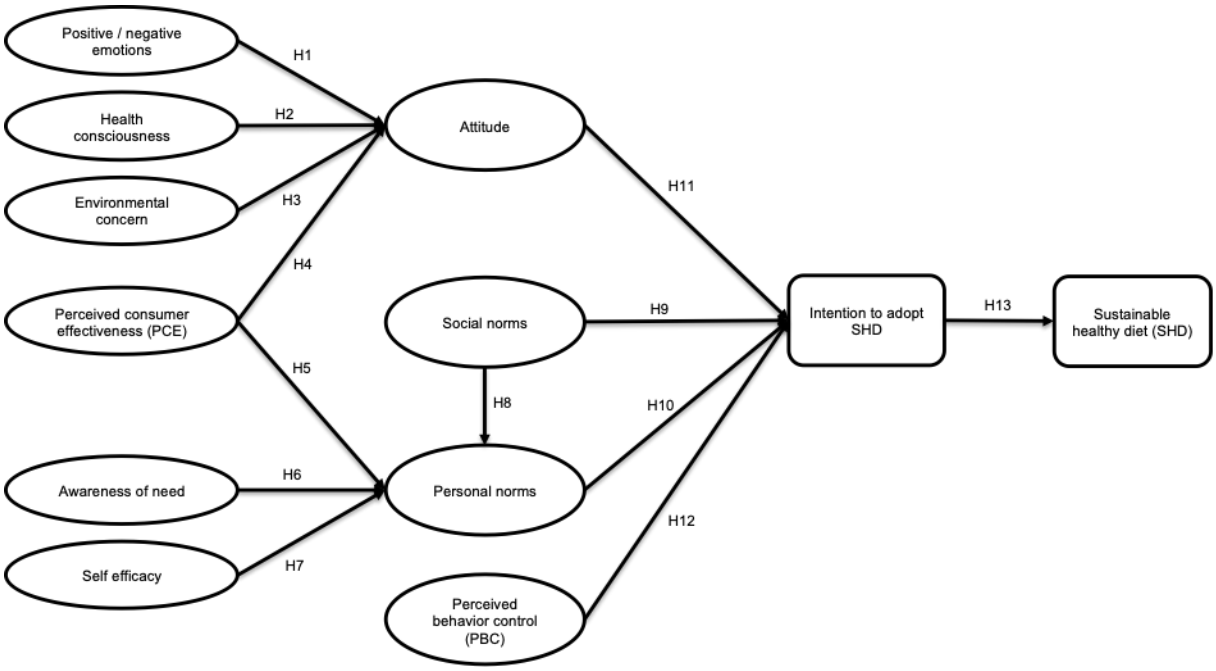

Figure 1: Extended Comprehensive Action Determination Model applied to the adoption of sustainable healthy diets based on Joanes et al. (2020)

Methodology

Design and participants

This research was conducted in two study waves using an online questionnaire with a different focus: data collection for wave 1 took place in November 2023 with the aim to measure determinants of the adoption of SHD; wave 2 took place four weeks later to assess self-reported dietary behavior (SHD). A panel provider helped us collect the data among German residents aged between 18 and 74 years who were solely or equally with another person responsible for household purchases of food. Sampling quotas were calculated based on gender, age, and residency (federal states) to match the German population. In total, 1,061 participants responded in wave 1, and were contacted again in wave 2. After matching wave-1 and wave-2 data, data from 620 participants were considered.

Measures

Participants were asked about their awareness of need (Joanes et al., 2020) (Mean ± SD = 4.34 ± 1.26; a = .83; AVE = .63; CR = .84), self-efficacy (Hanss & Böhm, 2010) (Mean ± SD = 4.92 ± 1.29; a = .90; AVE = .63; CR = .91), environmental concern (Paul et al., 2016) (Mean ± SD = 5.24 ± 1.33; a = .91; AVE = .69; CR = .87), PCE (Kim & Choi, 2005) (Mean ± SD = 4.97 ± 1.20; a = .80; AVE = .57; CR = .80), and health consciousness (Roininen et al., 1999)(Mean ± SD = 4.64 ± 1.18; a = .84; AVE = .50; CR = .84). After providing a short definition of SHD, participants filled in items for personal and social norms (Joanes et al., 2020) (Mean ± SD = 4.93 ± 1.31; a = .89; AVE = .76 ; CR = .90 and Mean ± SD = 3.67 ± 1.35; a = .86; AVE = .62; CR = .83, respectively), positive and negative emotions (Bagozzi & Dholakia, 2006) (Mean ± SD = 4.28 ± 1.34; a = .91; AVE = .77; CR = .91 and Mean ± SD = 2.80 ± 1.34; a = .88; AVE = .70; CR = .88, respectively), in particular happiness, pride, and excitement as well as guilt, frustration, and sadness (Penz & Hofmann, 2021), attitude (Pucci et al., 2022) (Mean ± SD = 4.27 ± 0.83; a = .88; AVE = .72; CR = .88), and PBC (Joanes et al., 2020) (Mean ± SD = 5.46 ± 1.16; a = .82; AVE = .61; CR = .82). All items were assessed on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree), except for attitude which was measured using a semantic differential. For intention to adopt SHD in the next four weeks, we rephrased the short form of the SHED index designed by Tepper et al. (2021) to capture intentions (Mean ± SD = 48.06 ± 18.74). In wave 2, the original scale was used to assess participants' level of SHD in the past four weeks (Mean ± SD = 27.31 ± 14.33).

Data analysis

Data cleaning as well as descriptive analyses were performed using IBM SPSS. A confirmatory factor analysis was performed using MPlus. Goodness of model fit for an ML estimator was evaluated using overall chi-squared test as well as multiple parameters with the following cutoff criteria (Byrne, 1994; Kline, 2015): CFI (> .90), TLI (> .90), RMSEA (< .05), and SRMR (< .08).

Results

The Fornell-Larcker criterion was used to check the discriminant validity (Fornell & Larcker, 1981). Based on low factor loadings and discriminant validity concerns, certain items were deleted from the questionnaire. The statistics reported in the methods section are based on the resulting number of items that were included in the final analysis. The overall model fit (c^2 = 1397.236, c^2/df = 2.290, p < .05; CFI = .934; TLI = .923; RMSEA = .046; SRMR = .054) is acceptable. The correlation matrix is shown in Table 1.

Construct	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Awareness of need	**.794**												
2. Self-efficacy	.470**	**.792**											
3. Environmental concern	.482**	.677**	**.827**										
4. PCE	.289**	.666**	.593**	**.754**									
5. Health consciousness	.203**	.343**	.370**	.447**	**.710**								
6. Personal norms	.348**	.650**	.608**	.642**	.599**	**.869**							
7. Social norms	.155*	.373**	.316**	.378**	.335**	.536**	**.790**						
8. Positive emotions	.235**	.461**	.432**	.532**	.474**	.707**	.547**	**.877**					
9. Negative emotions	.068	.053	.060	-.038	-.193**	-.019	.017	-.027	**.839**				
10. Attitude	.266**	.555**	.524**	.533**	.455**	.678**	.305**	.503**	-.094*	**.848**			
11. PBC	.057	.366**	.290**	.433**	.378**	.462**	.324**	.398**	-.167**	.498**	**.782**		
12. SHED intention	.204**	.430**	.400**	.490**	.653**	.624**	.424**	.543**	-.084*	.469**	.388**	-	
13. SHED behavior	.192**	.324**	.328**	.349**	.587**	.469**	.325**	.415**	-.086*	.357**	.313**	.789**	-

Table 1: Correlation matrix for the latent variables
Note: Diagonals (in bold) present the square root of Average Variance Extracted (AVE) for each construct, while the off-diagonals present the correlations. * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level or lower (2-tailed).

Next, path modeling was used to test the hypotheses. The variables explain 43% of the variance in attitude toward SHD, 58% of the variance in personal norms, 40% of the variance in intention to adopt SHD, and 62% of the variance in the self-reported adoption of SHD.

As hypothesized, positive emotions (b = .210, p < .001, CI = [.069, .191]), health consciousness (b = .159, p < .001, CI = [.045, .179]), environmental concern (b = .266, p < .001, CI = [.103, .228]), and PCE (b = .190, p < .001, CI = [.057, .206]) are positively associated with attitude toward SHD. A negative association between negative emotions and attitude is found (b = -.067, p < .05, CI = [-.091, .009]), however this association is not significant. These results support H1a as well as H2-H4; H1b is not supported.

PCE (b = .310, p < .001, CI = [.238, .438]), social norms (b = .296, p < .001, CI = [.215, .357]), and self-efficacy (b = .299, p < .001, CI = [.202, .402]) are positively associated with personal norms. However, the relationship between awareness of need and personal norms is non-significant (b = .072, p < .05, CI = [-.005, .154]). Accordingly, H5, H7 and H8 are supported; H6 is not supported.

Personal and social norms are positively associated with intention to adopt SHD (b = .478, p < .001, CI = [5.000, 8.524] and b = .122, p < .05, CI = [.348, 2.98], respectively), supporting H9 and H10. The same holds for PBC (b = .101, p < .05, CI = [.087, 3.130]). Interestingly, attitude is unrelated to intention to adopt SHD (b = .064, p = .155). Therefore, H11 is not supported. Lastly, intention is positively associated with the adoption of SHD (b = .784, p < .001, CI = [.554, .652]), which supports H13.

Discussion

The findings contribute to our understanding of the determinants of the adoption of SHD. First, the relation between intention and self-reported behavior is positive and strong. Second, personal norms matter most regarding the association with intention to adopt SHD, while social norms and

PBC are relatively less important. Attitude is unrelated to intentions to adopt SHD among the German consumers considered in the present study.

The extension of the CADM was helpful in the sense that 43% of the variance in attitude toward SHD could be explained by the four considered variables: positive emotions, health consciousness, environmental concern, and PCE. Still, attitude is unrelated to intentions. This is surprising given that attitudes are considered as a strong predictor of intentions and, hence, behavior (Emekci, 2019). The importance of personal norms has been shown in previous research, such as in Moser (2015).

The study has some notable limitations. First, the SHED index relies on self-reports and may thus be subject to over- and underreporting. Second, we do not provide evidence for the causality between the variables. Third, the SHED index has multiple dimensions, with foci on health and sustainability. In the next steps, these sub-dimensions (in particular healthy eating, sustainable eating, ready meal consumption) are assessed to get nuanced perspectives into the determinants of the adoption of sustainable and healthy diets. Also, the influence of moderators will be tested to assess whether relationships, particularly predictors of intention and behavior, differ between individuals with different backgrounds (e.g., knowledge, action plans).

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Describing sustainability: Triangulating the use of B Corp certification

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Abstract

In the dynamic realm of corporate sustainability, B Corporation (B Corp) certification has risen to serve as a popular benchmark for assessing a company's commitment to environmental and social governance (ESG) standards. This study presents a triangulation methodology to scrutinize how firms present B Corp certification status to consumers and stakeholders in different marketing spheres. We seek to describe the use of B Corp marketing and other ESG certifications and positioning claims.

Our three-phase methodology has increasing focus by integrating data from B Corp's official website displaying certified firms, the digital footprints of these companies and brands, and product insights from the Mintel Global New Product Database (GNPD). Over 14,000 datapoints of products encompass the categories of food, health, beauty and personal care, beverage, household, and pet products provided by over 100 brands. These products come from large multinationals such as Unilever and Groupe Dannon and a smaller contingent of medium sized international companies. This global and holistic approach facilitates a detailed examination of B Corp's influence across various corporate and consumer dimensions.

First, we delve into the B Corp website, exploring firm profiles and B Impact Scores, basic descriptions such as industry and headquarters, and the certification process. This includes a thorough review of documentation detailing the B Corp's firm-specific assessment methodology and firms' responses to B Corp assessment criteria, offering a foundational perspective of each company's verified sustainability credentials.

Second, our analysis extends to companies' online representations. By evaluating a firm's web presence, we assess how extensively B Corp certification is displayed and described, and if it is juxtaposed with other sustainability endeavors or credentials. This includes a nuanced consideration of the depth and breadth of B Corp discourse across diverse firm/brand sizes, elucidating how digital narratives are constructed within the smaller and often singular web presences of more focused brands and the multifaceted network of web pages operated by a large parent company.

Third, GNPD provides data on how B Corp certification manifests in product marketing and labeling. Our methodology examines both the general trends in and specific representations of B Corp status on product packaging. We observe broad data detailing the presence and use of ESG claims and how these have evolved over time, place and product category. We then investigate a series of firm case studies of claim size, location, complementary information, and use of other ESG positioning claims. This dual focus on broad product trends and detailed labeling practices provides insight of how firms choose to market B Corp status directly to consumers.

For example, at the time of writing, this data includes 115 Norwegian products, the vast majority in the food, beverage, and beauty and personal care categories. By weaving together these points of analysis, our methodology highlights the synergy and discrepancies between third-party certification, corporate self-representation, and consumer-facing product sustainability messages. This triangulated approach offers a comprehensive tool for future research, facilitating nuanced

inquiries into the impact of B Corp certification on markets, stakeholders, and consumer choices, and the broader ESG movement.

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Consumers' preferences for Kosher pálinka: Insights from an economic experiment

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Abstract

Pálinka is a fruit spirit protected by an EU geographical indication. Its raw material and production can only take place in Hungary (or in four Austrian provinces). The compliance of a food product with the strict hygiene requirements of kosher production and the compliance of its ingredients with religious standards is always verified by a rabbi and certified by the seal of a rabbinate. The category of kosher pálinka combines these two criteria and dates back several centuries.

Studies on kosher food consumers pointed out that the consumer base for kosher products is much wider than the Jewish community, i.e. non-Jewish consumers buy the products for a variety of reasons as Those are perceived as better quality, safer, healthier and more sustainable.

In order to get a more accurate picture of kosher product buyers, we conducted a non-hypothetical experimental economics mechanism, the BDM lottery among Jewish and non-Jewish pálinka buyers. We conducted the data collection in several locations in Budapest (e.g. in the separate rooms of two synagogues) with 136 Hungarian participants. The research was conducted with the support of a Chief Rabbi of Budapest, with ethical permission, and after pre-registration. Participants bid on non-kosher and kosher pálinka and, in addition to demographic data, answered questions on preference, their relationship with Jewish community and Schwartz's basic human values. A second willingness to pay (WTP) collection was performed after providing information on kosher pálinka to participants (i.e.: close connection between Jewish community and pálinka and about kosher production).

Our research is the first to apply an incentive compatible mechanism to assess kosher products and the first to choose kosher pálinka as its research product.

Half of the respondents showed a premium WTP for kosher pálinka and one tenth showed a reduced WTP. On average, respondents were 14.4% more willing to pay for kosher pálinka compared to the non-kosher one. According to the ANOVA analysis, those with higher education, Jewish religion, Jewish identity, those who partially or fully follow kosher kitchen rules, and those who perceive kosher products as better quality, better for health, safer, and more sustainable are willing to pay more for kosher pálinka.

We found that participants who were non-Jewish but open to paying a premium for kosher pálinka showed the highest WTP ($p<0.001$). Further analysing the characteristics of this group, we found that "Self-direction" is most characteristic for them. Seemingly unrelated regression (SUR) analysis found that primarily higher income and a more sustainable perception of kosher products had a positive effect on the WTP premium in this group.

The information provided in the second round increased the WTP premium for a third of the respondents for kosher pálinka. On average, treatment information increased the WTP premium by 7.7%. The ANOVA showed that main grocery shoppers were most affected with the treatment information. SUR showed that treatment information had the opposite effect to education (the higher the education, the smaller the treatment effect), and treatment worked well on those who perceived kosher products as safer than conventional.

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Valuing the bond: Unraveling German consumer segments for 'Cow-Calf Contact System' products from dairy farms via cluster analysis

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Abstract

Introduction

The welfare of farm animals is increasingly criticized by the public (e.g., Alonso et al. 2020). In the case of cattle farming, early cow-calf separation and subsequent individual housing of calves, in particular, receive criticism, notably due to the presumed emotional consequences of separation for cows and calves (reviewed by Placzek et al. 2021). In addition to public concerns, scientific studies also show that, for example, individual housing leads to suboptimal social skills, making it difficult for calves to cope with new situations later in life (Costa et al. 2016). The early separation and individual rearing of calves is still the dominant system in dairy farming, but alternatives are increasingly becoming the focus of practical and scientific attention, such as pair housing, early group housing, foster-cow system, and dam-rearing system (e.g. Knierim et al. 2020). Pair and group housing offer potential for more social interactions and playful behavior (Paula Vieira et al. 2010, Costa et al., 2016). Prolonged contact between cow and calf brings long-term benefits in terms of sociability, fearfulness, future maternal behavior, and health (Flower und Weary 2003). Research by Sirovica et al. (2022) shows that public perception of animal welfare was most positive in systems where calves were not separated from their dams, as opposed to systems where calves were separated and subsequently kept in group housing or a foster cow system, where the cow typically nurses its own calf and one to three additional calves from other dams. The study further suggests that some consumers in North America have a higher willingness to pay (WTP) for milk produced in these dam-rearing systems compared to milk from other calf-rearing systems. Interestingly, the WTP is not higher for foster-cow systems (Sirovica et al. 2022). However, foster-cow husbandry in Germany, along with dam-rearing systems, is discussed and investigated as a more animal-friendly system, and it often exists in practice in mixed forms (e.g. Eriksson et al. 2022). The usage of foster cows is thereby often more practical and economical than keeping the calves with their dams (Vaarst et al. 2021). Accordingly, it is relevant to achieve higher prices on the market, which in turn requires knowledge of possible target groups, both for cow-calf-contact (CCC) rearing systems in general and specifically for dam- and foster-cow systems. However, despite higher social acceptance, products from CCC systems remain a niche product in Germany (Placzek et al. 2020). Therefore, we aim to identify and characterize potential target groups for products CCC systems so that marketing strategies can be developed to offset the additional costs of these systems (Placzek et al. 2020). For this purpose, a cluster analysis will be applied.

Data & methods

The present study obtained approval from the Ethics Committee of the University prior to data collection. Data collection took place in August 2023 through an online survey, ensuring quotas for

age, gender, and education for the German population were met. Following data cleaning, the final sample comprised 996 participants.

Participants were asked to consider five different calf rearing systems. The housing systems were presented by using pictures and a short text that describes the most important aspects. The systems were shown in a randomized order.

For each system, participants rated four items (see Fig. 1) on a 5-point Likert scale (1 = “Completely agree” to 5 = “Completely disagree”) to assess acceptance on affective, cognitive, and conative levels. These statements were analyzed descriptively. Afterwards, principal component analysis was used to derive an acceptance factor for each rearing system from the four items. After removing outliers using single linkage method and missing values, 952 participants were included in the subsequent cluster analysis. Hierarchical cluster analysis was conducted using the factor scores, with the number of clusters determined by dendrogram and elbow tests. Cluster differences were analyzed using ANOVA, post-hoc tests, and cross-tabulations to investigate variations in acceptance of different calf rearing systems.

Results

The descriptive results for four different statements used to examine the acceptance of the five different rearing systems are shown in Figure 1. Across all four statements, the lowest level of approval is given to individual housing, followed by pair housing. Group housing receives a medium level of approval, and higher approval is given to foster cow system. The highest level of acceptance was given to dam-rearing system. This sequence from individual to dam rearing can also be observed later in most clusters.

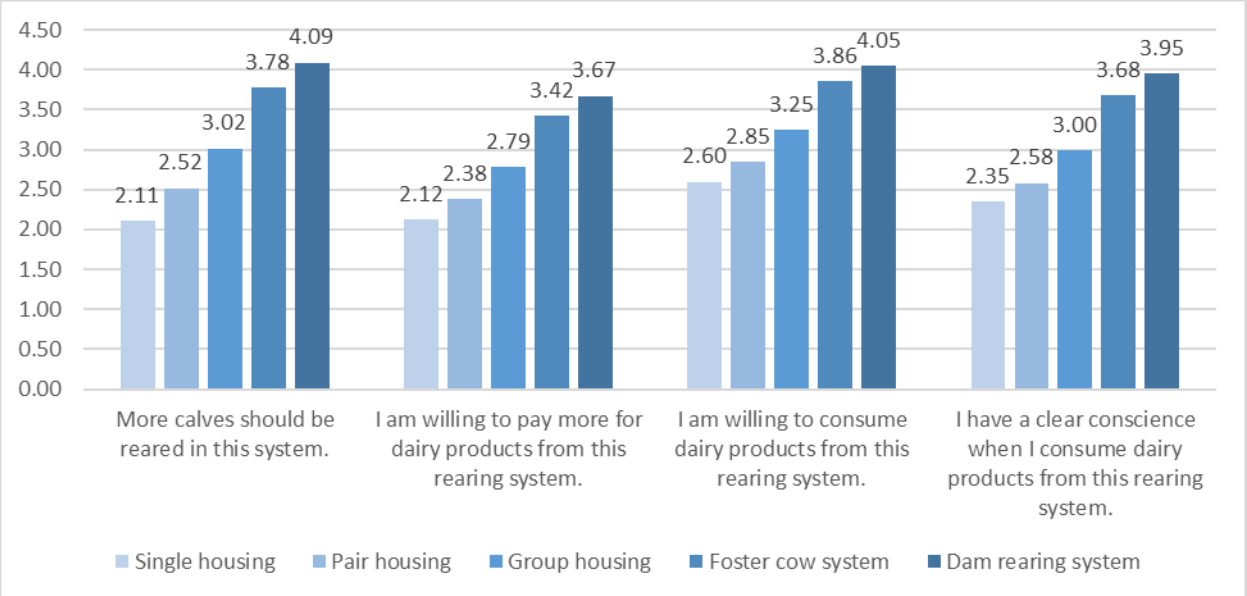

Figure 1: Agreement with items to measure the social acceptance of different calf rearing systems; mean values on scale: 1 (“Completely agree”) to 5 (“Completely disagree”)

A factor could be calculated for each calf rearing system using the principal component analysis with all four of the acceptance items shown in Figure 1, which was used cluster-building factor. The quality criteria fulfil the requirements (Cronbachs Alpha, KMO). The subsequent cluster analysis resulted in five clusters. The clusters differ significantly, as can be seen Table 1. For better interpretability, here an index is shown which represents the simple mean of the individual acceptance statements. Cluster 1 comprises 26.9% of the sample and is the largest cluster. These respondents do not completely reject any rearing system, but the absolute acceptance increases from single housing (3.32) to dam-rearing system (4.35). This cluster is named as "The acceptors".

