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Who eats seaweed? Barriers and motivations in Japan versus the United Kingdom

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ABSTRACT

Seaweed is widely recognised as a nutritious and sustainable food, yet its adoption varies markedly across cultures. This paper examines consumer acceptance of seaweed in the United Kingdom and Japan using national survey data. Japan offers a context with a long-standing tradition of seaweed consumption, while the UK represents a country where seaweed remains largely unfamiliar in everyday diets. By comparing these contrasting cases, we identify how social, cultural and psychological factors shape attitudes toward this environmentally and nutritionally beneficial food. We explore four dimensions of seaweed perception: current consumption, ease of access, willingness to eat it in future and perceived health benefits. The results reveal strong cross-cultural differences, with education, political orientation, and trust in institutions emerging as key predictors, but with distinct patterns across countries. In the UK, consumption is higher among ethnic minorities and the university-educated, while in Japan, it is more common among women and those on the political right. Although pro-environmental attitudes are often assumed to drive seaweed uptake, our findings suggest that behavioural change is shaped by a broader set of factors. By comparing two culturally distinct markets, the study offers insights that may inform efforts to promote sustainable eating practices in other regions.

1. Introduction

Meeting global food needs without breaching planetary boundaries is one of the defining challenges of the twenty-first century (FAO, 2023; Tilman et al., 2011). Edible seaweeds (macroalgae) have attracted growing attention as sustainable ingredients due to their exceptionally low ecological footprint and rich nutritional profile, including micro-nutrients, soluble fibre and bioactive compounds with potential health benefits.

From an environmental standpoint, farmed kelp and other macroalgae require no arable land, very little freshwater and grow happily without the synthetic nitrogen fertilisers that drive terrestrial run-off, eutrophication and nitrous-oxide emissions (Zheng et al., 2019). Many species actively sequester carbon and reduce coastal acidification, making seaweed aquaculture one of the few food production systems with the potential for net-positive environmental outcomes (Duarte

et al., 2022; Rebours et al., 2014; Young, Paul, Birch, & Swanepoel, 2022). Lifecycle assessments consistently rank seaweed as having lower greenhouse gas emissions than poultry, legumes, or mycoprotein, reinforcing its status as a low-impact food source (Buschmann et al., 2017; Govaerts & Ottar Olsen, 2023).

The nutritional case is equally compelling. Seaweed provides concentrated sources of iodine, calcium, soluble fibre, long-chain omega-3 fatty acids and a suite of bioactive compounds with anti-inflammatory or cardiometabolic properties (Brown, Allsopp, & Magee, 2014; Guo et al., 2019; Kishida et al., 2020; MacArtain, Gill, Brooks, Campbell, & Rowland, 2007). Incorporating powdered seaweed into breads, plant-based burgers or savoury snacks has been shown to raise micronutrient density while simultaneously lowering sodium and fat when used as a salt replacer (Mouritsen et al., 2021).

Yet consumer uptake remains strikingly uneven across cultures. In Japan seaweed is woven into daily cuisine, from kombu broth to onigiri

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wrappers, whereas in the United Kingdom it appears mainly in sushi outlets, gourmet restaurants and health-food aisles (Birch et al. 2019; Palmieri & Forleo, 2020). Western diners often describe seaweed as exotic or unfamiliar and cite texture, flavour uncertainty and lack of culinary knowledge as barriers to trial (Losada-Lopez, Dopico, & Faina-Medin, 2021; Mouritsen, Rhatigan, & Pérez-Lloréns, 2019; O'Connor, 2017). Such reactions align with food-neophobia theory, which conceptualises a stable, trait-like reluctance to try new or unfamiliar foods (Pliner & Hobden, 1992). Neophobia tends to decrease with repeated positive exposure (Dovey et al. 2008) and with culturally familiar cues that signal safety (Rozin, 1988), but remains a pivotal predictor of first-time acceptance.

Neophobia, however, is only part of the motivational mosaic. A growing body of literature shows that willingness to adopt novel foods is shaped by the broader constellation of food-choice motives (such as health, sensory appeal, price, convenience and social identity) and by the individual's perception of product naturalness and uniqueness (Renner et al., 2012; Govaerts & Olsen, 2024). Identity-based segmentation studies in Europe and North America routinely identify three clusters: progressive early adopters, conservative traditionalists and disengaged consumers. These segments differ in neophobia levels, environmental values and perceived benefits of seaweed (Govaerts & Olsen, 2024; Bakr, Al-Bloushi, & Mostafa, 2023; Chong, Leung, & Lua, 2022; Maksan, Matulić, Mesić, & Memery, 2025; Pennanen, Malila, & Luomala, 2024).