Cluster 2 is the smallest cluster and comprises 14.2% of the sample. These respondents have a low level of acceptance for all husbandry systems, with only dam-rearing system achieving a medium level of approval (3.14). As they reject the husbandry systems most strongly compared to the other clusters, this cluster is referred to as "The livestock farming critics".

Cluster 3 comprises 21.6% of the sample. Even if, as in the other clusters, the acceptance of single housing gradually increases towards dam-rearing system, they still rate all housing systems with average approval (2.72-3.30). They are categorised as "the disinterested".

Cluster 4 is the second smallest cluster and includes 15.9% of the sample. Single (1.52) to group housing (2.41) achieve a low level of acceptance among them; foster cow and especially dam-rearing system on the other hand, are highly accepted (4.07 and 4.61). They are named as "Highly supporters of dam-rearing systems ".

Cluster 5 is the second largest cluster with 22.6%. Like cluster 4, they reject single and pair housing (1.75 and 2.46). Group housing is moderately accepted (3.4). The cow-calf-contact-systems both receive a high level of acceptance, with the foster cow system receiving the highest rating (4.22). This cluster is referred to as "Those willing to compromise".

Table 1: Description of clusters by an index of acceptance of calf rearing systems

Variable	Characteristics	1 (n=256) *The acceptors*	2 (n=135) *The livestock farming critics*	3 (n=205) *The disinterested*	4 (n=141) *Highly supporters of dam-rearing systems*	5 (n=215) *Those willing to compromise*	Total (n=952)
Acceptance of calf rearing system (mean values)[1]	single housing	3,32[a]	1,32[b]	2,72[c]	1,52[bd]	1,75[d]	2,29
	pair housing	3,50[a]	1,46[b]	2,89[c]	1,66[b]	2,46d	2,57
	group housing	3,82[a]	1,76[b]	3,03[c]	2,14[d]	3,40[e]	3,01
	Foster-cow system	4,22[a]	2,47[b]	3,01[c]	4,07[a]	4,22[a]	3,69
	Dam-rearing system	4,35[a]	3,14[b]	3,31[b]	4,61[c]	4,14[a]	3,94

[a–d] According to post hoc tests, clusters with different letters do differ significantly ($p \leq 0.05$); [1]Scale: 1 (“Agree completely”) to 5 (“Disagree completely”).

The clusters are compared in terms of socio-demographics and diets, their consumption habits of animal products, their attitudes towards animal welfare in cattle, and their self-reported willingness to pay more for dairy products from foster-cow and dam-rearing systems (see Table 2).

Clusters 1 (“The acceptors”) and 3 (“The disinterested”) have a significantly higher proportion of men. While cluster 1 has one of the significantly highest proportions of university entrance qualifications, cluster 3 is further characterised by the significantly highest proportion of participants with low education.

Cluster 2 (“The livestock farming critics”) has a higher proportion of women (62%) and the significantly highest proportion of vegans (6%) and vegetarians (18%). This cluster has the lowest average age, but the differences are not significant compared to the other clusters.

Cluster 4 (“Highly supporters of dam-rearing systems”) has a significantly higher proportion of women (67%) and, together with cluster 2, differs from clusters 1 and 3 in the proportion of those who consume meat daily (13%) (“flexitarians”).

Cluster 5 (“Those willing to compromise “) is the most significantly balanced in terms of gender distribution and has one of the significantly highest proportions of university entrance qualifications (42%).

Of all the clusters, Cluster 1 gives the lowest level of agreement to the item "Most cows and calves in Germany are doing badly" (2.77) and, together with clusters 3, significantly lower than clusters 2, 4 and 5. They do not stand out compared to the other clusters in terms of their WTP more for animal welfare products (3.53). However, together with clusters 4 and 5, they would pay significantly more for products from foster cow systems than clusters 2 and 3. They show a rather high WTP more for foster-cow systems (3.87) and dam-rearing systems (4.05).

Cluster 2 has the highest level of agreement with the item "The welfare of the cows and calves is important to me." (4.27; similar to cluster 4). However, they show nevertheless the lowest WTP for products from dam rearing systems. This is similar to cluster 3, which also has the significantly lowest agreement of all clusters for the item " I am willing to pay more for dairy products from animal-friendly husbandry." (2.88) what is higher for people in cluster 2 (3.71).

Cluster 4 shows the highest WTP of all clusters for products from animal-friendly husbandry in general (4.01) and more specifically dam-rearing systems (4.46); however, cluster 5 shows the highest WTP for foster cow systems (4.02).

Table 2: Description of the clusters by sociodemographics, diet, attitudes towards animal welfare of cattle and WTP

Variable	Characteristics	1 (n=256) *The acceptors*	2 (n=135) *The livestock farming critics*	3 (n=205) *The disinterested*	4 (n=141) *Highly supporters of dam-rearing systems*	5 (n=215) *Those willing to compromise*	Total (n=952)
Gender [%]	Female	40.6[a]	61.5[bc]	37.1[a]	67.4[c]	52.1[b]	49.4
	Male	59.4[a]	38.5[bc]	62.9[a]	31.9[c]	47.9[b]	50.5
Age (mean values)		50.39[a]	47.04[a]	47.13[a]	50.55[a]	48.51[a]	48.81
Education [%]	Low education (yet)	28.9[a]	34.[1ab]	38.5[b]	32.6[ab]	26.5[a]	31.7
	General certificate of education	31.6[a]	31.1[a]	31.7[a]	32.6[a]	32.1[a]	31.8
	General qualification for university entrance	39.5[a]	34.8[ab]	29.8[b]	34.8[ab]	41.4[a]	36.4
Income [%]	4500€ +	22.3[a]	20.0[a]	10.2[b]	14.9[ab]	17.2[a]	17.1
Diet [%]	Vegetarian	2.3[a]	17.8[b]	1.5[a]	9.9[bc]	7.0[a]	6.5
	Vegan	0.8[a]	5.9[b]	0.0[a]	0.7[a]	0.5[a]	1.3
	Daily consumption of meat	27,9[a]	12,7[b]	25,5[ac]	12,8[b]	18,1[bc]	21,2
	Daily consumption of dairy products	37,2[a]	38,1[a]	33,0[a]	35,3[a]	39,4[a]	36,6
Attitudes towards animal welfare of cattle (mean values)[1]	"Most cows and calves in Germany are doing badly."	2.77[a]	3.41[b]	2.79[a]	3.33[b]	3.26[b]	3.06
	"The welfare of the cows and calves is important to me."	3.93[a]	4.26[b]	3.42[c]	4.27[b]	4.05[ab]	3.94
	"I am willing to pay more for dairy products	3.53[a]	3.71[ab]	2.88[c]	4.01[b]	3.68[ab]	3.52

	from animal-friendly husbandry."						
	"I am very interested in how cows and calves are doing."	3.51[a]	3.97[b]	3.09[c]	3.99[b]	3.71[ab]	3.60
"I am willing to pay more for dairy products from this rearing system." (mean values)[1]	Foster cow system	3.87[a]	2.31[b]	2.56[b]	3.97[a]	4.02[a]	3.42
	Dam rearing system	4.05[a]	2.96[b]	2.81[b]	4.46[c]	3.96[a]	3.67
Displayed are means or percentiles (stated in brackets) [a–d] According to post hoc tests, clusters with different letters do differ significantly ($p \leq 0.05$); [1]Scale: 1 ("Agree completely") to 5 ("Disagree completely").							

Discussion and Conclusion

In this study, a gradual increase in the acceptance of the calf rearing systems analysed was observed among all respondents, with individual rearing receiving the least acceptance and CCC systems (foster and dam rearing systems) the greatest acceptance. This finding is consistent with other studies describing consumers' rejection of individual housing of calves (review Placzek et al. 2021) Of interest is the comparison with the study by Sirovica et al. (2022), where only dam rearing systems found increased approval.

A total of 5 clusters were identified based on their acceptance of and WTP for products from the five husbandry systems. Two of these clusters, which together make up around a third of respondents, are not an attractive target group, as they are either uninterested or very price-sensitive. This supports existing studies in the area of animal welfare research that about one-third of consumers are not interested in such topics (e.g. Kühl et al. 2022). Furthermore, we found one cluster (cluster 1) that shows high approval rates for CCC systems but do not reject other rearing systems and overall have lower involvement in animal welfare issues, as they do not criticize the current state of German calf rearing. Therefore, respondents from this cluster may potentially opt for competitor products.

However, two clusters were found having the highest acceptance and WTP for foster and dam rearing systems (cluster 4 and 5). Cluster 4 has high involvement in animal welfare issues and simultaneously has a higher proportion of flexitarians and vegetarians; a relationship between animal welfare concerns and changes in dietary habits is already known from the literature (Ruby 2012). Additionally, this cluster has a higher proportion of women. Clark et al. (2017) found that women generally have a higher WTP for "animal welfare-friendly" products than men. This also fits in with Placzek et al. (2020), who found that women and customers of organic food shops in particular reject early separation and could therefore represent a suitable target group. These

factors along with dietary habits including sufficient dairy and meat products, make this cluster a suitable target group, especially for the highly accepted dam rearing systems, but also for products from foster cow systems.

Cluster 5 is more interesting as a target group for foster cow system products. These consumers show slightly lower involvement in animal welfare issues compared to cluster 4, but they reject individual and pair housing, making it less likely for them to resort to competitor products. These consumers demonstrating willingness to compromise, is unusual for a target group analysis for animal welfare products and reveal the potential of marketing products of foster cow systems.

Subsequent research should further investigate the factors favoring high acceptance of CCC, especially foster cow, systems.

References available upon request.

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Food and beverage content presented by influencers on TikTok

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Abstract

Amidst the growing popularity of social media platforms as marketing tools, particularly among young consumers, this study focuses on analyzing content related to food and beverages presented by influencers on TikTok in Poland in 2022. Employing a research methodology based on desk research and data selection from 100 influencer profiles, the study provides a cross-sectional examination of trends in the presentation of food products, considering their seasonality and potential impact on health. A total of 8714 materials were analyzed, of which 798 focused on food products, classifying them according to their impact on health: positive, neutral, and negative. Results indicate a predominance of content promoting products with potentially negative health impacts, raising concerns about their influence on the dietary habits of the younger population. The study highlights the role of influencers as significant mediators in shaping the perceptions and dietary choices of their audience. Research limitations and recommendations for future studies outline the need for further exploration of this rapidly evolving field, with a particular focus on changing strategies for marking collaborations and their perception by audiences.

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Conceptualization and item development for a healthy cooking scale

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Abstract

Cooking has long been acknowledged for its potential to directly contribute to an individual's general health. It is seen as a direct means to maintain a varied, balanced diet that prevents non-communicable diseases and enhances overall well-being, including positive psychosocial outcomes. However, the mere act of food preparation does not always ensure a healthy outcome. Therefore, exploring the concept of healthy cooking through research can give us a clearer understanding of how to truly benefit from cooking.

The lack of a consensus definition and the unavailability of a validated measurement tool for healthy cooking is an impediment to progress in research on healthy cooking. The goal of this research is to offer a conceptualization of the concept of healthy cooking and to develop items for a reliable and valid instrument to measure the extent to which people engage in healthy cooking. We define healthy cooking as the act of combining food ingredients to create a healthy dish. According to the definition and scientific evidence criteria outlined by authoritative agencies, including the World Health Organization (WHO) and the United States Department of Agriculture (USDA), healthy cooking can be described via two dimensions: selecting healthy ingredients and applying healthy cooking techniques. Furthermore, according to regulatory focus theory, avoiding unhealthy ingredients and unhealthy cooking techniques is as important as approaching healthy ingredients and applying healthy cooking techniques. Practices within both steps can go along with either positive or negative health consequences. Positive health consequences refer to cooking behaviors that can promote health, while negative health consequences describe potentially harmful outcomes that should be avoided.

In Study 1, we conducted semi-structured interviews with 16 informants, which adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ). The findings supported the proposed framework. Next, a list of 31 potential items for a healthy cooking scale was developed based on these interviews. In Study 2, ten nutrition experts were interviewed and took part in a classification task to test the content validity of the items and refine the item pool. This procedure led to a revised list of 25 items. In future studies, further evidence on the validity and reliability of the scale will be provided. With a suitable measurement scale, it will be possible to relate healthy cooking to important antecedents such as food literacy and cooking skills. It is also a step toward a better understanding of the relationship between healthy cooking and other downstream consequences such as healthy eating, subjective well-being and disease prevention.

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Do ingredients matter? Exploring consumer preference for abstract vs. concrete descriptors of plant-based meat and dairy alternatives

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Abstract

Introduction

Production and consumption of meat and dairy products have long held a pivotal role in discussions on how to make current food systems more sustainable (Clark et al.2019). There is general agreement that a reduction in consumption of animal-based products bodes well for improving both planetary and human health (Willett et al. 2019). The food industry, in developed markets especially, has steadily increased the accessibility of plant-based meat and dairy alternatives (PBMDAs). Nonetheless, the mere availability of these alternatives does not directly translate to consumer acceptance and uptake, as scepticism and negative perceptions persist among many (Collier et al. 2023). To address this, manufacturers have recognised the importance of strategic communication. Beyond offering certified labels, the language used to describe these products to consumers has been an important mechanism in enhancing the appeal of PBMDAs. Descriptors vary in abstraction, ranging from simply indicating the absence of animal-based ingredients (e.g. meat-free burger, dairy-free milk) to identifying the presence of plant-based ingredients in general (e.g. plant-based burger/milk), or highlighting the primary ingredient (e.g. lentil-based burger, soy-based milk).

Consumer perceptions are susceptible to influence from product descriptors. For example, literature shows that labels such as the 'vegan' label is highly contested. Some studies find that it has been counter-productive in encouraging the uptake of PBMDAs (Demartini et al. 2022; Sleboda et al. 2024; Ruby et al. 2024), while others (Rosenfeld et al. 2022) find that that it has encouraged the consumption of those meals. Despite the disconfirming results, many studies have focused on labels, yet fewer consider the influence of information provided by unregulated nomenclature, such as the varying levels of detail on front-of-pack product descriptors.

Against this background, this study aims to understand how consumers in the United Kingdom (UK) rationalise semantic differences between abstract to concrete descriptors of PBMDAs. Our research question addresses the following: *How do differences in product descriptors, ranging from abstract to concrete, influence appeal and expectations (taste, health, sustainability) of plant-based meat and dairy alternatives?* The UK context is appropriate from various aspects. Firstly, with its goal of having net zero emissions by 2050, there is an increased push to make food systems more sustainable, including integrating more plant-based foods into people's diets. This is deemed to be challenging given that the British population still exhibits strong attachment to meat and dairy products. Secondly, at the time of writing, no standardisation of PBMDAs product descriptors exists. This means there lies untapped potential in harnessing a certain level of abstraction which could have promising effects from both the consumer side, but also for manufacturers, in contributing to better health and environmental outcomes.

Method

To meet our objective, data were collected through an online survey in January 2024. 1,073 British participants were recruited via a panel provider. To firstly explore attributes associated with meat/dairy-free, plant-based or ingredient-specific labels, a 'Check-All-That-Apply' approach was used. Attributes explored included positive (e.g. "natural", "healthy") and negative (e.g. "processed", "unhealthy") dimensions identified as relevant to the product category. This was supplemented by a correspondence analysis to identify which words are most closely related to the three different levels.

Following this, the appeal of 8 PBMDAs presented under different levels of information granularity was measured by participants selecting one of the 3 products (meat/dairy free, plant-based, ingredient specific): "*Please imagine you are at a grocery store to buy a __ from these options. Which of the following sound most appealing?*". Four meat substitutes (burger patty, nuggets, sausage rolls, mince) and four dairy substitutes (milk drink, yoghurt, cheese, butter/margarine) which are commonly found on the British market were selected. Two products within the meat and dairy category were soy-based (sausage roll, mince and milk drink, yoghurt). There were two additional pulse-based meat alternatives (chickpea-based burger patty, lentil-based nuggets) and two oil-based dairy alternatives (coconut oil-based cheese, rapeseed oil-based margarine). Taste, health and sustainability expectations of these foods based on abstract (meat/dairy-free), intermediary (plant-based) and concrete (ingredient-specific) product descriptors were measured on 5-point Likert scales from 1= Not at all tasty/healthy/environmentally sustainable to 5 = very tasty/healthy/environmentally sustainable. Descriptive statistics as well as ANOVAs and post hoc tests were used to test differences in appeal, as well as taste, health and sustainability expectations between the different levels of abstraction across the products.

Findings & Conclusions

Strategic product descriptors can significantly shape consumer perception, influencing their willingness to try and ultimate acceptance of the food. In our study, we find that British consumers express a strong appeal for PBMDAs that are described with high levels of abstraction, by simply referring to the product as meat or dairy free. These findings are in keeping with the clean label trend literature, which also suggests that products gain desirability by virtue of being labelled as being 'free from' certain attributes (Asioli et al. 2017). However, this does not explain the prevalence of initial negative connotations associated with this label, as suggested by our correspondence analysis. Our results show that on the one hand, the most abstract condition initially elicits more negative attributes when asked generally, yet on the other hand and contrary to our hypothesis, it is this same level of abstraction that is most appealing when asked on a more personal and direct level.

This can be interpreted through several lenses. Given that meat alternatives can require high levels of processing, thereby classifying them as 'ultra-processed foods' (Ohlau et al. 2022), a higher level of abstraction disguises this to a greater extent and hence makes it more appealing. Secondly, the presence-based product descriptors (plant-based, ingredient-based) as opposed to the absence-based (meat/dairy free), may be less conducive to consumers' imagination and interpretation. The more abstract the descriptor, the more it encourages imagining something closely related to a familiar benchmark — in this case, meat texture and taste — two aspects which have been found to be most important when encouraging the replacement of meat in diets (Michel et al. 2021).

Our overall findings are contrary to previous research which showed that revealing key protein sources (soy, pea, potato) can improve overall product perception, as opposed to when products are simply presented as containing 'protein' (Aschemann-Witzel and Peschel 2019a). However, the explicit mentioning of ingredients can carry pre-existing connotations from certain ingredients, over to the product. When an ingredient is perceived as being of lower value, the horn effect or a reverse optimism bias may be triggered (Richetin et al. 2021). This bias entails that the negative perception of an ingredient extends to the entire product, thereby amplifying the food's negative functionality (Asioli et al. 2017). Soy, as an ingredient, has been found to be viewed critically by consumers (van Dijk et al. 2023), resulting in greater initial hesitancy towards foods that have it as a primary component. Therefore, it is not only the degree of information (abstract vs. concrete) but also the type of information (which ingredient) and the type of food that can influence consumer appeal, acceptance and expectations of PBMDAs.

While our results show that consumer appeal towards PBMDAs differed significantly depending on abstraction level, the extent of this effect was not as varied on taste, and less so in terms of health and sustainability expectations. While consumers perceive PBMDAs to have an average taste rating ($\bar{x}$= 2.8 ; SD = 1.3), they view these products more favourably in terms of health ($\bar{x}$=3.4 ; SD = 1.2) and sustainability ($\bar{x}$=3.5, SD = 1.2) outcomes. These findings corroborate existing literature stating that consumers commonly hold positive preconceptions regarding the sustainability and health benefits of PBMDAs. However, their expectations for taste tend to be considerably lower (Ketelings et al. 2023; Vural et al. 2023). The strong positive perceptions within this product category, regarding sustainability and health, leave little room for improvement. Hereby, consumers might simply accept the entire food category as healthier and more sustainable, without discerning much between the degree of abstraction of the descriptor.

Our results have implications for manufacturers and the marketing industry. As our results show that consumers welcome higher levels of abstraction in PBMDAs descriptors, it grants manufacturers greater flexibility in their approaches. When a product is described as 'meat-free' or 'dairy-free', it gives the manufacturer more leeway to use ingredients that are more economical, easier to handle, functional, or even use ingredients that give them the most scope to combine it with other claims, such as health claims. The industry could embrace this flexibility further by creating PBMDAs through extracting proteins from other waste by-products such as potato or grass protein (Aschemann-Witzel and Peschel 2019b), or by using different underutilised parts of plants (stalks, leaves etc). This could lead to positive externalities such as contributing to a reduction in food loss and waste. Similarly, this is also relevant for novel meat alternatives and protein manufacturers such as those using mycoprotein or precision fermentation (Banovic and Grunert 2023). Since consumers prefer more abstract product descriptors, this adaptability can be harnessed to mask such underused substitutes which may currently still face consumer scrutiny and thus aversion to products containing these. Although consumer resistance may arise from concerns that the broader conditions can be more misleading, it is important to note that these descriptors solely concentrate on front-of-pack labelling, with all detailed and concrete information still accessible back-of-pack. Yet, we acknowledge a limitation in this regard, particularly concerning other proteins such as insect-based alternatives. Here consumers may find the high level of abstraction unacceptable, although the implications of this warrants further research. Nonetheless, while ingredients do matter to consumers to a certain extent, the strategic framing and describing of products can be promising in addressing current and future health and sustainability issues liked to the production, consumption and promotion of meat and dairy products, and their alternatives.

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Connecting consumers with local produce: Insights for a local food provisioning app

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Abstract

Food supply chain resilience has been challenged in recent times due to climatic, political and health (pandemic) factors. Food transportation contributes 26% of carbon emissions globally.[1] Within Europe food is transported an average of 171km from farm to fork[2]. EU citizens waste over 58 million tonnes of food annually[3] at an estimated cost of €132bn[4]. To address such issues, greater resilience must be built into future supply systems to reduce food waste, support the next generation of food producers with a fair income, and ensure food security for all European citizens.

Utilising short food supply chains (SFSC) where 'local' food is sold through a limited number of intermediaries, with independent price setting for producers, and full production information available for consumers, may address these challenges. Given perceived proximity can increase the positive perception of mobile apps[5], such a development could enable a SFSC that allows for dynamic food supply in local areas. This study seeks to understand consumers' drivers and barriers in local food provisioning, and more specifically the potential for digital provisioning solutions (e.g. apps).

Five focus groups were conducted across five countries (Austria, Belgium, France, Spain, UK) with a total of 35 participants. Provisioning of local and/or non-local food, and the use/non-use of digital tools were explored. A semi-inductive, thematical approach was taken for the analysis, inspired by grounded theory.[6]

Findings covered three key areas: 1) definitions of local food, 2) drivers and barriers to local food provisioning, and 3) drivers and barriers in food provisioning with digital tools. Firstly, exploring consumers depictions of local food led to a heterogeneous and multifactorial definition of 'local food'. Key criteria discussed were origin, distance, type of products, number of intermediaries, packaging, type of transport, seasonality, and the context of purchase. Secondly, drivers of local food provisioning were found to be better quality (taste, freshness, healthiness), less waste/food waste, seasonality, and a reduction in the associated carbon footprint (although this was mentioned less than other drivers). Barriers to local food provisioning came in the form of expense as local food was considered more highly priced than alternatives, (although some saw this as a sacrifice to be made), lack of information (at times causing distrust) in the origin and length of the supply chain meaning consumers could not be certain it was 'local', and a lack of diversity. Thirdly, drivers of utilising digital tools for food provisioning were established as convenience (gaining of time, a simplified daily/weekly schedule, physical ease), along with a reduction on one's mental load (through easily finding recipes, etc.), and finally financial drivers with consumers stating they had more control over expenses with a digital tool. Barriers to food provisioning using digital tools, were stated as a lack of

variety in both products and recipes, waste associated with packaging, the proximity of other offers (such as those found in stores), and a loss of benefits such as interaction and physical presence (touch/smell, sociability) found with in-person food provisioning.

This research establishes that whilst consumers may perceive some barriers to using digital tools in food provisioning, there is still potential for their use in SFSC. Future research will look to explore these results further through a larger quantitative consumer study.

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Consumers' intention to buy low trophic aquaculture products: An exploratory study of European food-related lifestyle segments

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Abstract

Given the rising global importance of low-trophic level aquaculture products (e.g. seaweed and mussels) for sustainable food supply, this study examined consumer intentions towards low-trophic level aquaculture products among European consumers. This study focuses on the influence of food-related lifestyles, health consciousness, food neophobia, and food quality attributes on consumer intentions for low-trophic level aquaculture products. We conducted an online questionnaire survey in Denmark, the UK, and Spain (500 respondents per country). The consumer segmentation analysis, employing clustering techniques, revealed five distinct segments characterized by Innovation, Responsibility, and Involvement, namely 'Adventurous', 'Uninvolved', 'Foodies', 'Rational', and 'Conservative', each reflecting unique consumer behavioral patterns.

Then, setting-up structural equation modelling to test the conceptual model revealed that attitude significantly influences consumer behavior, with subjective norms and attitude. This dual approach explains the model's predictive power while identifying targeted segments for sustainable aquaculture product marketing, ensuring the distinction between the model's test and the subsequent segmentation analysis is clearly articulated. To enhance the adoption of low-trophic aquaculture products, marketers should primarily target the 'Foodies' segment, characterized by high involvement and innovation, by emphasizing health consciousness and food quality attributes, while mitigating food neophobia and leveraging subjective norms.

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Consumer trust in information about CBD and hemp food products

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Abstract

Natural and more environmentally friendly foods medicines are being sought by consumers [1–3]. As a sustainably grown crop and natural ingredient, hemp foods and cannabidiol (CBD) products have the potential to contribute to these preferences [4–7].

Though hemp has many benefits, historical regulatory ties to marijuana in the United States impeded its production and consumption since the 1950s [8]. Interest in hemp production resurfaced in the late 1990s and initiated regulatory changes across the state and federal levels, culminating with the passing of the 2018 Hemp Farming Act which federally legalized U.S. hemp production [9,10]. Hemp has since captured the attention of producers and consumers alike. Yet, there is evidence that consumers equate hemp products with psychotropic cannabis, and that information about hemp products ranges from legal claims to marketing ploys which may be considered deceptive [11–14].

Further, hemp regulations have focused on insuring hemp based products have low levels of the psychotropic compound delta-9- tetrahydrocannabinol (THC) [15]. Some hemp food products containing cannabidiol (CBD) have been associated with increased levels of delta-9- tetrahydrocannabinol, making the hemp-drug differentiation increasingly difficult for an average consumer[16]. If hemp is to succeed as an agricultural crop which can be transformed into a variety of useful products then people need information to make preference maximizing choices. We focus on two groups of hemp products that are consumed: foods and CBD (although there are also CBD topicals). CBD products are made from hemp floral material. Hemp foods are made from hemp grain (seeds) which can be pressed into oils, made into meal, or hulled (hemp hearts).

Trust in information sources is key element in using information to make choice. For new and novel products, current literature has focused on social networks, self-confidence, general trust, risk aversion [17,18]. Recent literature discusses trust across the supply chain including interpersonal, organizational (general), organizational (specific), food chain and product [19]. Price Waterhouse Coopers [20] specifically point to scandals, empowered consumers, changing food demand and certifications as areas to build consumer trust. Yet, with regard to novel hemp foods and CBD products, some have called the hemp marketing landscape the “wild wild west” [21–25]. Reference to this unsettled landscape have come from industry, government, and industry groups, all of which have been cited in the food system literature on trust [26].

Our study aims to answer three research questions:

R1. What is the trust in sources of information that originate from the hemp value chain (producers, processors, sellers); from advocacy and industry groups, friends and family; from the news media, social media and the internet and from government sources and from academic research?

R2. Does trust in information differ by whether a respondent is aware of hemp foods or hemp CBD?

R3. What are the implications of answers to R1 and R2 for the hemp food industry?

To investigate consumer trust in hemp information, we utilize a representative sample of U.S. consumers (n=2,000). We include only those who are at least aware of one hemp product groups (clothing, personal care products, rope, paper, and bioplastics, CBD, CBG, and foods) (n=1959). Data were collected by Qualtrix in the first quarter of 2021. We categorize hemp aware consumers into four mutually exclusive awareness groups: CBD only (33.2%), hemp foods only (13.6%), CBD and hemp foods only (22.1%), and any hemp product except CBD or food (31.1%). We also collected data on the level respondent trust for each of the following sources: hemp processors, sellers, farmers, other consumers, friends/family, state departments of agriculture, the United States Department of Agriculture (USDA), non-governmental agencies associated with hemp, university outreach (Extension), news media, social media and other internet sources. These data were collected on a five point scale and collapsed into three ordinal categories of trust: not trusted, neither trusted nor non trusted, and trusted, as this is most appropriate for our classification method, latent class analysis (LCA).

(LCA) is a statistical procedure used to identify qualitatively different subgroups within populations who often share certain outward characteristics. LCA models work on the assumption that the observed distribution of the variables is the result of a finite latent (unobserved) mixture of underlying distributions and membership in unobserved groups (or classes) that can be explained by patterns of scores across survey questions, assessment indicators, or scales.[27,28]. Latent class analysis is appropriate when data are collected as categories and the algorithm assigns probability scores that help identify which classification a respondent belongs to on each dimension. We utilized the Delta method and identify that a 3 class structure is appropriate. Table 1 provides details. The average latent probability scores decrease and then increase. The appropriate latent class cut off is at the point where the probabilities decrease. As shown in Table 1, the probability margin increases at class 4.

The three latent classes are described as: respondents who have an overall trust in every source, respondents who have an overall distrust in every source, and respondents who are in the middle across all sources of information. Individual respondents were placed in a class if the probability of being in that class was >.51. All but 6 respondents were classified (n=1953).

Figure 1 shows size of the 3 retained classes. Sixty percent of respondents were classified as trusting (2.60; δ=.186; η = 2.68) , 21 percent as neither trusting nor untrusting (2.04; δ=.082; η = 2.05), and 19 percent as untrusting (1.57; δ=.229; η = 1.51). Figure 2 shows detail of the average trust level for each source of information and depicts visually the three latent classes. ANOVA tests of the null hypotheses that each class is not different from another class is rejected for every source of trust (Critical value of F ranges from 280.428 to 933.756; P<.01). One notable result is that for the least trusting class, trust in both government (United States Department of Agriculture, USDA and University information, Extension) are higher (approaching neutral) compared to the other information sources.

Table 1. Latent Class Analysis fit statistics and class structure.

Fit statistic	Value	Description		n = 1,959
Likelihood ratio chi2_ms(1594215)	14005.86 (p<=.01)	model vs. saturated		
Latent class marginal probabilities				
Delta-method classes	Margin	std. err.	[95% conf.	interval]
1	0.2388277	0.0126247	0.2149687	0.2644427
2	0.1203782	0.0081467	0.1053025	0.137281
3	0.1549192	0.0085348	0.1389186	0.1723938
4	0.4858749	0.013752	0.4589886	0.5128433

Figure 1. Size of Assigned Latent Trust Classes (n=1953)

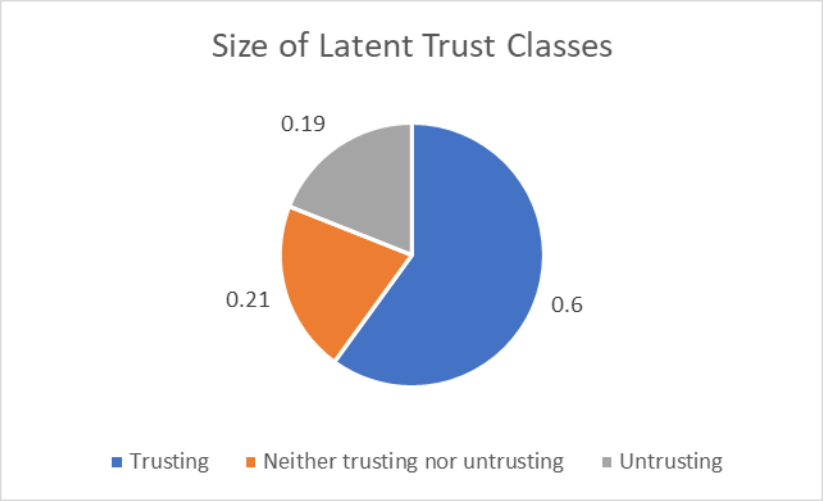
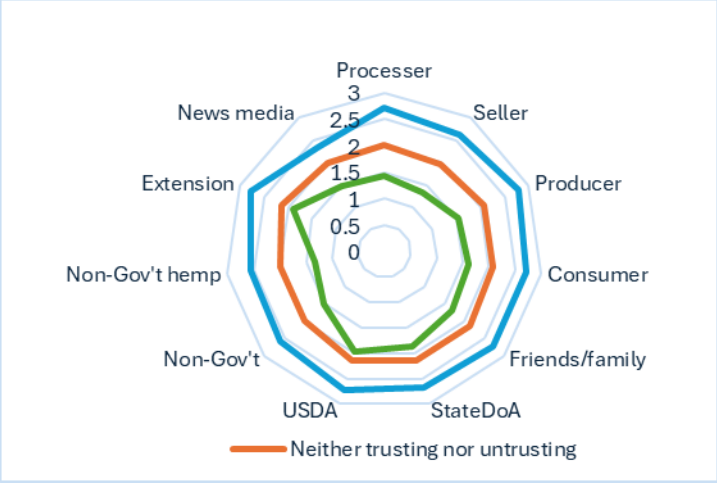
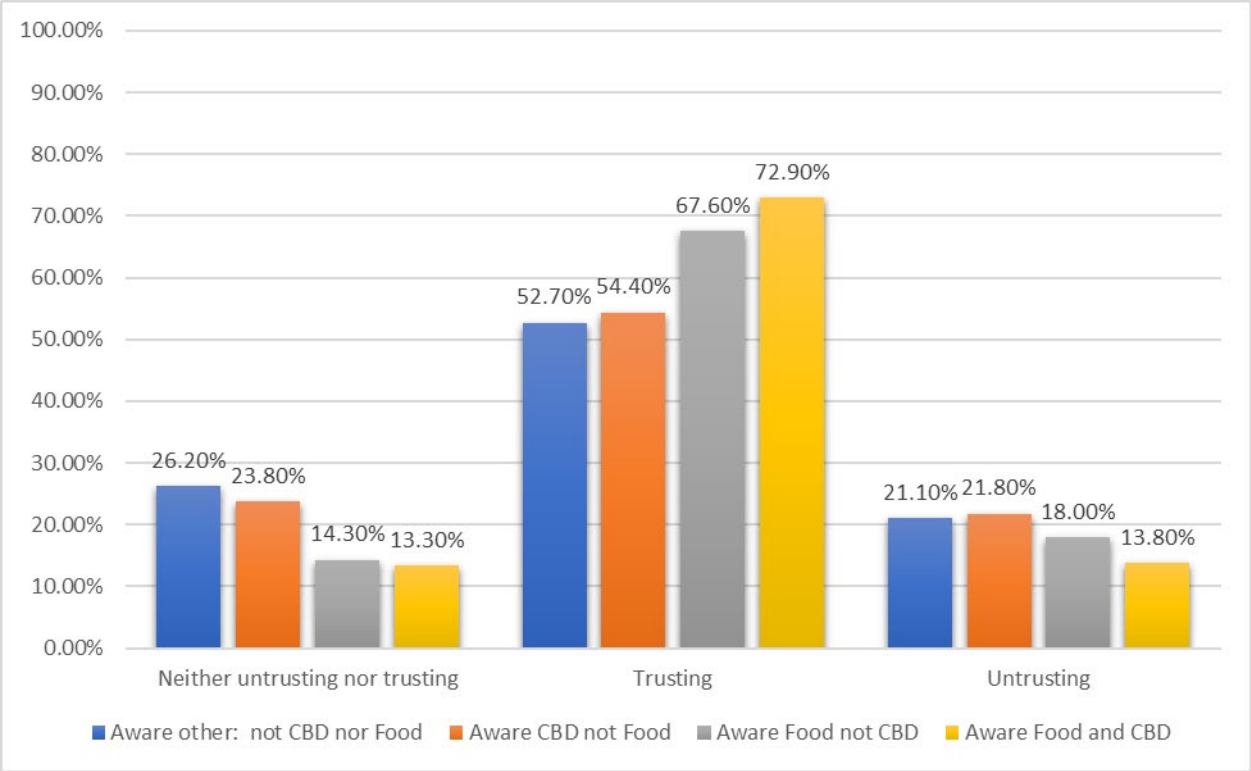


Figure 2. Latent Trust Classes (n=1953); Range = 1-3 (distrust, neither trust nor distrust, trust)



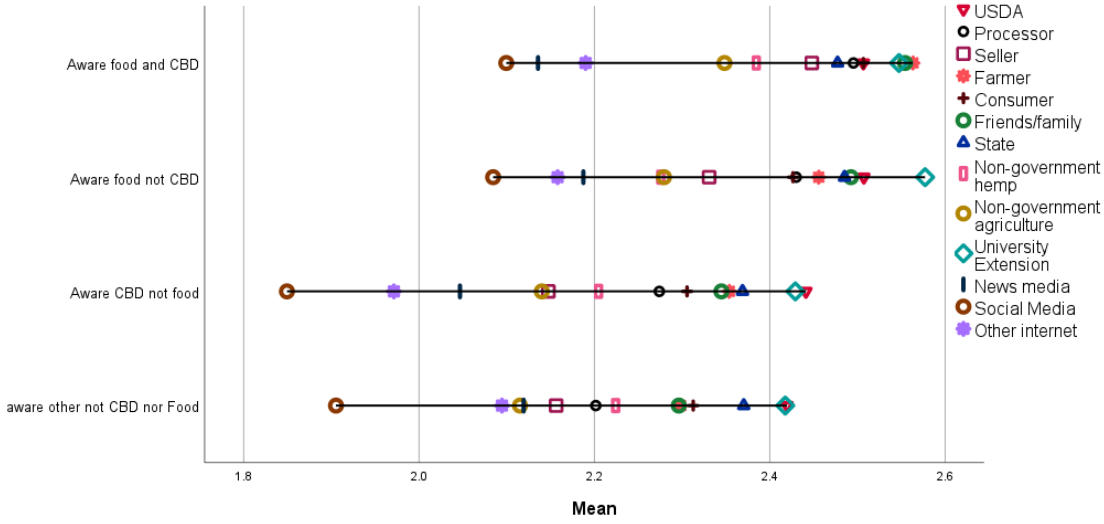
Next, we use Chi square analysis to test the null hypothesis that there is no difference in latent class assignment by hemp awareness group. We reject the null hypothesis that each hemp awareness group is assigned similarly to the 3 latent classes (= 57.87, P<=.01). See Figure 3. More respondents in the two food aware groups are in the trusting latent class (67.60% and 72.90%). More respondents in the CBD only group are in the neither trusting nor untrusting and untrusting latent classes (23.80% and 21.80%).

Figure 3. Percent of Aware Group by Latent Trust Class (n=1853; = 57.87, P<=.01)



We use ANOVA analysis to determine whether to reject the null hypothesis that levels of trust in each source does not vary by awareness group. Because of the ordinal nature of the trust variable, we also conducted Chi square analysis. The results were identical to ANOVA. For ease of visualization, we use the ANOVA results. We reject the null hypothesis that there is no difference in trust for every source except from USDA. See Figure 4. Overall, respondents aware of food are more trusting of sources including USDA, University Extension, and the Farmer. They are least trusting of news and social media. Sellers are not the most nor least trusted. That said, sellers are not trusted for information by CBD and hemp product aware consumers.

Figure 4. Differences in Mean Trust by Awareness Categories (n=1953).



What does this mean in the information marketplace? With regard to R1, using LCA, the "salsa effect" is at play with regard to information source trust. Respondent trust from all sources of information presented were classified as distrust, neither trust nor distrust and trust (mild, medium and hot salsa) [27]. The majority of respondents are trusting of all sources of information (60%). With reference to R2, more respondents who are aware of hemp foods, either with or without also being aware of CBD are classified as trusting. But, respondents aware of food have do a higher trust in more evidence based information sources, including USDA and Extension, and are more trusting of farmers, State departments of agriculture and in the case of food only, the seller. Across all groups, social media is less trusted, as is the news media and "other" internet sources.

Some sellers have been warned by the FTC concerning false and misleading advertising. The news media is often used to disperse information about this type of information and about any recalls that may occur due to foods having higher levels of psychotropic THC than are allowable by law. As the U.S. promulgates appropriate policy for hemp foods and current loopholes with regard to Delta-8, caveat emptor, or buyer beware is the recommendation. Consumers need to vet information sources. If the hemp industry is to thrive in the U.S. and provide consumers with products that meet their preferences, industry and policy makers continue to have to "find their way." With regard to R3, the implications of this study reveals we have a way to go in order to make concrete market recommendations. That said, sellers must be honest and not deceptive, they must follow all current (and developing regulations), and they should be wary of conflating hemp foods with CBD and CBD containing foods, especially when the food product contains Delta-8 psychotropic THC produced from legal (<.3% THC hemp). This is increasingly being seen as a slippery slope by regulators and market watchdogs, including the Federal Trade Commission.

The strengths of this study are the use of a national data base of U.S. consumers. That said, there is much research to be conducted. We studied hemp aware consumers. We have not yet included consumers who have purchased or intend to purchase hemp products (that information is in the data set). We have not included information search patterns of consumers (that information is in the data set). And, we have not included any demographic nor attitudinal questions or a multivariate analysis. All these are aims for future studies.

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How are different options relevant to food consumer science ranked by members of the public in terms of their public benefit? A multi-country exploration.

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Abstract

Public benefit, often used interchangeably with the common good, does not yet have an agreed definition, despite a long history of usage in a variety of disciplines, settings and situations. It is arguably the main goal of research and innovation and is the only means whereby data sharing is permitted, other than through informed consent, under the General Data Protection Act. It is vital therefore that a common understanding of this concept is created with the participation of the public as its main beneficiaries, or we may fall short in our attempts to achieve it. In this study, which was part of the civic engagement tasks within in the wider Communities on Food Consumer Science (COMFOCUS) project, we sought to explore how different options relevant to food consumer science were ranked by members of the public in terms of their public benefit. We used the PlayDecide serious game methodology to stimulate discussion within groups of higher and lower levels of attained education across 6 European countries (Denmark, Germany, Italy, Slovakia, Spain and the UK). Discussions revolved around "Free" choice, Food characteristics (e.g., healthy or unhealthy, local or imported), Consumer characteristics (e.g., purchasing power, education and information) and Others Influencing Food Choice (e.g., advertising, labelling, taxes and personalised recommendations). The option viewed as providing the greatest public benefit was "Making healthy food cheaper and easier to prepare and unhealthy food more expensive and difficult to find," whereas "Protecting the free choice of individuals at the cost of the environment or society" was ranked as providing the least. The dialogue generated further insights into how thought processes and lived experiences affected the evaluation of public benefit by participants, as well as increasing their awareness of issues around food choice and public benefit.