Two additional factors deserve attention. First, institutional trust has been shown to moderate risk perceptions of new technologies and foods; consumers who trust government regulators and scientists rate novel foods as safer and are more willing to try them (Siegrist, 2021). Second, general risk-taking propensity predicts willingness to sample unfamiliar products, especially when social proof is limited (Dovey et al. 2008). Political orientation may also play an indirect role: in Western settings, left-leaning publics appear more open to alternative food sources framed around sustainability, whereas conservative identities tend to prefer traditional fare (Chuck et al., 2016; Leach et al., 2020).

Synthesising these strands, the present study asks which individual-level factors best predict seaweed acceptance and whether the pattern differs between a mature-consumer context (Japan) and a nascent-consumer context (the United Kingdom). Using probability-based online surveys of adults in Japan ($n \approx 1500$) and the UK ($n \approx 1275$), we model how food neophobia, institutional trust, risk propensity, political orientation and core socio-demographics relate to (i) willingness to consume seaweed and (ii) self-reported consumption frequency. By examining the intersection between cultural familiarity and psychological disposition, the findings aim to inform sensory and consumer research on novel foods, public-health strategies to diversify food supplies, and industry efforts to position sustainable ocean foods in Western markets (Figueroa, Farfán, & Aguilera, 2023; Mouritsen, 2013, 2017).

1.1. Edible seaweeds

Despite being grouped under the single term “seaweed,” edible seaweeds encompass a taxonomically diverse set of marine macroalgae spanning three major groups: brown algae (*Phaeophyceae*), red algae (*Rhodophyta*), and green algae (*Chlorophyta*). These lineages differ not only in pigmentation and cellular structure but also in their ecological roles, nutritional profiles and regional prevalence (Peñalver et al., 2020; Swamy, 2011). For example, Japan's seaweed diet relies heavily on brown algae such as *Undaria pinnatifida* (wakame) and *Laminaria japonica* (kombu), while the UK features native red and green species like *Palmaria palmata* (dulce) and *Ulva lactuca* (sea lettuce) (Dawczynski et al., 2007; Yoshinaga et al., 2018). While more than 168,000 macroalgal species have been documented, only a small fraction are widely consumed or cultivated at scale (Xu et al., 2023). Table 1 summarises some of the most commonly eaten seaweeds in Japan and the UK, along with their taxonomic classification.

Table 1

Types of edible seaweed in Japan and the UK.

| Country | Scientific name | Common name (English) | Common name (Japanese) | Taxonomic group |
|-----------|-----------------------------|---------------------------|------------------------|----------------------------|
| Japan | <i>Undaria pinnatifida</i> | Wakame | ワカメ | Phaeophyceae (brown algae) |
| Japan | <i>Saccharina japonica</i> | Kombu (Sweet kelp)* | 昆布* | Phaeophyceae (brown algae) |
| Japan | <i>Sargassum fusiforme</i> | Hijiki | ヒジキ | Phaeophyceae (brown algae) |
| Japan | <i>Neopyropia</i> | Nori | 海苔 (アマノリ) | Rhodophyta (red algae) |
| Japan | <i>Monostroma nitidum</i> | Green laver | アオサ (ヒトエグサ) | Chlorophyta (green algae) |
| Japan | <i>Ulva prolifera</i> | Branched string lettuce** | アオノリ** | Chlorophyta (green algae) |
| UK | <i>Palmaria palmata</i> | Dulse | アカハタ*** | Rhodophyta (red algae) |
| UK | <i>Ulva lactuca</i> | Sea lettuce** | オオバアオサ** | Chlorophyta (green algae) |
| UK/ Japan | <i>Saccharina latissima</i> | Sugar kelp** | カラフトコンブ** | Phaeophyceae (brown algae) |

* *Saccharina japonica* and *Saccharina latissima* are both types of kombu, however, *S. japonica* is much more widely used in Japan than *S. latissima*.

** There is confusion in English literature on members of the *Ulva* genus. Some literature refers to any member of the genus *Ulva* as ‘sea lettuce’, but this is incorrect, as the ‘lettuce’ part comes from *lactuca*. It should be pointed out that even in Japan there has been and still is confusion over the taxonomy of seaweed.

*** Dulse is sometimes referred to as アカハタ (Akahata) in Japan, but this appears to be a misidentification. The Japanese アカハタ does not clearly correspond to *Palmaria palmata* and may be closer to *Devaleraea mollis*, which remains less well-known in Japan.