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Oregon's farm direct marketing law: Institutional bricolage to expand regional marketing opportunity and food access

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Abstract

Background

The Oregon Farm Direct Marketing Law (FDML) (Oregon House Bill 2336 (2011), Oregon Senate Bill 507 (2023)), also known as the "pickle bill" or a "cottage food law," is a reimagination of food safety regulation in regional food networks: it allows farmers to sell value-added products directly to consumers without a food processor license if the primary ingredients were grown on the farm; for example, jams, pickles, dried beans and grains, dried and cured fruits and vegetables, nuts, salsas, sauces, and others that use limited additional ingredients and can be safely made in a home kitchen, up to a gross sales limit per farm (Gwin, Brekken, and Trant 2018; Brekken 2013, ODA 2023). It also clarified licensing and food safety requirements for direct sales venues, such as farmers' markets, which faced threats of increased regulation as early as 1999 (Brekken 2013). In 2023, updates to the FDML were passed by the Oregon legislature to allow new products and food processing techniques, online sales, consignment, and increased the sales limit (Perkowski 2023). The original bill and 2023 updates were supported by farm direct marketers and a broad coalition of regional farm and food advocates.

Theoretical frameworks

Institutional bricolage is a process of institutional innovation through re-purposing institutional resources "at hand" to solve perceived problems as they arise, creating continuity between past and future while allowing for adaptation and experimentation (Lanzara 1998, 27; Lowndes 2005, Campbell 2005, Campbell 2007). Available institutional resources are both "internal" and "external" to those negotiating change processes, drawing from both "old" ideas or practices that take on new meanings and "new" ideas or practices adopted from others, composed of "formal" laws or economic relationships or "informal" social norms or belief systems (e.g., Haider and Cleaver 2023, Archer 2013). Institutional bricolage can be practiced by private or public actors to compose new practices and paradigms in their field to break out of the path dependency of current systems. Scholars have identified different types of institutional bricolage, which can be harmonized into 4 categories: Refurbish, Reuse, Repurpose, and Reimagine.

Local and regional agri-food production and marketing innovations are fertile sites for institutional bricolage processes, where particular local and regional growing conditions, infrastructure, values, social norms, history, and political and economic dynamics lead to unique reinvention of food marketing practices and policy innovation. The International Panel of Experts on Sustainable Food Systems (IPES-FOOD) calls for a 2045 goal of "territorial" or "regional" supply chains where 25% of small livestock, fruit, and vegetable production comes from local sources and 25% of food comes from regional foodsheds (IPES-FOOD and ETC Group 2021). A region is more than a description of

geography, it is a process of "regionalism" as a food system production, marketing, and policy approach (Ruhf and Clancy 2022, xiv; Keegan et al. 2023, Brekken et al. 2018). Regional food networks are composed of embedded local food systems, and are themselves embedded within national and international food systems to create food systems of multiple functional embedded scales that enhance food system sustainability and resilience (Keegan et al. 2023, Ruhf and Clancy 2022, Brekken et al. 2018). In most regional foodsheds, supplying half of the food needs from within a region will not be possible without food processing and preservation; however, food safety regulation is designed based on the characteristics of national and international supply chains rather than for local and regional supply chains.

Analysis

As a form of institutional bricolage, Oregon's FDML and other cottage food laws can be characterized as 'refurbishing' traditional food processing and direct marketing, where traditional practices are revived and feel novel compared to dominant practices (Lostak et al. 2015). FDML advocates in Oregon emphasized that the FDML was simply 'refurbishing' traditional methods, such as drying, pickling, and other forms of food preservation that have been done safely in a home kitchen and sold or shared in a community for generations.

The spread of cottage food laws between jurisdictions is also a form of 'reuse,' where practices are spread between populations when actors see a new possibility for innovation, often out of a logic of appropriateness rather than instrumentality (Campbell 2005, 2007). FDML advocates emphasized the 'reuse' of the cottage food law concept which had been adopted in other states and the federal Food Safety Modernization Act, which created exemptions for some food safety regulation for direct sales within a defined distance and dollar amount (Brekken 2013). Oregon advocates sought to fashion the FDML to the local context, relying on social norms of appropriateness created through trust between farmers and consumers, rather than an instrumental logic of food safety risk-benefit analysis.

The FDML is most important as a 'reimagining' of the relationship between food production, processing, and consumption as a challenge to the globalized industrial food system. 'Reimagining' calls for new practices that resolve the tensions that arise when people feel that their subjective aspirations are not aligned with their objective reality (Higgins et al. 2023). The objective reality of food safety regulation is necessary for the dominant industrial food system where contamination in national and global supply chains create public health risk across borders, designed for transparency and accountability to protect consumers from the hazards of foodborne illness outside of their control (Brekken et al. 2013). From the food system sustainability perspective, aspirations for 50% of regional food supply coming from within the region is not aligned with the objective reality of costly food safety regulation scaled to the relative risk of high-volume industrial food processing and mass retailing. The FDML was drafted to handle the tension between the risk of foodborne illness and regional food system aspirations, designed for transparency and accountability through standardized labeling requirements, record keeping, limiting the types of products to low-risk processing, limiting ingredients to farm-fresh produce plus limited additional ingredients (vinegar, sugar, lemon, etc.), and only direct-to-consumer sales under an annual sales cap. The Oregon Department of Agriculture retains authority to write regulations and conduct investigations of any alleged violations of the FDML (Brekken 2013, ODA December 2023).

The FDML is an example of a refurbishing, reuse, and reimagining institutional bricolage processes to create a new institution for food safety regulation that re-embeds food production and consumption

in values-based and social rationalities, while serving the instrumental interests of small direct market farmers and their communities. Oregon local and regional food advocates articulated tensions between food safety regulation designed for national and global food supply chains and the instrumental interests of direct market farms, which were too small to justify the cost of commercial kitchen licensing or rental, or located in rural areas where such facilities were not available. Advocates also stressed instrumental interests in increasing farm revenue, new marketing opportunities, extending the marketing season to smooth cash flow, diversifying product lines, test marketing, reducing loss from excess seasonal production, and rural economic development (Brekken 2013; Gwin, Brekken, and Trant 2018). Food safety regulation was misaligned with the social relationships of community and trust formed by farmers and consumers in local food systems, which created transparency and accountability through their direct relationship rather than through regulation. Regional food system advocates and farmers also expressed social goals of community food security and health, especially in rural and low-income areas that lack grocery stores with fresh and diverse food options at affordable prices. Farmers were also motivated by values-based rationales such as autonomy and personal commitment to food justice (Gwin, Brekken, and Trant 2018). Tensions with the dominant model of food safety regulation was particularly pertinent in rural areas, where cost, lack of infrastructure, community health, food security, and strong community identity were important to organizing broad and diverse support for the FDML.

The 2023 FDML expansion represents another step in the institutional bricolage process that supports broader development of Oregon's regional food networks. The 2023 expansion extends relationships of trust between producers and consumers across the state by allowing online and consignment sales of FDML foods, authorizing new products and processing techniques, and raising the sales cap (ODA December 2023). Advocates stressed the need to continue to adapt the FDML to current conditions and based on farmer experience, citing inflation, rural development, resilience in the face of supply chain shocks, and growing demand for local and regional food (Perkowski 2023). The 2023 FDML expansion was bipartisan in a sharply divided political environment, and only possible because it has worked—no reports of foodborne illness linked to FDML foods have been found, and participants report broad benefits (Perkowski 2023, Gwin, Brekken, and Trant 2018). Over time, Oregon's regional food system has developed through experimentation and adaptation with new marketing options. For the FDML in particular and for other regional marketing innovations, a broad network of advocates can attest to its benefits and protect it from misuse. Advocates are also looking for new opportunities to adjust laws and regulations to be scale-appropriate, using the example of the FDML to open new opportunities to develop Oregon's regional food systems in the future.

Conclusion

All states now have cottage food laws with varying breadth and requirements, with strong interest in adding and expanding laws after the Covid-19 pandemic revealed the importance of local and regional food sources in the face of global and national supply chain shocks (Montgomery, Paparo, and Broad Leib, 2022). The breadth and diversity of regional food network innovations such as values-based supply chains, food hubs, regional branding, regional sustainability certifications, and others have grown from creative private marketing and public policy support. As these innovations spread, advocates identify new public policy innovations to remove barriers or expand the reach of innovations. Reimagining food system relationships builds new institutional contexts for agriculture and food systems, supporting regional food networks in both function and scope. The regional scale is essential to a sustainable food future, re-grounding the food system in place-based values and social embeddedness, rather as a purely market space (IPES-FOOD and ETC Group 2021). Through an

deeper understanding of institutional bricolage processes of Refurbishing, Reuse, Repurposing, and Reimagining, food system advocates can fashion deliberate and reflexive marketing and policy innovations in other regions across the US and around the world, adapted to fit local conditions, history, and traditions.

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Attitude strength and intention to consume functional food in Norway

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Abstract

Functional food, or food that provides additional health benefits beyond conventional products, has garnered increasing research interest in recent years. According to a review article by Baker et al. (2022), attitudes are the most favoured construct for explaining consumer acceptance and choice of functional food. As with most food types, attitudes towards functional food are varied, conflicting, and change over time. This is evident in Norway, for instance, where many consumers have little to no experience with functional food, potentially leading to mixed, ambivalent, and unclear attitudes towards this product category.

To uphold the importance of attitude as a key construct in explaining variations in individuals' decision-making and behaviour, a substantial body of literature emerged in the late 1990s. This literature introduced the construct of attitude strength in terms of its consequences, focusing on what makes attitudes enduring and influential on individuals' thoughts, intentions, and actions. In our study, we examine the extent to which the relationship between attitude and the intention to consume functional food is affected by attitude strength. Within the realm of food attitude strength research, there has been a predominant focus on examining each property of attitude strength in isolation. Our study aims to broaden the existing literature by assessing how the combined effect of subjective attitude ambivalence (simultaneous positive and negative evaluations) and attitude confidence (certainty in one's evaluation) correlates or interacts with the intention to consume functional food in Norway.

The study analyses survey data from a representative sample of over 800 Norwegian consumers aged between 18 and 74 years. Intention, attitudes, ambivalence, and certainty were measured using four items for each construct, based on previous literature. A Structural Equation Modelling (SEM) approach was employed to test the theoretical hypotheses. The results demonstrate that the theoretical constructs and model fit well with the data. The constructs measured in the model support evidence of appropriate psychometric properties, reliability, and validity. As anticipated, the results indicate a strong and positive relationship between attitude and intention to consume. Additionally, attitude certainty contributed to explaining a positive variance in individuals' intention to consume functional food. The direct association between ambivalence and intention was not significant. However, the empirical evidence also reveals that ambivalence and confidence both significantly moderate the attitude-intention relationship, albeit with different valences. Ambivalence negatively moderates this relationship, while confidence positively moderates it. The managerial implications of the findings suggest that producers of functional food should increase consumer confidence and reduce their ambivalence by providing relevant information, knowledge, and product experience with the product category to overcome "weak" attitudes.

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Towards understanding the food related eco-guilt – a scale validation for measurement

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Abstract

Introduction

Nothing better demonstrates consumer ambition and demand for sustainability than the growing number of sustainable products on the market. In the food market, their importance is paramount, for example, the market for organic, fairtrade and other sustainability-related food products is growing worldwide, as evidenced by a number of statistics (fairtrade.org.uk, 2023. europarl.europa.eu, 2023). There are many reasons why consumers choose such products, one of which is the sustainability related perceptions (Dragusanu et al., 2014, Makita, 2016).

With our consumer habits and choices, we can easily find ourselves in situations where we feel that we do not meet certain personal or social standards. This is when we develop a sense of consumer guilt (Dedeoğlu& Kazançoğlu, 2012), which is often exploited by companies in marketing terms through various advertisements (Dedeoğlu& Kazançoğlu, 2010). However, the feeling of guilt is not only significant on the corporate side, as it also affects our consumer behaviour (Brennan & Binney, 2010). Guilt can help us to change our consumer habits acting as a motivator (Bedford et al., 2011) to avoid the recurrence of this fundamentally negative feeling, and thus a driver for better consumer choices. In relation to our food consumption behaviour in many aspects, several researchers have already investigated its impact in different scenarios (Yu et al., 2021, Onwezen et al., 2014, Mishra & Mishra, 2010, Steenhuis, 2009).

As an area of guilt, the concept of eco-guilt, a specific manifestation of guilt when consumers feel that they are not complying with environmental standards, are engaging in polluting activities, has been increasingly researched (Ágoston et al., 2022). In many cases, eco-guilt appears in general terms (Mallett, 2012, Moore & Yang, 2020) or in relation to tourism in previous research (Ullah et al, 2023, Mkono&Hughes, 2020, Bahja & Hancer, 2021).

At the same time, from a food and catering perspective, eco-guilt has also been brought to the fore: making sustainable consumer choices in specific circumstances (Antonetti & Maklan, 2014), reducing waste due to feelings of guilt (Russell et al., 2017), choice of organic or fair trade products (Nguyen et al., 2021, Fernandez-Ferrin et al., 2023), changing meat consumption habits (Kranzbuehler & Schifferstein, 2021).

As far as we know, there is no scale to measure eco-guilt related to food consumption. Our aim was to build and validate it. We considered it important that our research should not focus on the impact of guilt, but rather build a scale system that could measure the feeling of guilt itself. It was therefore important to define a framework against which we could build the scale system. In our research, we used the UN's Sustainable Development Goals (sdgs.un.org, 2023) framework and formulated statements for points that fit the research topic.

Methodology

In the data collection phase of our research, we used a consumer survey method. The questionnaire was surveyed among the students of the Hungarian University of Agriculture and Life Sciences on two campuses, among Hungarian students between 12.02.2024 and 16.02.2024. During the data collection 367 respondents were reached online. A breakdown of the sample by demographic and other characteristics is shown in Table 1.

Table 1. Demographic composition of the sample and other characteristics of respondents

Category	*Sub-category*	*n*	*%*
Gender	Male	131	35,69
	Female	233	63,49
	Non-binary	3	0,82
Age	18-25	304	82,83
	26-35	35	9,54
	36-45	16	4,36
	46-55	9	2,45
	above 55	3	0,82
Highest education	Technical school	3	0,82
	High school	298	81,20
	University degree	66	17,98
Place of living	Capital	132	35,97
	Capital agglomeration	64	17,44
	Rural ('non-agglomeration') town	114	31,06
	Village/community outside the agglomeration	57	15,53
Perception of income	Very tight	8	2,18
	Tight	24	6,54
	Average	176	47,95
	Good	132	35,97
	Very good	27	7,36

The elements of a scale designed to measure eco-guilt are presented in Table 2.

Table 2. elements of the food eco-guilt scale

Elements of the scale
1. When we throw out food, I often think of how many people in this world are starving
2. We consume far more calories than we need, and others have nothing to eat
3. We consume special foods and drinks and others go without food and drink
4. We use too much water to prepare our food
5. I am overly averse to foods that are not common to us but would help the environment
6. We use too much packaging for our products
7. Poor countries' agricultural products do not reach European consumers, so those countries cannot develop
8. Products from poor countries are often produced with undue exploitation of workers
9. We are destroying our environment (e.g. clearing rainforests) in order to produce more food
10. We use too many chemicals in agricultural production
11. The production and transport of food produces too many harmful (greenhouse) gases
12. If we continue fishing in the sea, there won't be enough fish left in the sea
13.Transporting and storing food brought from faraway places causes unjustified environmental damage

Data analysis

The data collected were analysed using the R software, by the Psych and PsychTools packages (Revelle, 2023). During validation, our aim was to examine the data from several sides, using the principle of triangulation to obtain a result supported from several sides. Consequently, in the first phase of our work, we performed analyses using the psych R-package (Revelle, 2023), examined the Cronbach's alpha (and related) coefficients obtained, and performed omega principal component analysis.

Results

Our results are presented step by step, based on the different analyses carried out. The results of the correlation analysis are presented first, followed by the Cronbach's alpha and finally the omega principal component analysis.

Correlation analysis

Correlation analysis helps to understand the relationship between statements. The first figure shows the results of the Pearson correlation test.

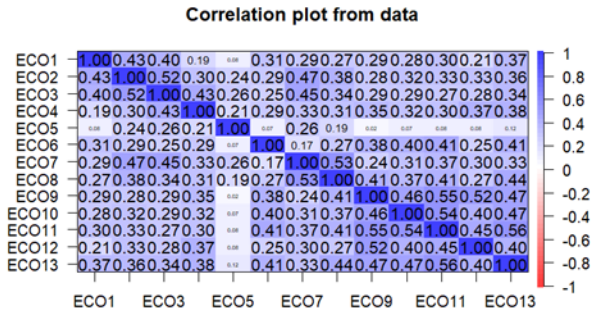

Figure 1: Results of the correlation analysis

In the correlation analysis, we searched overly strong or weak correlations. Figure 1 shows that statement five is weakly correlated with most of the statements, i.e. it has a very weak relationship with the other statements. On the other hand, values higher than 0.5 show a strong correlation, from which point of view some statements are affected, the applicability of these statements will be investigated in later analyses.

Based on these results, from a correlation point of view, most of the statements work well in the scale system, with the exception of ECO5.

Test of Cronbach's alpha

In the next stage of the analysis, we examined the Cronbach's alpha index (Cronbach, 1951). The results of the analysis are summarised in Table 3.

Table 3. Results of the cronbach's alpha analysis

Raw alpha	Std. alpha	G6(smc)	average_r	Mean	sd
0,86	0,86	0,87	0,32	3,3	0,75

Based on the indicators in Table 3, the scale shows good reliability. Both the Cronbach's alpha is greater than 0.7 (Kline, 1999)) and the Guttmann lambda 6 values indicate good reliability and the unidimensionability.

For the Cronbach's alpha indicators, we also investigated whether removing individual items would increase the reliability of the scale. The results are presented in Table 4.

Table 4. Results of Cronbach-alfa if item removed

	Raw alpha	*Std. alpha*
ECO1	0,86	0,86
ECO2	0,85	0,85
ECO3	0,85	0,85
ECO4	0,85	0,85
ECO5	0,87	0,87
ECO6	0,86	0,86
ECO7	0,85	0,85
ECO8	0,85	0,85
ECO9	0,85	0,85
ECO10	0,85	0,85
ECO11	0,85	0,85
ECO12	0,85	0,85
ECO13	0,85	0,85

Our initial Cronbach's alpha was 0,86, against which we looked at the results in Table 4. We see that in most cases our scores have not improved but worsened. In one case we see minimal improvement when we remove the ECO5 statement from the analysis.

As part of the analysis, we have obtained a picture of the distribution of responses, which helps us to check whether respondents answered the same, the results of which are summarised in Table 5.

Table 5. Distribution of responses by statements (the values 1-5 refers to the choice options of respondents)

	1	2	3	4	5
ECO1	0,08	0,11	0,23	0,29	0,29
ECO2	0,12	0,23	0,27	0,17	0,21
ECO3	0,19	0,25	0,28	0,18	0,10
ECO4	0,26	0,23	0,24	0,16	0,11
ECO5	0,32	0,26	0,25	0,11	0,06
ECO6	0,04	0,06	0,15	0,24	0,51
ECO7	0,23	0,21	0,31	0,15	0,10
ECO8	0,10	0,20	0,23	0,25	0,22
ECO9	0,06	0,09	0,21	0,27	0,37
ECO10	0,04	0,12	0,22	0,31	0,31
ECO11	0,07	0,12	0,27	0,29	0,25
ECO12	0,13	0,16	0,20	0,26	0,25
ECO13	0,08	0,15	0,26	0,28	0,23

The distribution in Table 5 reflects the diversity of respondents. Based on the distribution of responses, it was found that the responses to each statement were sufficiently spread across the response options and that no statement had a significant majority of respondents giving the same response. This also strengthens the reliability of the scale.

Omega principal component analysis

The ω_h (hierarchical) and ω_t (total) values constructed by McDonald provide an alternative way to test the reliability of a scale (Revelle, 2024). The results of the omega principal component analysis test are presented in Figure 2.

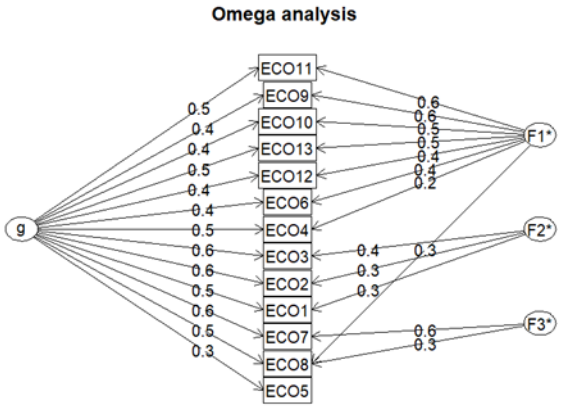

Figure 2: Results of the omega principal component analysis

This analysis will help us to understand whether the claims used can actually measure one dimension or whether there are underlying factors that can act as separate categories. As part of the analysis, we obtain ω_h (0,63) and ω_t (0,89), which also support the good reliability of the scale. Based on the analysis of Figure 2, statement 5 is also highlighted in this analysis, which has a lower Schmid-Leiman g value and is not associated with any of the underlying factors.

Discussion and further research

The current results of our research suggest that the scale works well in principle. In general, both the Cronbach's alpha and Omega values support its reliability. When examining the individual items, statement 5 ("I am overly averse to foods that are not common to us but would help the environment") stood out in several tests, so its omission seems inevitable.

Nevertheless, we consider it necessary to include additional indicators and perspectives in the analysis, so that we can have a more substantiated and robust scale.

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Buying into state affinity: The influence of affinity, egoistic, and altruistic considerations on behavioral intention toward state-sponsored marketing programs

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Abstract

Introduction

Over the past decades, the increasing consumer preference for locally grown or sourced foods in the United States has led to significant shifts within the food system (Onken & Bernard, 2010). This trend has spurred the development of state-sponsored agricultural marketing programs that leverage state-designated slogans and/or logos to promote agrifood products grown or sourced within the state (Khachatryan et al., 2018; Neill et al., 2020; Velandia et al., 2014). With the influx of state-supported block grants, the first wave of state marketing or branding programs was established in the 1980s (Nganje et al., 2011). Notable examples include Vermont's *Vermont Seal of Quality* in 1980, Wisconsin's *Something Special from Wisconsin* in 1983, and New Jersey's *Jersey Fresh* in 1984. By 2009, every state had at least one such program, with about 90% overseen by the state's agency or department of agriculture (Onken & Bernard, 2010). Some states, like Tennessee, have implemented multiple programs, such as *Pick Tennessee Products* and *Tennessee Farm Fresh* (Velandia et al. 2014).

The growing popularity of state-sponsored marketing programs (SSMPs) has led to research efforts examining consumers' valuation and behavioral responses in various regions, including Missouri (Grashuis & Su, 2023), Tennessee (Merritt et al., 2018), South Carolina (Carpio & Isengildina-Massa, 2016), and a region with eight contiguous states (i.e., Colorado, New Mexico, Arkansas, Oklahoma, Texas, Kansas, Missouri, and Louisiana) (Neill et al., 2020). The existing literature consistently reports positive consumer attitudes toward SSMPs, with a demonstrated willingness to pay a premium for products labeled with state brands (James et al., 2009; Barnes et al., 2014; Soley et al., 2019). However, a critical gap remains in the understanding of the psychological factors and mechanisms that shape consumers' preferences and behavioral intentions toward SSMPs.

Psychological factors driving consumer preferences for food promoted with a state destination differ from those related to general local preferences. This distinction arises from the additional layer of consumer perception and attitude toward the state itself. The concept of consumer affinity, a positive disposition towards a particular origin of products of interest (Oberecker et al., 2008; Serrano-Arcos et al., 2022), plays a key role. While the literature on international marketing and country image has documented the important role of consumer affinity in decision-making, the key aspects of the nature of consumer affinity remain a debated area, highlighting a considerable amount of conceptual, methodological, and measurement inconsistencies (Serrano-Arcos et al., 2022). Therefore, validating state-designated consumer affinity, or *state affinity*, and evaluating its impact on consumer behavior necessitates a cautious approach.

Moreover, the connection between local food preferences and the effectiveness of SSMPs is not well understood. Prior studies identified several key factors shaping local food preferences, including (1) perceived freshness and quality, as local food is often harvested and marketed within a short timeframe (Feldmann & Hamm, 2015); (2) consumer's desire to support the local farmers and economy by purchasing food grown and sold within the community (Adams and Salois 2010; Onozaka, Nurse, and McFadden 2010); (3) reduced environmental footprints as local food requires less transportation-related energy inputs (Wakeland, Cholette, and Venkat 2011); and (4) the transparency and accountability that consumers appreciate in knowing where their food comes from and how it was produced (Roininen, Arvola, and Lähteenmäki 2006). These suggest consumer values likely influence preferences for locally sourced options, but the specific dynamics of how these values translate into consumer demand for SSMPs remain unexplored.

To address these research gaps, this study aims to identify psychological factors shaping consumer preferences for SSMPs, with a particular focus on state affinity and considerations related to local food. We leverage the Stimulus-Organism-Response (S-O-R) framework to investigate how these factors influence consumer behavioral intention toward SSMPs. To ensure the robustness of our findings, we test the conceptual framework using two distinct state branding applications – Florida's *Fresh from Florida* and Kentucky's *Kentucky Proud* programs. This empirical investigation will yield valuable insights into consumer decision-making processes within the context of state-branded agrifood promotions, informing the development of effective marketing strategies and policies.

Theoretical Framework

The Stimulus-Organism-Response (S-O-R) framework, originally proposed by Mehrabian and Russell (1974) and further elaborated by Jacoby (2002), has been widely applied to understand consumer behavior. The framework posits that internal or external stimuli (S) influence an individual's organism (O), more specifically, cognitive and affective states, which then lead to behavioral responses (R). In addition to the substantial empirical evidence supporting its effectiveness in explaining behavioral variances, a primary strength of the S-O-R framework lies in its flexibility and adaptability, which allows researchers to examine various types of psychological factors or constructs, such as internal or external stimuli, experiential or non-experiential organisms, and diverse behavioral responses (Sultan et al., 2021).

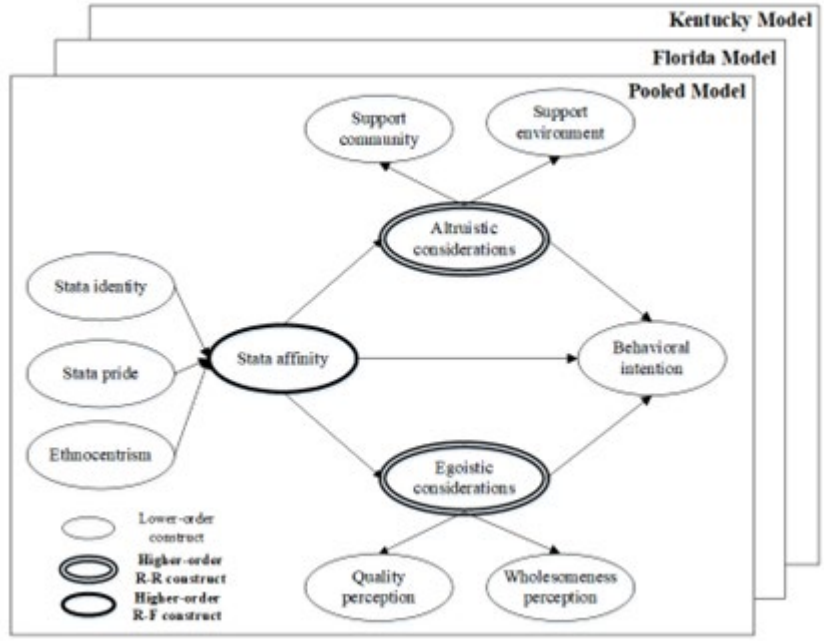

Figure 1. Conceptual framework

As depicted in Figure 1, the proposed conceptual framework is characterized by internal stimuli – state affinity, organisms – egoistic and altruistic considerations, and response – behavioral intention toward SSMP. Drawing on the literature on international marketing and country image, along with Becker et al.'s (2012) guidance on conceptualizing higher-order constructs, *state affinity* is formulated as a high-order reflective construct. This construct comprises three dimensions: (1) state identity, interpreted as the extent to which individuals identify with their state and see themselves as part of the state's community; (2) state pride, refers to the positive feelings and emotions that individuals have towards their state (Neuliep and McCroskey 1997; Osburn, Holcomb, and Neill 2020); and (3) state-based ethnocentrism, a belief that products sourced within the state are superior to those sourced from other states (Fernández-Ferrín and Bande-Vilela 2013).

Similarly, egoistic and altruistic considerations are conceptualized as higher-order reflective-reflective constructs consisting of two lower-order constructs. Specifically, egoistic considerations include perceptions of product quality and wholesomeness, while altruistic considerations capture consumer support for the local community and environment.

Material and methods

Data collection

Consumer data used in this study were collected through two independent online surveys administered to consumers in the states of Florida and Kentucky, United States. The Florida survey was distributed via a panel company, Dynata, from June through August 2023, whereas the Kentucky survey was disseminated via Qualtrics in January and February 2023. Both surveys were developed to investigate consumer perspectives, preferences, and behavioral intention toward agrifood products promoted through SSMPs (i.e., *Fresh from Florida* and *Kentucky Proud*), targeting primary food shoppers who are above 18 years of age. Although the data collection timeframes in the two states are not strictly aligned, previous studies indicate that the length of data collection may not be relevant if the research focus is on participants' behavioral reactions, and data accuracy is likely to

be preserved (Bellón et al., 2000; Savelli & Murmura, 2023).

Measures

The distinction between reflective and formative constructs is crucial to the interpretation and evaluation of the measurement model (Hair et al., 2022). A construct can be specified as "*reflective*" if the underlying factor *gives rise* to the observable indicators (i.e., measurement items), whereas a "*formative*" construct is usually *formed* by "*explanatory combinations of indicators*" (Diamantopoulos & Winklhofer, 2001; Fornell & Bookstein, 1982). The indicators used to measure a formative construct are not necessarily correlated and thus contribute differently to the formation of the underlying construct (do Valle & Assaker, 2016). Therefore, the primary conditions for specifying a formative construct include: (1) changes in the indicators are expected to cause changes in the construct, but not vice versa, (2) changes in the value of one indicator are not expected to cause changes in another (do Valle & Assaker, 2016; Fakih et al., 2016; Haddad et al., 2015; Jarvis et al., 2003).

These criteria, combined with specifications in previous research (Fakih et al., 2016; Haddad et al., 2015; Hair et al., 2022; Söderlund, 2006), indicate that behavioral intention toward SSMP should be specified as a formative construct. The three measurement items adopted from prior studies (Choe & Kim, 2018; Lee et al., 2010; Yadav, 2016) include "*I will recommend Fresh from Florida/Kentucky Grown program to my family, friends, or neighbors*," "*I will seek out food labeled with 'Fresh from Florida/Kentucky Grown' when grocery shopping*," and "*I am willing to pay more for food labeled with "Fresh from Florida/Kentucky Grown*." These items capture different aspects of behavioral intention, and changes in one item (e.g., recommending the program) do not necessarily correspond to changes in another (e.g., willingness to pay a premium). All measurement items utilize a 7-point Likert scale anchored from one (completely disagree) to seven (completely agree), with a value of four indicating indifference.

Data analysis

Preliminary data analysis was performed using Stata 16 MP to describe sample characteristics. Next, partial least-squares structural-equation modeling (PLS-SEM) was employed via SmartPLS 4 to test the conceptual framework on behavioral intention toward SSMPs. Subsequently, a bootstrapping procedure drawing on 10,000 subsamples was used during the model estimation and hypotheses testing, as suggested by Hair et al. (2022). The PLS-SEM estimation comprises two components: the measurement model (also known as *the outer model*), characterized by formative and reflective constructs, followed by the assessment of the structural model (also known as *the inner model*) (Hair et al., 2022).

Following the procedure specified in Becker et al. (2023) and Sarstedt et al. (2019), we use a disjoint two-stage approach to estimate models with higher-order constructs. The first stage only draws on lower-order components without specifying higher-order constructs. In the second stage, the lower-order construct scores are calculated and used as indicators of the higher-order constructs' measurement model, while all other non-hierarchical constructs are kept as they are in the first stage. Finally, following the PLS-SEM estimation, a multi-group analysis (MGA) was performed to test for differences in structural paths between the Florida model and the Kentucky model (Cheah et al., 2023; Hair et al., 2023).

Results

Sample description

A total of 507 Florida respondents and 827 Kentucky respondents completed the survey, resulting in a total sample of 1,334 complete responses. For each sample, more than half of the respondents were above 45 years of age, female, the household's primary shopper, had a college degree, and had a household income above $50,000. These demographic characteristics were consistent across the Florida and Kentucky samples, suggesting a high degree of comparability between the two groups of respondents.

Reflective measurement model results

The standardized indicator outer loadings range from a minimum of 0.87 to a maximum of 0.89, exceeding the recommended threshold of 0.71 (Hair et al., 2022). This suggests that the indicators of each construct have a high level of shared variance, indicating satisfactory indicator reliability. All reflective constructs exhibited satisfactory reliability values exceeding the recommended threshold of 0.70 (Hair et al., 2022).

Furthermore, the AVE values of all reflective constructs are greater than 0.70, demonstrating a high level of convergent validity. Discriminant validity was assessed through the Heterotrait-monotrait-ratio (HTMT) to determine the extent to which the selected constructs are truly distinct from other constructs. All HTMT values are below the threshold of 0.90 (Henseler et al., 2015), demonstrating sufficient discriminant validity for all reflective constructs.

Formative measurement model results

Evaluation of the formative measurement model for behavioral intention adhered to established guidelines provided by Hair et al. (2022), Carins et al. (2020), and Albertsen et al. (2020). Importantly, the variance inflation factor (VIF) values for the indicators are below 2.5, indicating no concerns for multicollinearity issues (Hair et al., 2022). A bootstrapping procedure with 10,000 subsamples and a 95% confidence interval revealed significant outer weights and outer loadings greater than 0.80 for all three indicators (Hair et al., 2022), confirming their significance and relative importance in forming the behavioral intention construct.

Structural model and multiple group analysis results

The satisfactory results of measurement models allow for the second step in evaluating PLS-SEM – the assessment of the structural model (Figure 2), which demonstrates the relationships among constructs featured in the conceptual framework. The key parameters for evaluating the structural model include the model's explanatory power, as indicated by the coefficient of determination (R^2); out-of-sample predictive power, as assessed by Stone-Geisser's Q^2 statistics; the potency of the structural model relationships, quantified by f^2 effect size; and the statistical significance and relevance of the path coefficients (Hair et al., 2022).

The conceptual model overall provides a satisfactory level of coefficient of determination for endogenous constructs. The R^2 values for altruistic considerations, egoistic considerations, and behavioral intention toward SSMP are 0.26, 0.42, and 0.50, respectively, indicating a satisfactory

explanatory power. All Stone-Geisser's Q^2 values for all endogenous variables are greater than zero, with a minimum of 0.21 for supporting the local community and a maximum of 0.39 for the perception of wholesomeness, suggesting that the conceptual model has moderate to strong predictive relevance.

The reflective-formative higher-order construct state affinity has positive and significant effects on altruistic considerations (β = 0.51, p<0.01) and egoistic considerations (β = 0.68, p<0.01). For the two reflective-reflective higher-order constructs, while both have significant and positive effects on behavioral intention, altruistic considerations have a much larger effect (β = 0.34, p<0.01) than egoistic consideration (β = 0.13, p<0.01). State affinity has a positive and significant direct effect (β = 0.33, p<0.01) as well as an indirect effect on behavioral intention.

The MGA was employed to determine if the path coefficients are equal between the Florida and Kentucky samples. The analysis reveals differences between the states: the link between state affinity and egoistic consideration is significantly stronger in the Florida sample relative to the Kentucky sample (*diff_FL-KY*=0.14, p<0.01), highlighting regional variations in the effect of state affinity. Notably, this is the only path coefficient found to be significantly different between the two states' samples, and all other relationships in the model remained statistically indifferent. This corroborates a high level of consistency in the overall structure of the conceptual framework.

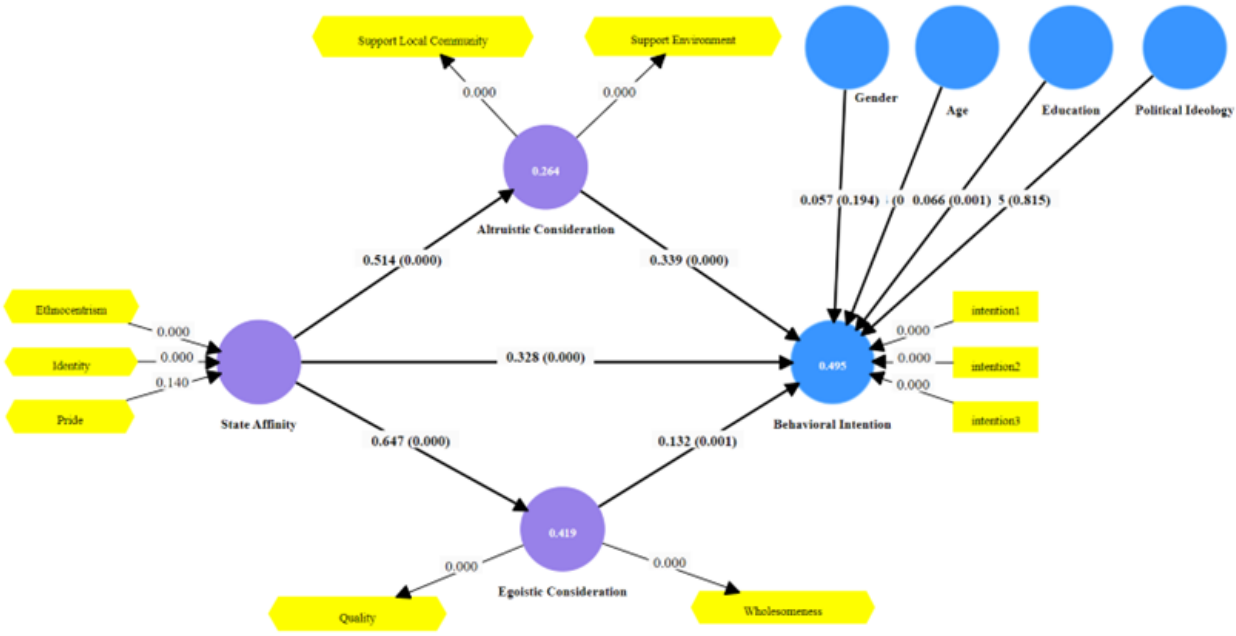

Figure 2. The structural model

Discussion and conclusion

This study develops and tests a conceptual framework based on the S-O-R model to investigate the psychological factors influencing consumer preferences for SSMPs. The findings demonstrate that state affinity – a higher-order construct comprising state identity, state pride, and state-based ethnocentrism – has a significant positive impact on both egoistic and altruistic considerations, which consequently shape behavioral intentions towards SSMPs. Notably, altruistic considerations,

such as support for the local community and environment, emerge as more influential predictors of behavioral intention compared to egoistic considerations.

The multi-group analysis reveals regional differences between the Florida and Kentucky samples, suggesting the importance of tailoring SSMP marketing strategies to the unique characteristics and preferences of each state's consumer base. The study contributes to the literature by providing a comprehensive framework that integrates state affinity, egoistic considerations, and altruistic considerations within the S-O-R model, offering valuable implications for policymakers and marketers involved in SSMPs.

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Beyond the ocean: Understanding consumer preferences, market challenges and policy implications for cell-cultivated salmon.

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Abstract

In the past 30 years, total global fish consumption increased by more than 120%, now comprising 17% of the worldwide intake of animal protein [1]. In the United States, per capita seafood consumption reached 16.5 pounds in 2023, marking the highest level observed over the previous decade [2]. This rapidly growing demand has put considerable pressure on wild fish stocks, leading to a significant expansion in aquaculture. Today, aquaculture fulfills over half of the global demand for fish, yet wild fish capture remains a crucial supply source, achieving record highs [1]. Although aquaculture is often viewed as a means to alleviate the strain on wild fisheries, it primarily complements, rather than decreases, the need for fish capture [3]. Increasing awareness of the negative environmental effects associated with aquaculture among consumers has also led to a shift in preferences away from farm-raised fish and toward wild catch [4,5]. Given the growing demand for fish, the sustainability challenges posed by aquaculture management, and the threat of rising ocean temperatures to marine biodiversity, the exploration of alternative, sustainable fish supply sources are critically needed.

Cellular aquaculture is an emerging seafood production technology that has the potential to overcome the limits of wild fish capture and challenges posed by industrial aquaculture. In contrast to plant-based seafood alternatives, which mimic fish textures and flavors, cellular aquaculture cultivates fish meat directly from the muscle cells of specific species, utilizing a nutrient-rich blend [6]. The capability to selectively produce species at risk of overfishing, those that are heavily imported, or those not conducive to traditional farming, positions cellular aquaculture as an important supplement to the existing sources of fish supply. Moreover, cellular aquaculture enables the production of edible fish components, like filets, thereby minimizing the food waste typically associated with the disposal of non-consumable parts of fish. Additionally, cell-cultured seafood does not contain mercury and other harmful contaminants and is produced without genetic modification [6].

Despite these potential benefits, there is limited understanding of consumer willingness to purchase fish produced using cellular aquaculture and how it compares to traditional sources of fish. Often, consumers view foods developed through novel technologies as risky, despite substantial scientific evidence affirming their safety [9]. For example, studies show that consumers reject foods produced with genetically modified ingredients [9], milk produced with rbST hormone [7], and produce irrigated with recycled water [11]. Consumers are also willing to pay (WTP) less for cell-cultured meat compared to conventional meat options [11]. As cell-cultivated fish products are expected to enter small consumer markets in the U.S. within the next few years, gaining insights into consumer preferences for these products is crucial for stakeholders in the food industry and policymakers. Furthermore, there is no consensus on the term that should be used to refer to fish produced using this novel technology. Our study fills these gaps.

Using an experimental survey design, we measure U.S. consumers' awareness, preferences and WTP for cell-cultivated salmon and compare it to WTP for other types of salmon, including farm-raised,

wild-caught, plant-based, and genetically modified. To our knowledge, this is the first study to compare WTP across all these sources of salmon. We also test the effects of behavioral interventions that provide consumers with information about the production process used to grow cell-cultivated salmon, nutritional content, and environmental impact of cell-cultivated salmon. Further, we evaluate consumer understanding and preferences for the different terms (cell-based, cell-cultured, cell-cultivated) U.S. policymakers are considering as a potential label for fish produced with this technology. The label needs to accurately describe the product in a way that is clear to an average consumer, without stigmatizing the product in the eyes of the consumer.

Our survey was administered to 2,010 adult consumers in the U.S. online via a Qualtrics panel. Participants were randomly assigned to either a no-information control group or to one of three information treatments. To compare WTP for salmon labeled as cell-based, cell-cultured, cell-cultivated label, each participant was randomly assigned to only one of these labels, while the definitions and WTP questions were the same across all participants. Further, we invited participants to state what they thought cell-based, cell-cultured, cell-cultivated salmon meant in an open-ended question format prior to receiving any information and responding to other survey questions. Using our survey data, we construct a panel dataset of consumer responses to a series of WTP questions regarding different source of information and analyze it using random effects logistical regression. We then derive marginal and average WTP for each salmon source – wild-caught, farm-raised, cell-based/ cell-cultured/ cell-cultivated salmon, plant-cased and genetically modified salmon.