While this taxonomic and cultural diversity underscores the complex foundations of seaweed consumption, it also raises important questions about how individuals make food choices in different societal contexts. The types of seaweed that are familiar, and therefore more acceptable, to consumers differ markedly between Japan and the UK. Kombu and wakame, for example, are deeply embedded in traditional Japanese cuisine and are often used as core ingredients in broths, soups, and salads. By contrast, red and green seaweeds such as dulce and sea lettuce, although native to the UK, are less commonly featured in everyday meals and are largely absent from mainstream food culture. These species-level differences contribute not only to regional variation in taste and usage, but also to broader perceptions of accessibility, healthiness, and even legitimacy as a “real” food. This may help explain why UK consumers express greater uncertainty or hesitation around seaweed, while Japanese consumers exhibit more entrenched and often politicised patterns of acceptance. In this way, taxonomy is not just a biological classification, but a reflection of cultural familiarity and culinary practice.

Moving beyond biological and geographical factors, the following section introduces the psychological, sociocultural, and political dimensions that may explain why certain groups are more receptive to seaweed than others. Drawing on existing literature in food studies, consumer segmentation and trust research, we develop a theoretical framework to guide our empirical analysis.

1.2. Theoretical framework and prior evidence

With a high demand for environmental sustainability, the multifaceted benefits of seaweed are part of positioning seaweed as a possible alternative to traditional food sources. Seaweed is a food source that provides multiple vitamins, minerals and bioactive compounds, all of which offer benefits for human nutrition. It should also be noted that

apart from being a food source it has extensive applications in pharmaceuticals, biofuel production and various environmental treatments (Nedumaran & Arulbalachandran, 2015). Seaweed also has a number of ecological benefits that extend beyond its value from a purely nutritional perspective. One of the most notable contributions of seaweed is its potential to act as a carbon sink, where seaweed cultivation can sequester large amounts of CO₂ from the atmosphere, helping to mitigate climate change by reducing greenhouse gas concentrations (Luo et al., 2023). Seaweed farming also reduces the need for fertilisers and pesticides, which are major contributors to soil and water pollution in traditional agriculture (Zheng et al., 2019). For its many benefits, seaweed has even been identified as a potential solution to meet global sustainability targets of reducing environmental footprints of food production, set by the United Nations (Duarte, Bruhn, & Krause-Jensen, 2022; Duarte, Wu, Xiao, Bruhn, & Krause-Jensen, 2017). Moreover, in times of increasing food scarcity exacerbated by climate change, seaweed represents a resilient food source that could help achieve global food security (Forster & Radulovich, 2015).

Rising Western interest in edible seaweeds is tempered by persistent barriers of unfamiliarity, limited retail presence and occasional “yuck-factor” concerns (Vincent et al., 2020). Behaviourally, adoption hinges on food neophobia, a trait-like reluctance to try unfamiliar foods, typically measured with the Food Neophobia Scale (Pliner & Hobden, 1992). In Spain and Norway, for example, high-neophobia consumers shun macroalgae (Govaerts & Olsen, 2024; Losada-Lopez et al., 2021), whereas lifelong exposure makes the same products unremarkable in Japan (Young et al., 2022).

Beyond neophobia, segmentation studies identify three broad Western consumer clusters. “Progressive” early adopters value environmental benefits and naturalness; “Conservative” traditionalists favour familiar staples; and “Egoistic” disengaged consumers show little interest (Govaerts & Olsen, 2024; Govaerts & Ottar Olsen, 2023; Maksan et al., 2025). Recent U.S. and pan-European work echoes these patterns, highlighting affordability, sensory appeal and sustainability as pivotal drivers of seaweed uptake (Rombach et al., 2024; Gegg & Wells, 2019; Van der Stricht, Hung, Fischer, & Verbeke, 2024). In addition, consumers’ willingness to adopt unfamiliar foods is shaped by institutional trust and individual risk orientation. Consumers who trust regulators perceive emerging foods as safer (Siegrist, 2021), while high risk-takers are quicker to adopt dietary innovations (Hartmann & Siegrist, 2017).