Our analysis reveals several findings with significant economic implications for both the food industry and policymakers. First, we find that on average consumers are willing to pay significantly less for salmon produced using cellular aquaculture. This result holds no matter what label is used for salmon produced with this technology. Consumers prefer wild-caught and farm-raised salmon to cell-based/ cell-cultured/ cell-cultivated alternatives. However, consumers are willing to pay more for cell-based/cell-cultured/cell-cultivated salmon than plant-based salmon.

Second, information on the nutritional equivalence of cell-cultivated salmon to conventional salmon and its lack of mercury and other contaminants increases consumer WTP to purchase cell-cultivated salmon by as much as $7 USD relative to WTP of consumers receiving no information. However, details regarding the production process and environmental impact of cell-cultivated salmon have no significant impact on purchasing decisions, underlining a key insight for marketing strategies. This finding aligns with a handful of other studies testing whether the information on the absence of contaminants has an impact on consumer acceptance of cultivated seafood [12] and is supported by the broader literature indicating that food labels denoting the absence of certain ingredients can boost consumer WTP [7].

Third, our text analysis of open-ended questions aimed at understanding of consumer perceptions of the three salmon labels reveals a widespread lack of understanding; more than half of the consumers are unsure of what terms cell-based, cell-cultured, cell-cultivated salmon mean. Further, using polarity analysis, we show that the three most frequent co-occurring responses to our open-ended questions are “no idea", "don't know", and "not sure". This finding is supported by Phi coefficient that measures how often a pair of words appears together relative to when it appears separately. Lastly, we find that consumers do not differentiate between cell-based, cell-cultured, or cell-cultivated labels. Our analysis shows a marked preference among consumers for any label that is accompanied by additional explanatory information, such as "produced using cells of salmon", suggesting that without additional context, the labels alone fail to convey the nature of the product adequately. Therefore, without any additional information, these labels alone fail to give consumers enough context to understand the product, a critical issue for policymakers when selecting a label.

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Is the juice worth the squeeze? Supply chain mapping and marketing margins for the florida orange juice industry

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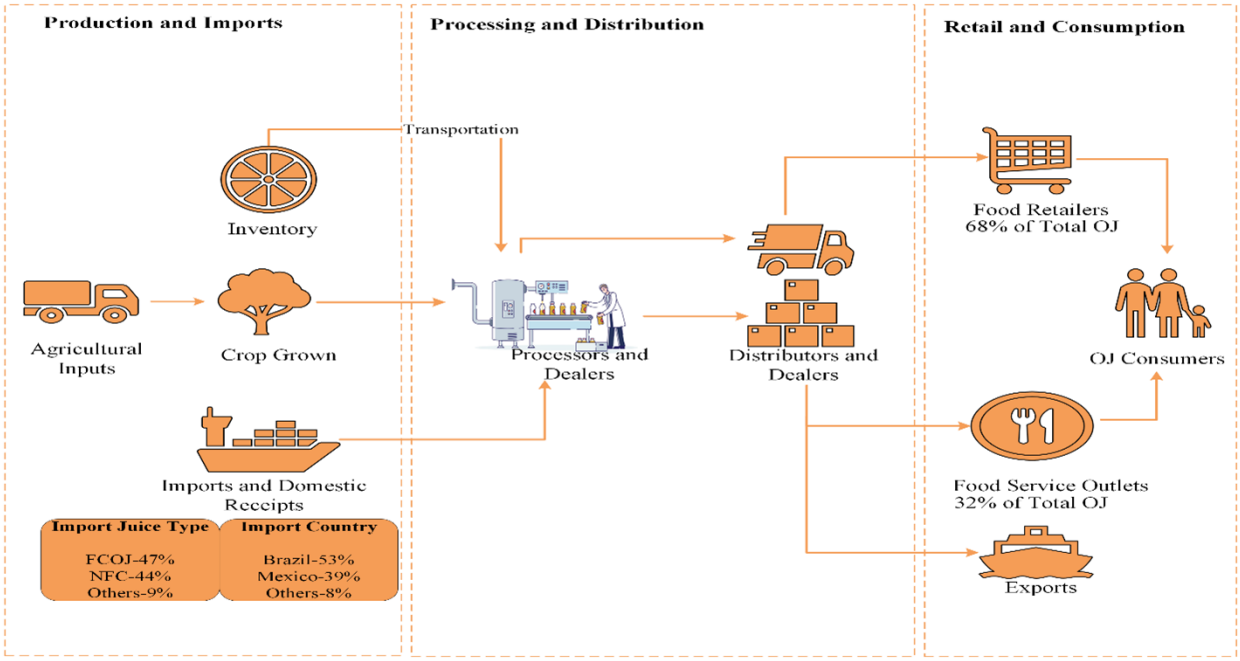
Abstract

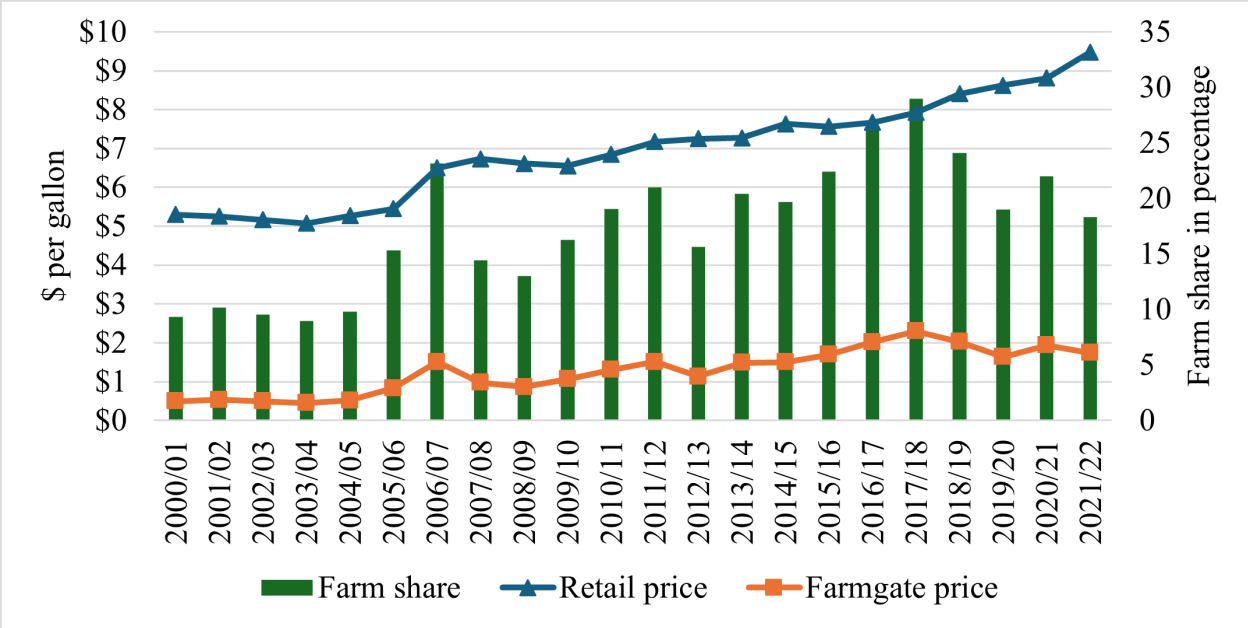
The state of Florida holds a significant position both within the United States and the global orange juice market. It serves as one of the primary hubs for orange production and orange juice processing alongside Sao Paulo in Brazil. The geographical concentration of orange production highlights the unique dynamics of the orange juice market. A few specific regions dominate the industry's operations, making it susceptible to supply chain disruptions (Wang et al., 2006). Over the past two decades, Florida has faced significant challenges that have profoundly affected its citrus industry. In the 2003/2004 crop season, Florida produced approximately 10.9 million tons of oranges, representing a remarkable 84% share of the total orange production within the United States (USDA-NASS, 2023). By the 2021/2022 crop season, Florida orange production fell to 1.85 million tons, representing an 83% reduction in production in 20 years.

One major cause of the production decline is the citrus greening disease, also known as huanglongbing (HLB). Citrus greening is a devastating bacterial disease that has become endemic to Florida since its introduction in 2005. Its adverse economic effects on commercial citrus production have materialized in three ways (Farnsworth et al., 2014). First, the disease elevates the mortality rate of citrus trees. Second, it diminishes the marketable yield per tree by adversely affecting fruit quantity, size, visual appearance, and flavor profile. Last, combating citrus greening necessitates increased production costs, as growers apply additional insecticides and fertilizers to mitigate the damage caused by the disease.

This study aims to examine the complicated structure of orange juice supply chain and model marketing margins at the grower, processor, and retail levels. To achieve this, we employ the supply chain mapping approach, utilizing a mix of secondary and primary data. Because the domestic orange juice industry is concentrated within Florida, we focus on key supply-side issues within the state and expand to the national scale when addressing the demand-side considerations. Using the supply chain map as a foundation, we proceed to estimate the factors determining the pricing structure in the Florida orange juice supply chain. We find that firm size and organizational structure are significant factors affecting marketing margins. As smaller citrus growing operations and processors have exited the industry, the remaining producers and processors have commanded a larger share of the retail price of orange juice.

See the attached figures for a visual representation of the Florida orange juice supply chain (Figure 1) and the orange juice marketing margins for growers and retailers, excluding processors (Figure 2).


Production and Imports
Processing and Distribution
Retail and Consumption
Transportation
Inventory
Agricultural Inputs
Crop Grown
Processors and Dealers
Distributors and Dealers
Food Retailers 68% of Total OJ
OJ Consumers
Food Service Outlets 32% of Total OJ
Exports
Imports and Domestic Receipts
Import Juice Type
FCOJ-47%
NFC-44%
Others-9%
Import Country
Brazil-53%
Mexico-39%
Others-8%


$ per gallon
Farm share in percentage
$10
$9
$8
$7
$6
$5
$4
$3
$2
$1
$0
35
30
25
20
15
10
5
0
2000/01
2001/02
2002/03
2003/04
2004/05
2005/06
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
2019/20
2020/21
2021/22
Farm share
Retail price
Farmgate price

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The moderating effect of consumption motivations on hedonic eating simulation and (un)healthy food experience

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Abstract

Background

Mental simulation of hedonic eating and its potential as healthy eating intervention have been of interest of researchers in recent years. Previous studies suggest that an intensive exposure to hedonic food cues may induce satiation and compensate desire to actually consume such food. However, less is known how consumers with differing food consumption motivations react to this kind of stimulus, i.e. which consumer groups benefit from hedonic eating simulation and who may be caused more harm by it. This study provides an investigation of the moderating effect of food consumption motivations (health, pleasure, dieting, unhealthy=tasty and sustainability) on hedonic eating simulation and subsequent (un)healthy product experience.

Design and methods

Taste experiment was conducted in a multisensory laboratory (Aistikattila®, University of Turku) with 231 participants (76.2% women; aged 19–70, M=38.7, SD=14.8; 56.7% with academic degree). Participants in the treatment condition (N=107) were first exposed to hedonic food consumption stimulus comprising of a 6 min video compiled of clips depicting serving and consuming hedonic high-calorie savoury foods, such as hamburgers, fries and pizza, with restaurant soundscape being played on the background. After exposure participants evaluated two food products: one with healthy image (vegetable lentil soup) and one with unhealthy image (fried potatoes with sausage). Participants in the control condition (N=124) were not exposed to any stimulus prior to product evaluations. The products were evaluated in terms of pleasantness, sensory aspects, perceived nutrition contents, healthiness, purchase intention and emotions elicited by the products. After evaluations participants filled out rest of the questionnaire with items measuring food consumption motivations.

Results

The overall results confirmed that exposure to hedonic food consumption stimulus deteriorated experience of the unhealthy product (decrease in pleasantness of taste, tastiness, healthiness and feeling soothed) but did not affect evaluations of the healthy product. In addition, several moderation effects were found for hedonic imagery and consumption motivations. With higher dieting motivation liking of the healthy product increased (decrease in boredom, increase in satisfaction, feeling energetic, fullness, fillingness, energy and fat content) after exposure. Hedonic imagery with higher unhealthy=tasty belief also improved experience of the healthy product (increase in pleasantness of smell, taste, appearance and fat content, decrease in disgust and guilt).

On the other hand, with higher health motivation hedonic imagery impeded pleasantness of smell and induced guilt for the healthy product and also with higher sustainability motivation the healthy product was perceived as less pleasant (decrease in pleasantness of taste, overall pleasantness, fillingness, and feeling energetic, increase in disgust). Higher pleasure orientation in turn increased disgust and lowered purchase intention for the unhealthy product after exposure.

Implications

This study provides implications for food marketers and policymakers suggesting that hedonic eating simulation may help those who have harder time achieving healthy eating (chronic dieters and consumers believing that healthy food is less tasty) but more negative effects may result for consumers motivated by health and sustainability in food.

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Finding synergies between fish farmers and fish feed manufacturers to facilitate more sustainable choices

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Abstract

Introduction

Among the enormous variety of aquatic species that are farmed, Atlantic salmon is the most important in marine aquaculture, accounting for a production of 2.7 million tonnes in 2020, representing 32.6% of marine and coastal aquaculture of all finfish species (FAO, 2022). Norway is the world's largest producer of farmed Atlantic salmon, with a successful industry that has grown from 46,500 tonnes in 1986 to approximately 1.2 million tonnes in 2021 (FAO, 2022; Solberg et al., 2021). Still, expansion is expected to continue, with current projections indicating a plan to produce approximately 5 million tonnes of salmon by 2050, representing a significant increase in demand for aquafeeds (Solberg et al., 2021).

As the aquaculture sector expands globally, access to essential feedstuffs such as fish meal and fish oil will become increasingly limited due to the scarcity of wild harvesting resources, as the Food and Agriculture Organisation (FAO) considers pelagic fisheries to be fully or overexploited. Consequently, plant-based sources have partly replaced marine ingredients in salmon diets (Li et al., 2020). Nowadays, 71% of the aquafeeds used in Atlantic salmon are of plant origin, with only about 22.4% being of marine origin (Aas et al., 2022). However, studies have shown that plant-based products have a negative impact on the environment, food availability, and fish health (Kiron et al., 2020). In addition, Intensified soy crop production has increased land conversion and agricultural use (Pellegrini and Fernández, 2018). Furthermore, as the price of these commodities rises and the public becomes more aware of how fishing affects the environment, producers are being forced to find more sustainable feeds (Cottrell et al., 2020).

Considering the previous, the present study aims to understand the perception of fish farmers and fish feed manufacturers for the most important criteria related to fish feeds and their sustainability. Further analysis focuses on understanding which criteria or information enhances the level of importance assigned by fish farmers to each of the sustainability dimensions (environmental, economic, social), and how this can be used for feed manufacturers to increase sustainability along the value chain.

Materials and methods

The present study employs a mixed-methods approach, including interviews with fish feed manufacturers' representatives and surveys addressed to fish farmers. A qualitative approach using online interviews was used to understand better the criteria considered by fish feed manufacturers when producing their feeds. Semi-structured interviews were conducted with three different representatives from three of the most important feed manufacturers in Norway. The interviews included information about the current feed production practices of fish feed manufacturers, their

perceptions about their customers, sustainability, innovation, collaboration amongst the value chain, and future perspectives of the fish feed manufacturing industry.

The survey was used to understand the important criteria of fish farmers when selecting their feed formulations. Questionnaires were distributed physically during the AQUANOR 2023 conference in Norway, which gathers the aquaculture industry in Norway, including farmers. Following that, some additional questionnaires were distributed online to other Norwegian grow-out aquaculture companies producing salmon. At the end, 35 aquaculture companies filled out the questionnaire. To understand better which criteria or information enhances the level of importance assigned by fish farmers to each of the sustainability dimensions (environmental, economic, social) as defined by Elkington (2000), a hybrid-fuzzy TOPSIS methodology was established.

Hybrid-fuzzy TOPSIS methodology

The methodology is derived from a hybrid approach that combines Fuzzy Set Theory (FST) and TOPSIS (Techniques for order preference based on ideal solution similarity). The dataset for the hybrid-fuzzy TOPSIS analysis is based on three rating exercises from the questionnaire completed by fish farmers: "On a scale from 1 to 5, please rate the level of importance of environmental/social/economic aspects when choosing your feed formulation"

The answers to this question are based on a five-point Likert scale according to: Not important (1); Low importance (2); Neutral (3); Important (4); Very important (5). Likert scales, like other qualitative semantic scales used in social science, produce imprecise and ambiguous results that are unsuitable for quantitative analysis The hybrid-fuzzy TOPSIS method outperforms other statistical techniques based on averages and multi-criteria approaches in addressing uncertainty with Likert scales (Martín et al., 2019). To manage this ambiguous data, we convert the dataset's raw data into triangular fuzzy numbers (TFNs), as shown in Table 1. The TFNs are made up of three parameters (a, b, and c), which represent the minimum, most likely, and maximum values.

Table 1. Triangular fuzzy numbers. Default values of linguistic terms.

Linguistic terms	Fuzzy Number
Not important (1)	(0,0,30)
Low importance (2)	(20,30,40)
Neutral (3)	(30,50,70)
Important (4)	(60,70,80)
Very important (5)	(70,100,100)

The remaining questions from the questionnaires were used to generate the various segments of analysis. Finally, three synthetic indicators (SIs) were estimated, one for each sustainability dimension, and ranged from 0 to 1 to represent the importance of environmental, economic, and social aspects in each segment of analysis, with 1 being the highest and 0 being the lowest. The methodology is based on Cantillo et al. (2020, 2021a).

Results and discussion

Criteria for establishing the feed formulations by fish feed manufacturers and information shared with customers (fish farmers)

According to the interviews with fish feed manufacturers' representatives, the composition of feed formulations emerges as a consequence of different factors, including particularly high growth performance and feed conversion ratio, as well as nutritional factors. Along the same line, the selection of certain raw materials for the feed depends on aspects such as the price of ingredients, availability of ingredients, nutritional requirements, the effect on fish (digestibility and health), consumer acceptance, pellet size, environmental sustainability (Mainly measured through CO2 emissions), food safety, and compliance with regulations. Also, external factors related to world-relevant events like wars can establish changes in the supply chain, as due to the war between Russia and Ukraine, one of the companies stopped buying ingredients sourced from Russia, due to ethical reasons.

Regarding how information is shared with consumers, usually, it is provided electronically (production certificate), and the content is according to current regulations. Some feed manufacturers mentioned that usually novel ingredients are reported but there are no specific tags for local products. More detailed data is obtained by accessing the internal portal of the feed manufacturer. Most of the readily available information provided in the portal is aggregated stats (most common types of ingredients and nutritional aspects); however, there is the possibility to request further detailed information, such as the average information about all the specific ingredients and environmental information of the feeds (CO2 emissions and discharges). They claim that it is possible to provide information about the origin of the ingredients, as they have traceability, but is not something that occurs regularly. However, information is based on average values rather than individual batch levels. Moreover, it is worth noticing that there is usually no information about social aspects, apart from the information registered in the publicly available corporate social sustainability reports.

Performance and nutritional aspect vs. Sustainability aspects.

From the interviews, on one side, all the companies value high or very high performance and technical aspects as you need to be in line with the competition. This is in line with the results of farmers, which evidence a strong preference for aspects related to the performance and technical aspects of the fish feed, even above the importance of every dimension of the sustainability of the products (Table 2). However, for one manufacturer, environmental sustainability is more relevant, as they see it as a differentiation factor from the competition. Regardless, these findings suggest that better sustainable feeds can only be achieved without trade-offs on performance.

Moreover, regarding sustainability dimensions, two of the companies agreed that the economic aspects are not the most relevant aspect, as one of them prioritizes higher performance, especially considering the Norwegian market, while the other claimed that the environmental aspect over time has become more relevant than the economic aspect. Meanwhile, one company considered the opposite, as claimed that the economic aspect is very important to survive in the market. Thus, there are heterogeneous preferences about which aspect is more important between economic and environmental dimensions. Meanwhile, for fish farmers, there is a slightly high importance assigned to economic aspects over environmental aspects, although variations can be seen between customers, due to the high standard variation.

Moreover, all the feed manufacturers claim that social aspects are relevant, but most agree that are not as strong as the other sustainability aspects. Only internal social aspects, which fall under the regulatory side seem to be relevant, while external aspects are not considered as relevant. Meanwhile, fish farmers also consider the social dimension to be the least relevant.

Table 2. Evaluation of general aspects from fish farmers

Aspects considered		Mean importance	SD
Performance and technical aspects		4.8	0.4
Sustainability	Environmental aspects	4.1	0.9
	Social aspects	3.5	1.0
	Economic aspects	4.3	0.7

Information that enhances the more sustainable decisions by fish farmers

After the application of the hybrid-fuzzy TOPSIS methodology, three different synthetic indicators were established (Table 3). (1) ENVSI: level of importance of environmental aspects when choosing feed formulations; (2) SOSI: level of importance of social aspects when choosing feed formulations; and (3) ECOSI: level of importance of social aspects when choosing feed formulations.

The results highlight that there is a higher environmental importance, for those that are willing to use and pay more for higher inclusions of local products in the feed formulation. However, this local product importance seems to be relevant only to a segment of the farmers, as when farmers were asked about their willingness to pay for feed formulations with a higher proportion of local products, only 17% answered yes, while the rest answered either maybe (43%) or no (40%). In addition, some fish feed manufacturers claimed that they have customers who see the local factor as positive but are not generally highly valued. They added that some customers prefer local products because they have incentives to use them. Meanwhile, another fish feed manufacturer added that local products are not necessarily more sustainable. Still, highlighting the local factor might be a way to attract sustainable decisions for some segments of farmers.

Moreover, all indicators evidence the higher importance of all sustainability dimensions for those who care about the proper conditions of fish feed manufacturers to all their employees. Therefore, highlighting these aspects could be a way to enhance overall sustainability for fish feed manufacturers. From the interviews, feed manufacturers claimed that this aspect is regulated and needed to operate, but it could still be emphasized further for marketing to customers. Similarly, all indicators show that there is higher sustainability importance for those who prefer tailor-made feed, suggesting that these tailor-made diets could be in part pursued to create more sustainable options.

In addition, it was found there is higher importance on all sustainability aspects for those who consider it important that products are certified. So overall, certified products will enhance the trust of farmers and higher concern for sustainability. Therefore, relevant stakeholders might be interested in further initiatives to increase the use of certified feeds. Moreover, as expected, those that consider important the emissions, impacts on biodiversity and land-use changes coming from feed products, assigned a higher importance to environmental issues. Thus, fish feed manufacturers should focus their marketing on highlighting indicators that facilitate the reporting on these issues, to increase a higher sustainability choice amongst farmers.

Surprisingly, there seems to be an overlap between environmental and social concerns of products, as those who consider important the social contributions of the companies, assign high importance to both environmental and social aspects. Furthermore, it was found that bigger fish farmers assign more importance to environmental and economic aspects, while companies using automatic feeding systems assign more importance to all dimensions of sustainability.

Table 3. Results from synthetic indicators after Hybrid-fuzzy TOPSIS

Category	Subcategory	ENVSI	SOSI	ECOSI
Location of farm	Trøndelag	0.62	0.60	0.51
	Vestlandet	0.53	0.35	0.52
	Nord-Norge	0.61	0.61	0.49
	Other	0.50	0.57	0.44
The company has certifications	Yes	0.58	0.50	0.61
	No or nor answer	0.53	0.49	0.27
Number of employees	Micro (1-10)	0.31	0.45	0.06
	Small (11-50)	0.48	0.48	0.44
	Medium or higher (>50)	0.74	0.53	0.71
Type of feed used	Commercial	0.49	0.42	0.48
	Tailor-made feed	0.72	0.61	0.62
Aquaculture system used by the company	RAS	0.60	0.52	0.39
	Sea cages	0.55	0.45	0.54
Feeding system	Automatic	0.59	0.53	0.50
	Manual	0.42	0.38	0.42
Agreement to the idea of using more local products in your feed formulation.	Disagree (2)	0.24	0.24	0.00
	Neutral (3)	0.50	0.50	0.57
	Agree (4)	0.56	0.40	0.38
	Highly agree (5)	0.89	0.84	0.72
Willingness to pay more for feed formulations with a higher proportion of local products	Yes	0.91	0.91	0.54
	Maybe	0.42	0.31	0.42
	No	0.56	0.53	0.56
Importance of certified/organic ingredients in feed formulation	Low importance or Neutral (2-3)	0.42	0.37	0.46
	Important (4)	0.58	0.44	0.52
	Very Important (5)	0.83	0.75	0.62
Importance of the use of products offering competitive advantage that can be translated to the consumer (additional willingness to pay)	Low importance or Neutral (2-3)	0.30	0.47	0.50
	Important (4)	0.71	0.57	0.51
	Very Important (5)	0.69	0.25	0.60
Importance of price of the product	Neutral (3)	0.48	0.34	0.06
	Important (4)	0.30	0.28	0.37
	Very Important (5)	0.83	0.71	0.78
Importance on the land-use change generated by the ingredients included in the formulation.	None or Low importance (1-2)	0.26	0.24	0.65
	Neutral (3)	0.43	0.36	0.43
	Important or very important (4-5)	0.79	0.67	0.59
Importance of the negative impacts on biodiversity (e.g., by-catch generated by marine resources, etc.) of the ingredients of the formulation	Low importance or Neutral (2-3)	0.27	0.24	0.50
	Important (4)	0.64	0.70	0.42
	Very Important (5)	0.84	0.49	0.67
Importance of the emissions of the feed formulation	Low importance (2)	0.00	0.00	0.31
	Neutral (3)	0.41	0.31	0.52
	Important (4)	0.55	0.50	0.36
	Very Important (5)	0.93	0.75	0.91
Importance of the social contributions of the company offering the feed (social campaigns, etc)	Low importance (2)	0.33	0.24	0.77
	Neutral (3)	0.41	0.28	0.47
	Important (4)	0.69	0.63	0.46
	Very Important (5)	1.00	0.93	0.77
Importance of knowing that feed provider guarantees proper conditions to their employees	Neutral (3)	0.35	0.29	0.38
	Important (4)	0.66	0.59	0.56
	Very Important (5)	0.75	0.59	0.67
Importance of the contribution of the company to the local economy (employment generated)	Low importance (2)	1.00	0.73	0.65
	Neutral (3)	0.41	0.36	0.47
	Important (4)	0.74	0.57	0.49
	Very Important (5)	0.74	1.00	1.00

Also, the results show that whether companies have certifications or not, seems to be only relevant for the economic dimension, as those with certifications assign higher importance to economic aspects. This might be due to the fact, that these certifications are in part used to try to generate a willingness to pay premiums. Similarly, the aquaculture system is only relevant to the economic

dimension, with those using sea cages caring more about the economic dimension, probably because these companies have stronger competition, as their business plan usually relies on volume.

Conclusions

From the findings of this research, it is possible to conclude that better sustainable feeds can only be achieved without trade-offs on performance. Furthermore, some strategies to increase overall sustainability choice amongst dimensions would be to focus more on certified feeds and highlighting information to farmers on proper conditions given by employees in the industry. Moreover, marketing oriented to emphasizing local products can enhance more environmental choices by some segments of the population. Along the same line, drawing attention to indicators measuring environmental impact on marketing might enhance environmental choices by farmers. Finally, as commented by some manufacturers in the interviews, it is important to consider that implementing sustainable solutions will have an additional cost, and someone needs to take that cost, and that has to be addressed through the value chain.

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Integrating affective computing into food marketing research: Understanding consumer emotions with machine-learning models

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Abstract

Emotions have been shown repeatedly to have a significant influence on consumer food choices and on the effectiveness of food marketing communication. The evolution of food marketing research, from early cognitive models to an increased focus on emotion, reinforces those findings, which are particularly relevant for marketing communication. Indeed, if promotional messages such as food advertising are to be effectively processed, it is essential that they evoke appropriate affective responses from consumers. Before the advent of big data and the emergence of affective computing, food marketing researchers have examined the role of emotion primarily through experimental approaches. The benefits of experimental investigations notwithstanding, they have a series of inherent limitations, particularly in terms of ecological validity, which have hindered our ability to fully develop and integrate knowledge on the role of emotion in the food marketing literature.

This methodological paper discusses promising avenues for the adoption of computational methods, especially affective computing, into food marketing research, thus allowing researchers to fill critical gaps in current understanding of how emotions drive consumer responses to food marketing messages.

We start by differentiating between various forms of affect – such as generalized affect, emotions, moods, and feelings, and highight their distinct roles in food advertising and marketing communication research. These foundational distinctions underscore the importance of accurately and correctly identifying and measuring the various forms of consumer emotional responses to food marketing messages.

We follow with a discussion of affective computing – an emerging field focused on enabling machines to recognize, interpret, and respond to consumer emotions. We move from basic sentiment analysis, which broadly categorizes emotions as positive or negative, to more sophisticated emotion recognition techniques that identify specific emotional states. First, we explain the principles and implications of unimodal approaches such as automated text analysis or automated visual analysis for food marketing research. Then, we detail how a recent shift towards multimodal approaches that integrate data from multiple sources to enhance the accuracy of emotion detection, can impact the type of research questions food marketing researchers can ask and answer using such models.

We also discuss potential practical implications of using computational emotion analysis for food marketing researchets. Finally, we present criteria that can be used by researchers and marketers to evaluate affective computing models and decide which one to adopt.

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Understanding food consumer behaviour through simultaneous measurements of implicit measures and data integration

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Abstract

Implicit measures play a crucial role in understanding food consumer behaviour, as they provide insights into underlying cognitive and affective processes that influence decision-making and consumption. Technologies such as eye tracking, facial expression analysis, and physiological measurements such as heart rate measurement offer valuable tools for uncovering these implicit responses. However, understanding the precise interpretation of these measures and their collective predictive power remains a challenge.

In this presentation, we address this gap by introducing the preliminary findings of a 'all-in-one' research tool, the NOLDUS Hub. This platform enables researchers to conduct synchronized measurements of psycho-physiological responses, offering new avenues for exploring consumer behaviour. By leveraging this tool, researchers can present stimuli, such as images or videos, while simultaneously capturing participants' eye movements, fixations, heart rate, and facial expressions in real-time. This integrated approach allows for a deeper understanding of the intricate interplay between explicit and implicit processes in consumer decision-making.

As a case, we present initial results of an experimental study, in which we looked into how packaging cues can influence the purchase intention for eco-friendly tea, using a 2x2 factorial design with a control group added. Starting off with an organic-fairtrade tea as our baseline, several variations were introduced: a best-seller stamp to indicate popularity, a “healthy food” logo, and a version combining these elements. To understand consumer responses, we made use of direct survey techniques and indirect measures captured by NoldusHub, aiming to explore the complex effects of environmental claims, health appeals, and social validation on product selection.

We also aim to highlight the topic of data integration within and across studies, a focus of the EU project COMFOCUS, a starting community in food consumer science. Adopting consistent data collection formats and approaches over time would enable formal comparisons and advance the development of a unified European perspective on food consumer science. Currently, such standardization within the discipline remains insufficient. Achieving interoperability and reusability of data requires higher levels of harmonization in measurement and research protocols.

Through our presentation of the initial study results and the challenges experienced in data standardization and integration, we aim to show how measurement of various implicit measures can add to a better understanding of food consumer behaviour.

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Sensitive nudges to decrease meat consumption: Effectiveness of information treatments from a repetitive assessment trial

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Abstract

Understanding the uptake of consumers lifestyle and food consumption practices are important to sustainable food system transformation overall. The aim of this research was to examine the effectiveness of an information strategy using various integrative delivery methods.

The initial analysis of repetitive intervention trails with fixed effect models reveals significant impacts of the communication treatments on the frequency of monthly meat and sausage consumption. The daily habits, however, vary in regard to meat type, processing, as well as consumer group. Sensitive nudging approaches seem useful to foster sovereign decision-making processes; of interest to policy makers as well as to society.

Motivation

In order to enrich and enhance the provision and uptake of sustainable dietary consumption, communication approaches are debated as a soft (politically-inclusive) intervention that still have the potential to change consumers' daily food consumption practices and therefore serve as an important carrier of transformation strategies of food systems overall.

The aim of this research project was to examine the effectiveness of an information strategy using various delivery methods and emotional formats (including a well-designed homepage, humoristic-sarcastic artwork documentaries, and computer games focusing on both competition and integration) in inducing changes in consumers' sustainable dietary practices. By taking animal produce consumption patterns in particular focus, the debate allows to assess social stigmatization and polarized debates as well as product attributions, such as the nutritional value of different processing stages of animal produce as well as process attribution of sustainable ethical value under the theoretical setting of a socio-ecological framework.

Methods

This paper presents results from a quantitative follow-up study that builds on the findings of preliminary qualitative and quantitative empirical work that tested the content and modes of conveying sustainability information. Collaboratively developed with a sociologist, artist, and media specialist, the information materials were deployed in an online panel study, encompassing an initial survey, an eight-week intervention phase, and a concluding follow-up survey. The data was collected over an eight-week the period in Germany during the summer of 2021. In the intervention, respondents were randomly assigned to one of four treatment groups (n=525, *4), where the material was presented and outlined, or to a control group (n=524), where no information regarding

sustainable dietary practices was provided. A total of 2099 respondents participated in the study, with varying dropout rates observed, particularly in approaches involving highly engaging games.

Expected Results/Lessons Learned

The initial analysis utilizing fixed effect models reveals significant impacts of the communication treatments on the frequency of monthly meat and sausage consumption. Specifically, findings indicate that both the well-designed homepage and the humoristic-sarcastic art documentaries demonstrate a significant reduction in monthly meat and sausage consumption compared to the control group. Also, both online game treatments led to a significant increase in monthly sausage consumption relative to the control group. However, different allocation and consumption patterns were observed, when comparing meat types and lifestyle assessments. Moreover, even some negative effects were detected in a high involvement setting, which may indicate the need for a sensitive information strategy in regard to targets and time allocation of the involved recipient. Also, reactant behavior may play a role in fostering sustainable consumption practices, which may have to be looked at and understood for specific target groups. Subsequent analyses will incorporate propensity score matching techniques to shed light on the nuanced effects of these communication interventions not only on the monthly meat and sausage consumption, but also on the consumption patterns of various types of meat.

Methodologically, this study follows-up on consumer behavior and integrates ‘treatments’ formally known from medical trials. Hence, it encompasses approaches from Social Sciences, Nutrition and Public Health Science as well as Agricultural Economics to understand consumption practices and barriers to change from an interdisciplinary perspective. The findings may be discussed in regard to Public Health, Environmental as well as Agricultural Policies. For the transition towards sustainable food choice behavior, it seems to be key to find creative ways to convey information and adequately and holistically address the motives and measurements to consumer behavior change.

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Distaste as a way of constructing identity – empirical observations from young adults in Stockholm

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Abstract

Introduction

Taste and distaste are both important parts of our relations with food. Whereas taste has been extensively researched, distaste has attracted far less interest. However, if one wants to understand taste, distaste is equally vital to understand. Hence, in order to contribute to taste as a theoretical construct, it is of utmost importance also to understand the concept of distaste.

Distaste can have different forms: gustatory distaste (elicited by unpleasant tastes), basic disgust (contaminants) and moral disgust (unfair treatment). The studies conducted on distaste have addressed distaste from various academic perspectives. Some studies have focused mainly on the psychological and medical perspective highlighting the perceived contamination aspects (e.g., Rozin, 1987) and stressing the importance of understanding disgust as a system that evolved in order to avoid diseases (e.g., Curtis, 2011; Curtis, de Barra & Aunger, 2011).

Sociologists have mainly studied power structures in relationship to distaste (e.g., Grieshaber, 1997; Wilk 2010). A study by Cornelissen (2016) showed that 'dumpster divers' in New York considered their practice as 'commonsensical', as a life-style to counter wastefulness and save money in the process. Worth noticing is that those dumpster divers were all white college-educated people in their twenties and thirties.

From an anthropological perspective disgust is considered a mirror of desire, and food in relation to identity and difference is discussed which can encompass both consumption and non-consumption (Wilk, 1994, 1995, 1997). Sharing a similar distaste, as a moral discourse, can form the foundation for identity and social inclusion. Rejection and distaste are therefore more important than taste and consumption in making social distinctions (Wilk, 1997). Hence, you are more defined by what you don't eat since identity and social boundaries are created through practices of non-consumption. Cultural sociologists have discussed the notion of highbrow versus lowbrow taste, and argue that omnivorous consumption of a broad range of goods has mostly replaced highbrow taste in signaling status distinctions (e.g., de Vries and Reeves, 2022). A recent study addressing disgust, explores a contemporary German phenomenon called 'bänderer', when consumers eat leftover from other people's plates, an activity regarded as an idealistic way to satisfy hunger guided by environmental reasons, but also perceived as a threat to health and social order (Diekmann & Germelmann, 2021).

Food consumption can be an expression of autonomy, since it allows young people to define themselves in relation to other family members. By expressing diverging taste, young people are provided with a possibility to experiment with different identities (Wills, 2005; Wills, Backett-Milburn, Gregory & Lawton, 2008).

Numerous studies have focused on the importance of food consumption and taste for this group of consumers and highlighted the mechanisms that occur within a household context, between children and parents, adolescents and parents or between spouses (Miller, 1999; 2001; Mouritsen, 2015). Those mechanisms have been interpreted as opportunities of negotiation and construction of identity between adolescents and family members (Miller 2001; Wills, Backett-Milburn, Gregory & Lawton, 2008). Food can even work as a distinction in terms of expressing difference in consumer society, as a mere 'fashion accessory' (Wilk, 2012).

Taste and distaste are important constructs for expressing who you are. You can express political and moral concerns by choosing or avoiding certain food.

This study will focus on distaste as a way of constructing identity among young adults. Hence, this paper addresses distaste as a moral activity, an activity in which identity can be both formed and maintained.

Theoretical point of departure

Habitus is a central concept for this study (Bourdieu, 1984). However, I will use habitus in line with Cornelissen (2016) who applies the concept of "context-specific habitus", to focus on the dispositions that get mobilized across various contexts and which do not. Context-specific habitus highlights how traditional ways of carrying out acts become meaningful in new contexts. Cornelissen argues that everyday practices become imbued with meaning: they do not just indicate difference but are distinctive, as we consciously and unconsciously draw on them to evaluate others and make decisions about whom to associate with. The reason for choosing context-specific habitus is that it allows me to study contemporary class mobility, the proliferation of subcultures, and the changing lifestyle practices of individuals over a lifetime (ibid) which is aligned with the scope of this study.

Aim

The aim of this study is to understand how you empirically can understand distaste and how it is expressed among young adults.

Methodology

The ontological point of departure is to understand the perceived experience of how distaste is perceived from the informant's perspective, hence a phenomenological perspective is practiced where 'active listening' is an important part of the research design (Smith, 2010; Pietkiewicz & Smith, 2014). Therefore, the subjective narratives from the informants will be of crucial interest. More specifically, Interpretative Phenomenological Analysis (IPA), a dominant qualitative research methodology in many academic disciplines is applied, which emphasizes both convergence and divergence of the lived experiences of a small number of informants (Gioia, Corley & Hamilton 2012; Smith, 2010; Tuffour, 2017). Even though the majority of research using IPA as a method have been conducted in health studies in psychology journals (Smith, 2010), it is argued that IPA is an approach well-suited for research in various academic fields. The approach is inspired by ideals of both Husserl and Heidegger. Husserl believes that access to the world is through consciousness as experienced from the first-person perspective (Smith, Flower & Larkin, 2009) 'giving voice' to the concern of informants (Larkin, Watts & Clifton, 2006; Larkin & Thompson, 2011) and Heidegger (1962) emphasizes the researcher's subjective interpretation of the experiences from the informants

(Frostling, 2023). However, IPA integrates ideas from both traditions, "resulting in a method which is descriptive because it is concerned with how things appear and letting things speak for themselves, and interpretative because it recognizes there is no such thing as uninterpreted phenomenon" (Pietkiewicz & Smith, 2014, p. 8).

The practical design of the study will be interviews with young adults in Stockholm at Stockholm university and in London at Queen Mary University of London. The interviews will last 1-1,5 hours and be open questions around the concepts of *the meal*, *food, taste, distaste* and *identity* (See Appendix 1). As already mentioned, the choice to use open interviews are guided by the phenomenological perspective where 'active listening' is an important part of the research design. Therefore, I will give the informants a chance to share their narrative about what they find important concerning the chosen concepts. This will give me a chance to probe the discussions I find especially interesting.

Data will also be collected by a (voluntary) photo-elicitation technique, implying that the informants will be given the opportunity to choose pictures representing *the meal, food, taste, distaste* and *identity,* and then telling me about the choice of pictures and what they symbolize and mean to the informants. Even though there are some pitfalls to consider when using photo-elicitation technique (Meyer, Höllerer, Jancsary & Van Leeuwen, 2013), the choice of this method is to enrich the interview experience, facilitate associations and bring forward deeply rooted motivations (Kyololo, Stevens & Songok, 2023).

The contribution of this study is to shed light on distaste as a phenomenon in order to understand how it is constituted. It will be understood in relationship to identity construction and as such hopefully bring some clarity to how avoidance of food can serve as means to communicate who you are.

Empirical data

The empirical data in this study comes from 30-40 interviews with young adults (age 18-22) in Stockholm and London. The data will be collected at Stockholm university in the spring of 2024 and at Queen Mary University of London in the fall of 2024. The ethical vetting procedure both in London and Stockholm are approved.

Since the interviews starts spring 2024 in Stockholm, some preliminary findings will be presented at the conference.

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Appendix

Draft - data collection instrument

I will conduct open-ended interviews with the informants around *the meal*, *food, taste, distaste* and *identity*. I have formulated 13 broad questions, and will probe these questions depending on what comes up in the interviews. I want to let the informants define the meaning of the questions subjectively, therefore I will not follow a strict interview guide. My ambition is to let the informants talk as freely in an open manner as possible, and I will pose questions depending on the content of the answers. The questions a-c, are examples of probing questions.

Questions

1. Can you tell me a little bit about who you are?

1. What is important for you?
    1. What is important in life in general?
    2. Something of importance in particular?

1. I am interested in issues around the meal, could you tell me about the meal in general.
    1. Is the meal important? If yes, why? If no, why not?
    2. Tell me about a good meal
    3. Tell me about a bad meal

1. What do you like about food?

1. What do you dislike about food?

1. What do you find disgusting when talking about food?

1. What is your taste when it comes to food issues?
    1. Why?

1. Can you tell me about a situation where you experienced distaste relating to food?

1. What was so distasteful about the situation?

1. When did you experience distaste in relation to food and/or eating?

1. What do you have distaste for?
    1. Why?

1. Do you identify yourself by what you eat?
    1. If yes, explain?
    2. If no, explain?

1. Something you want to add, that we have not talked about?

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Breaking bug! Exploring advertising strategies to overcome cultural barriers in entomophagy acceptance.

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Abstract

Introduction

Entomophagy (insect consumption) is a globally established practice, yet relatively novel in Western societies (Van Huis, 2013). Europe, prioritizing health and sustainability within Sustainable Development Goals (SDGs) and circular economy (CE) principles (Moruzzo et al., 2021), has seen a rise in insect farming (Montanari et al., 2021) fuelled by positive media portrayal (Pippinato et al., 2020). However, major barriers to widespread acceptance persist, notably disgust, neophobia, lack of familiarity, insect visibility, and taste (Alhujaili et al., 2023). Disgust is tied to implicit attitudes (La Barbera et al., 2018), which in turn are influenced by social and cultural norms (Fiske et al., 1998) that dictate what is considered edible (Gallen et al., 2019). While powerful, these norms are malleable (Devos, 2008).

Divergent attitudes towards entomophagy that persist among Europeans (Verneau et al., 2016) make effective advertising strategies to encourage insect consumption remain uncertain. By investigating the influence of insect visibility on food packaging and leveraging message framing theory, this study aims to illuminate how advertising messages impact intentions and attitudes towards insect-based products. Incorporating social norms into message framing offers a novel perspective that may help mitigate negative implicit attitudes towards entomophagy and provide valuable insights for marketing strategies targeting Western markets.

Theoretical Framework

Insect Visibility & Taste

Insect visibility, the extent to which insects are whole or processed in a product, is a growing area of study in consumer behavior research (Bruckdorfer & Büttner, 2022). Findings indicate that lower visibility (processed insects) improves consumer expected sensory liking (Hartmann et al., 2015) and willingness to consume the product (Gallen et al., 2019).

Despite some preference for specific insect species (Schäufele et al., 2019), taste and familiarity (i.e., gustatory markers or dissimulation into familiar and pleasing foods) are key for acceptance (Gallen et al., 2019). Processed insect forms (e.g., flour) offer practical incorporation into familiar foods, potentially increasing acceptance (Caparros Megido et al., 2016). Notably, while initial resistance to whole insects exists, positive experiences can increase familiarity and mitigate reluctance over time (Collins et al., 2019). Nonetheless, insect ingredients consistently lower expected sensory liking compared to insect-free products, potentially due to a mismatch with established food expectations. (Tan et al., 2016).

Insect Visibility & Packaging

Studies on insect-food packaging design found that featuring a real insect on the packaging is often perceived as disgusting (PozharlievI et al., 2023) as opposed to packaging with an anthropomorphized or cute insect, or no insect at all. While the previous authors link perceived disgust to food rejection and decreased liking and purchase intention, others found no significant effect of packaging design on willingness to try (Bruckdorfer & Büttner, 2022). Omitting insect references may be seen as deceptive and reinforce the notion of insects as atypical food (Koch et al., 2021). Thus, effective packaging design becomes crucial in shaping consumer perceptions, especially since consumers prioritize taste expectations (Glanz et al., 1998). Accordingly, the first 2 hypotheses this study tests are:

H1a: Packaging aesthetic evaluation mediates the relationship between insect visibility and willingness to try

H1b: Packaging aesthetic evaluation mediates the relationship between insect visibility and expected liking

Message Framing

Message framing, which presents information to emphasize specific aspects, significantly influences audiences' perceptions and response, for instance, emotional appeals in sustainability messages are found effective (Vega-Zamora et al., 2019). While limited, entomophagy research also shows some insights; messages promoting social benefits or immediate gratification (taste) resonate more than those focused on individual benefits or distant benefits like health (Berger et al., 2018).

Evidence favors emotional messages for sustainability and entomophagy acceptance, whereas rational messages' effectiveness remains uncertain. This ambiguity underscores the significance of understanding how message framing influences persuasion pathways. The Elaboration Likelihood Model (ELM) suggests messages can be processed through central (rational) or peripheral (emotional) routes (Petty & Cacioppo, 1986). Effective messages may combine emotional appeal with a foundation in rationality. Integrating the ELM allows exploration of how ads, prioritizing emotional or rational appeals, influence consumer acceptance of insect-based foods, considering insect visibility on packaging.

H2a: Exposure to emotional ad messages leads to higher willingness to try insects than exposure to rationale ad messages

H2b: Exposure to emotional ad messages leads to higher expected sensory liking of insects than exposure to rationale ad messages

Culture & Social Norms

Sociocultural factors impede insect consumption, with low perceived insect appropriateness as food diminishing willingness to try. This aversion is potentially rooted in implicit negative attitudes due to the link between disgust, a major barrier to entomophagy acceptance, and implicit attitudes towards insects (Alhujaili et al., 2023; La Barbera et al., 2018). Social norms (descriptive and injunctive norms)

shape implicit attitudes (Devos, 2008; Mackie et al., 2015), often hindering acceptance of new foods like insects. To promote entomophagy, we must "unfreeze" negative attitudes by understanding and challenging these norms (Roşca, 2020). Implicit attitudes, albeit influenced by social and cultural norms, remain flexible (Devos, 2008) and, thus, addressing negative beliefs about entomophagy could cause a shift (McLean, 2003). Strategies like highlighting historical insect consumption (Olivadese & Dindo, 2023) could challenge these beliefs, aligning with emotional appeals. This study incorporates social norms messaging to potentially counteract negative implicit attitudes towards insect food.

H3a: High social acceptance leads to higher willingness to try insects

H3b: High social acceptance leads to higher expected sensory liking of insects

Methodology & Measures

The proposed study employs a between-subjects 2×3 factorial design to measure the effects of product type (high vs. low insect visibility) and ad message type (emotional vs. rational vs. no message control within a social-norms framework) on social and cultural norms, willingness to try, and expected sensory likeness of insects. This design enables a comprehensive exploration of factors influencing participants' intentions and attitudes toward insect-based products. Sampling entails random selection from the diverse and representative general population of Greece.

Stimuli Choice

Product*:* The study utilizes insect-based products with flavors (chocolate, paprika) to cater to diverse preferences (Orkusz et al., 2020). Stimuli will either feature a retail product with whole insects (crickets, mealworms) or disguise them within familiar products (protein bars, snacks); both with familiar flavors to potentially enhance acceptance (Gallen et al., 2019; International Platform of Insects for Food & Feed, 2023). A crispy texture is prioritized across all products (Orkusz et al. 2020). EU-origin or EU-appearing products will be used to foster trust and willingness to try among European consumers (International Platform of Insects for Food & Feed, 2023).

Ad Message Content*:* The ad messages draw on the historical practice of entomophagy in Ancient Greece, including figures like Aristophanes and Aristotle (Olivadese & Dindo, 2023). Emphasizing taste and texture, especially "crunchy" and flavorful aspects, will be key to addressing apprehension (PozharlievI et al., 2023), aligning with research indicating taste education (Sogari et al., 2018) and familiarity (International Platform of Insects for Food & Feed, 2023) as crucial in overcoming negative attitudes towards edible insects.

Measures

Two manipulation checks measure product type familiarity and ingredient visibility (7-point Likert; Poortvliet et al., 2019). Product evaluation includes packaging aesthetics (5-item 7-point Likert for attractiveness/pleasantness; Blijlevens et al., 2017) and expected sensory liking (9-point Likert for taste; Tan et al., 2017). Dependent variables include social and cultural norms (social/financial acceptance; 7-point Likert adapted from Schäufele et al., 2019) and willingness to try based on Theory of Planned Behavior (Ajzen, 1991; 7-point Likert for trying/incorporating the product into

diet). It is intuitive to also add an item to measure product relevance to personal culinary choices (7-point Likert). Lastly, socio-demographics information is also collected. Data collection for this study is ongoing. Preliminary findings expected for conference presentation.

Data Analysis

A two-way ANOVA will examine main and interaction effects of product type (high vs. low visibility) and message type (emotional, rational, control) on social norms (acceptance/financial) and willingness to try insect-based products. Manipulation checks (familiarity, visibility), product evaluation (aesthetics, liking), and demographics will be analyzed using appropriate scales. SPSS will be used for all analyses. Descriptive statistics and potential moderating effects of age, sex, and education will be explored.

Theoretical & Managerial Implications

This ongoing study aims to contribute to consumer behavior research by exploring the effectiveness of advertising insect-based food guided by insect visibility on packaging and framing theory. Integrating social norms into message framing offers a novel approach to understanding consumer attitudes towards insect-based products, potentially advancing our understanding of consumer decision-making in Western markets.

For marketers, this ongoing research offers insights for product development and advertising strategies. Anticipating potential outcomes based on the theoretical framework can inform strategic decisions, particularly regarding packaging aesthetics and message framing. Marketers should stay informed about emerging trends in the insect-based food market to develop targeted marketing strategies effectively.

Keywords: message framing; insect visibility; packaging; entomophagy, social norms, willingness to try

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Seaweed – not only for food innovative consumers

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Abstract

Introduction

In an era marked by increasing threats to food resources, the quest for alternative, local, and sustainable food sources has become imperative [1]. Seaweed has emerged as a potential new resource within the food industry. With its content of protein, fiber, vitamins, and minerals it can serve as a flavour enhancer, food stabiliser, and enhancer of the nutritional profile of both new and existing food products and dishes [2, 3].

Seaweed has historically played a significant role in the diets of coastal populations worldwide for centuries [4]. While Asian cuisines highly esteem seaweed as a delicacy and incorporate it in various ways, some Western cultures have associated seaweeds with times of scarcity and as food for those of limited means. Moreover, certain seaweeds are known to contain elevated levels of undesirable substances such as iodine and heavy metals [5, 6]. Consequently, encouraging Western consumers to integrate more seaweed into their diets presents a considerable challenge.

There are indications that Norwegians are receptive to incorporating seafood into their diets [7-9]. To our knowledge, there is limited understanding of the types of seaweed products and dishes they would prefer to purchase and consume. Furthermore, there is a lack of insight into the information requirements of various consumer segments to feel confident in consuming seaweed and incorporating it into their culinary endeavours.

A challenge facing the seaweed industry is the development of products and dishes in which seaweed is perceived as a natural ingredient by Western consumers. While they commonly consume seaweed in dishes such as sushi [10], broadening the market necessitates the discovery of novel applications of seaweed for human consumption. To date, there have been numerous attempts to incorporate seaweed into products such as chocolate, potato chips, ice cream, and pasta [3], albeit with varying degrees of success. High prices represent a significant barrier to market expansion [11].

Study Aim

The aim of this study was to uncover the psychological barriers and opportunities perceived by Norwegians regarding the inclusion of seaweed in their diets, specifically focusing on sugar kelp (Saccharina latissima), the most farmed seaweed in Norway [12]. Specifically, we sought to explore whether consumers who are more food-innovative exhibit different attitudes and informational needs compared to other consumer groups. By elucidating such insights, we aimed to provide guidance to the Norwegian seaweed industry on adjusting their products and marketing communication to align with consumer preferences.

We formulated three research questions to fulfil the study aim. Firstly, we aimed to elucidate Norwegian consumer attitudes towards consuming sugar kelp. Secondly, we sought to identify consumers' informational requirements regarding food products containing seaweed. Lastly, we aimed to compare the attitudes and informational needs of consumers who frequently purchase and consume new foods with those who are less innovative, to ascertain potential differences in their responses to products containing sugar kelp.

Theory

Food attitudes

There is a consensus that attitudes often influence behavioral intentions [13], including the intention to consume seaweed [14-17]. Attitudes are typically defined as an individual's overall positive and negative evaluation of an attitude object. Thus, attitudes towards seaweed are shaped by the sum of expectations derived from relevant beliefs, contributing to a person's general evaluation of seaweed as a consumable item [18, 19]. For instance, Govaerts and Olsen [9] observed that Norwegian consumers form positive attitudes towards seaweed food products based on their sustainability values, known as biospheric values. This suggests that consumers who perceive seaweed as having a minimal environmental impact are more inclined to purchase and consume seaweed products. Moreover, most respondents viewed seaweed products as healthy and natural. However, no positive relationship was found between hedonic values and attitudes, suggesting that Norwegian consumers do not associate seaweed with pleasure due to limited experience with such foods. The limited availability of seaweed in Norwegian stores is posited to hinder consumer behavioural control and, consequently, their ability to purchase and consume seaweed.

Food Information

All food products commercially sold in EU must be labeled with nutritional content, such as sugar, fat, proteins and allergenic substances [20]. Additional information may be necessary for unfamiliar foods. For instance, Van Rijswijk and Frewer [21] found that consumers typically seek diverse information about food and its production processes. This underscores the importance of robust and transparent traceability systems in making such information accessible to consumers, particularly for food products containing potentially harmful substances such as high levels of iodine and heavy metals.

Food innovative consumers

It is generally recognised that consumers who are more inclined to try new foods and ingredients represent a target group for producers of new food products [22]. These innovative consumers often serve as opinion leaders and influence other consumer groups that are less innovative in trying new products [23]. For instance, Ling, Jung Choo [24] found that innovators and early adopters of new foods were more responsive to sales promotions and less brand loyal, rendering them more willing to experiment with new products. They are also more inclined towards risk-taking, less price-conscious, and exhibit greater information-seeking behaviour. With the increasing use of social platforms such as blogs, TikTok, and Facebook, innovators and early adopters possess various avenues to influence the late majority and laggards to try out new foods and recipes [25].

Our hypothesis posits that food innovative consumers harbour more positive attitudes towards consuming seaweed due to their proclivity for trying new foods and their greater knowledge, which contributes to their confidence in the safety of consuming seaweed compared to other consumer segments.

Method

To the best of our knowledge, most consumer studies on seaweed have utilised surveys (eg.[7, 8, 10, 26-28]. However, we opted for a more explorative approach and employed focus groups to collect our data. Focus groups are deemed appropriate for exploring consumer perspectives on fairly new products or updated versions of existing products [29]. They are also suitable for marketing purposes as they reveal abstract consumer needs and values. However, their efficacy in unveiling radically new products and thinking outside the box is limited.

Participants in this study were recruited via advertisements on Facebook over a two-week period in March 2023. The advertisements included a link to a brief questionnaire soliciting demographic information and frequency of purchasing and using new ingredients in cooking. One hundred and twenty-six individuals volunteered, with 40 subsequently invited to participate based on their degree of food innovativeness to ensure a diverse demographic sample. The final cohort comprised 32 participants divided into six focus groups, with three to seven participants in each. Half of the participants were classified as food innovators according to Rogers, Singhal [23].

The focus groups were conducted using the Teams software, which facilitated recording and automatic transcription of discussions. The discussions aimed to explore participants' perceptions of seaweed consumption, sustainability, health benefits, taste, preparation methods, and the potential market for seaweed-infused products. Participants were also presented with images of 12 different seaweed-based products and dishes to assess their natural fit within various meal contexts and gauge their willingness to pay a premium for seaweed-enhanced food.

Each session lasted approximately 1.5 hours, including a ten-minute break. Transcripts were manually quality-assured by the first author through comparison with recordings. Content analysis of transcripts was conducted using ChatGPT [30] with codes developed both abductively by ChatGPT and manually by the researcher. All participants received 500 Norwegian kroner as compensation for their participation.

Results and discussion

Attitudes to seaweed foods

Consistent with previous studies (e.g. [9, 10, 28] participants generally regarded seaweed as a sustainable and underutilised resource that should be incorporated more into diets. However, concerns were voiced regarding the ecological impact of wild and cultivated seaweed harvesting, particularly on marine ecosystems dependent on seaweed forests. There was a notable demand for more information on the sustainability of seaweed production to ensure that its consumption aligns with a sustainable diet. Participants exhibited a preference for locally produced Norwegian seaweed, perceiving it to have a lower environmental footprint and enhanced food safety owing to compliance with Norwegian regulations.

Seaweed was widely viewed as a healthy product akin to vegetables, abundant in minerals and vitamins. However, iodine content emerged as a concern among participants in five of the six focus groups, leading to scepticism regarding its health benefits.

Seaweed was deemed most suitable for dinner dishes, particularly seafood dishes like fish burgers and fish soup. Its association with Asian cuisine suggested a natural pairing with noodle and vegetable dishes. Participants noted its compatibility with vegetarian and vegan diets as a mean to incorporate "seafood" flavours.

Information needs to seaweed foods

Like Ling, Jung Choo [24] found, most participants expressed curiosity about the taste of different seaweed products and their impact on the flavour of dishes. While many anticipated a salty taste due to its marine origin, there was openness to using seaweed as a seasoning in various foods. Participants expressed interest in opportunities to taste different types of seaweed without committing to a purchase, suggesting in-store tastings or food festivals as potential avenues.

Participants desired more information about the iodine content from independent and scientific sources to assure the safety of consuming kelp. The potential for seaweed to address iodine deficiency was not discussed, indicating a gap in consumer knowledge. They also sought more information about other nutrients, such as protein and fibre.

Guidance on how to cook with seaweed was also desired. Participants were receptive to trying seaweed dishes served in restaurants, trusting the expertise of professional chefs. However, there was hesitation about paying for a dish they might not enjoy, underscoring a lack of confidence in personal cooking skills with seaweed.

Differences between food innovators and the rest

The results indicated minimal differences between the two segments. Both groups exhibited curiosity about seaweed foods and expressed a desire to learn more about kelp, taste it, and incorporate it into their cooking. They both viewed it as a healthy and sustainable food source, confirming findings from previous studies [9, 10, 28].

However, food innovators and early adopters tended to possess more knowledge about seaweed, were more information-seeking, and thus more aware of potentially harmful substances such as heavy metals and iodine. They were also more receptive to incorporating kelp into a wider range of dishes, including desserts, compared to other segments. They favoured a higher proportion of kelp in dishes to accentuate its flavour, suggesting its use as a primary ingredient rather than merely a spice that blends with other ingredients. This aligns with the notion that food innovative consumers are more willing to take risks when trying new food products [24].

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Does mortality salience influence takeaway food preferences?

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Abstract

According to Terror Management Theory, rooted in Becker's (1973) work "The Denial of Death" and proposed by Greenberg et al. (1986), people's reactions to existential threats can manifest in unpredictable ways. More specifically, when death-related thoughts are activated, people become motivated to shield themselves against these threatening cognitions by deploying psychological defences that aim to restore existential security. To achieve this goal, people are argued to engage in 'worldview defence', that is, to " cling to their own cultural worldviews—collective understandings of reality that render existence meaningful, coherent, and permanent" (Grant and Wade-Benzoni, 2009, p. 603). This can manifest in various domains, such as bolstering charitable giving to one's ingroup (Meer and Rosen, 2013), championing one's own religion (Greenberg et al., 1990; Maheswaran and Agrawal, 2004), and forming and maintaining close relationships and attachments (Mikulincer et al., 2003). Importantly, one area through which worldviews can be supported or derogated is consumer behaviour. TMT suggests that consumer decisions can be driven by worldview defence when death-related thoughts are active. Arndt et al. (2004) explains how deeply rooted concerns about mortality can influence consumer consumption behaviour. One such example is related to the tragic events of 9/11 in the US, after which many Americans appear to have increased the consumption of American products, such as US flags and pro-US bumper stickers, to symbolise their positive feeling towards their own country when reminded by death via this tragedy. Similarly, Jonas et al. (2005) found that mortality salience increased the favouritism of German participants towards the German currency as opposed to Euro and concluded that mortality concerns lead us to prefer symbols or products representing our culture. Of relevance to the study at hand, similar findings have also been found in the context of food preferences.

In the domain of food preferences, Friese and Hofmann (2008) investigated Swiss consumers' preferences for local vs international soft drinks. In a lab experiment, they asked participants to sample as much as they liked of two soft drinks, a Swiss and an American brand. They found that participants who thought of their death consumed more of the Swiss relative to American soft drink when compared to those in the control group (who were instead reminded of dental pain). Similar findings have been found in other TMT studies, including preferences for local vs foreign beers (Marchlewski, 2007), local vs foreign foods (Jonas et al., 2005), and alcohol consumption during weekends [vs weekdays; McCabe and Bartholow (2019)]. In some of these findings, the choice of "local" foods or drinks becomes more than simply "food or drinks", instead symbolising individuals' cultural worldview and a pathway to champion cultural values and beliefs when under the influence of mortality salience.

Despite the extensive research conducted on consumers' food and beverage choices and eating behaviours, there exists a noticeable gap in the literature regarding preferences for takeaway food. The emergence of online ordering platforms and specialised delivery services has propelled the takeaway market into a new era, yet this aspect remains relatively underexplored in the literature. In the UK, a study conducted in 2018 found that 15% of total spending on food was on takeaway, creating over 285,000 new jobs (Campaign, 2019). In 2019, the food service delivery market value in the UK was around £8.5 billion, with around 11 million users (S, Lock, 2020). Recent national statistics underscore the substantial economic impact of the takeaway sector, with the UK's food

service delivery market valued at approximately £10.5 billion in 2021, projected to reach £15 billion by 2025 (Campaign, 2019; Statista, 2023a), and the US market increasing from £322 billion US dollars in 2021 to £382 billion US dollars in 2022 (Statista, 2023b). These figures highlight the pivotal role of the takeaway industry within both economies, emphasising the potential economic ramifications of any disruptions. In fact, amidst the recent COVID-19 pandemic, many countries implemented various levels of lockdown to mitigate its spread, resulting in restrictions on the operations of takeaway outlets and significant financial challenges. However, takeaway meals became essential for certain demographic groups, including those who prefer not to cook at home or lack culinary skills. Therefore, examining consumer preferences for takeaway meals, especially during times of heightened mortality salience such as pandemics or global disasters, represents a crucial addition to existing literature. Such research has the potential to enhance our understanding of consumer behaviour within the evolving socio-economic landscape.

This study investigates the influence of mortality salience on takeaway meal preferences through the examination of two distinct samples drawn from the UK and the US. This approach not only underscores the sensitivity of our experimental design to variations in pandemic exposure across different countries but also provides validation for our research framework. Additionally, our unique methodological approach combines Terror Management Theory (TMT) with Discrete Choice Theory, offering a novel perspective for understanding and eliciting preferences during situations where mortality is heightened, such as illnesses and pandemics. This integration contributes conceptually and methodologically to the existing literature on TMT and stated preference elicitation.

Our findings reveal that reminders of mortality tend to steer individuals towards selecting food options aligned with their cultural preferences, as posited by Terror Management Theory. This significant finding remains consistent across participants from the UK and the USA.