Despite its numerous nutritional (Rocha et al., 2021) and environmental benefits (Jagtap & Meena, 2022), seaweed remains an underutilised food product in many Western spaces, especially when compared to East and Southeast Asian countries, where the majority of seaweed consumption is concentrated (Mouritsen et al., 2018). Although being largely absent from the modern European diet today, biomolecular evidence for the consumption of seaweed suggests its widespread exploitation as a food source from the Mesolithic period to the early Middle Ages. This decline in consumption likely coincided with the gradual shift away from wild resources and toward domesticated crops like wheat and barley (Buckley et al., 2023). Focusing on the significant environmental benefits of seaweed production is a key aspect of investigating seaweed consumption. The cultivation of seaweed has the potential to increase the amount of nutrient-rich food for human consumption using the ocean as a reserve that allows a more sustainable cultivation compared to land-based agriculture (Tiwari & Troy, 2015). Unlike livestock farming which requires extensive land-use change, freshwater, feed, etc., seaweed farming is a zero-input system that does not need additional resources to grow (Grebe et al., 2019).

Food and food systems have always been inherently political (Leach et al., 2020), especially in terms of sustainability, reflecting cultural values and a shared social identity. This is particularly evident in the complex interplay between dietary habits and political affiliation (Chuck et al., 2016; Karami et al., 2021; Mosier & Rimal, 2020; Sarić et al., 2020). However, given the added dimensions of food neophobia and xenophobia, the connection between seaweed consumption and

these various political dimensions has remained largely unexplored. Assessing the issue through an environmentalist lens, political efficacy (the belief in one’s ability to influence political decisions) has been extensively linked to increased pro-environmental attitudes and intentions (Feldman & Hart, 2015). However, it is important to note that while pro-environmentalist attitudes have increased, such attitudes do not tend to translate into actual behavioural change (Asvatourian, Craig, Horgan, & Green, 2018; Saini, Prakash, Yaqub, & Agarwal, 2024). That said, pro-environmentalist behaviour has been associated with a more health-conscious diet (Asvatourian et al., 2018), which, although not specified, could include seaweed. Supporting this, food neophobia, which has been shown to reduce willingness to try seaweed (Losada-López et al., 2021), is also inversely associated with adherence to a balanced diet (Gutiérrez-Salomón & Villanueva-Rodríguez, 2016).

Taken together, this literature suggests that cultural familiarity, consumer segmentation, trust, risk orientation and politics will intersect to explain seaweed acceptance in distinct ways across the United Kingdom and Japan.

1.3. Hypotheses

Based on the theoretical framework and existing research literature, we propose the following hypotheses to explore cross-cultural differences in attitudes toward seaweed consumption:

H1: Individuals with university degrees will demonstrate a more positive attitude toward seaweed consumption.

H2: Younger individuals will exhibit a greater willingness to consume seaweed compared to older individuals.

H3: Higher levels of institutional trust (including trust in government, scientists, and regulatory bodies) will correlate positively with attitudes toward seaweed consumption.

H4: Individuals who are more willing to take risks will show a more positive attitude toward seaweed consumption.

H5: Political orientation will influence attitudes toward seaweed consumption differently in Japan and the UK. Specifically, we hypothesise that:

H5a: In Japan, individuals identifying as more right-wing will exhibit more positive attitudes toward seaweed, reflecting traditional dietary preferences.

H5b: In the UK, individuals identifying as more left-wing will exhibit more positive attitudes toward seaweed, aligning with openness to dietary innovations, environmental concerns, and alternative food practices.

These hypotheses guide our empirical analysis, helping to unlock the role of cultural, socio-demographic and psychological factors in shaping consumer acceptance of seaweed in different cultural contexts.

2. Data and methodology

The data used in this article are based on surveys collected in Japan and the United Kingdom. In Japan the survey was conducted by Rakuten Insight and in the United Kingdom by YouGov. Full replication data, code and bilingual (English and Japanese) versions of the survey questions are available from the Harvard Dataverse, at: Doi: 10.7910/DVN/LXCCIG. The surveys were collected in mid-April 2024 for Japan and mid-April and mid-May 2024 for the United Kingdom. Descriptive statistics for all of our independent variables are presented in Table 2. For Japan, 1532 responses were collected and for the United Kingdom 1276 respondents completed the survey. As is common with UK opt-in panels, the sample slightly over-represents women.

We include a number of independent variables as discussed in our hypotheses. The socio-demographic variables are the age of the respondents, whether they have completed university education and for the UK whether they belong to an ethnic minority. The latter variable is not relevant for the mono-cultural Japanese case, but is relevant for the multi-cultural UK one. We include three trust variables: general trust

Table 2
Descriptive statistics.

| Variable | UK | Japan |
|------------------------------------|--------------------------|-------------------------|
| N | 1276 | 1532 |
| Mean age (SD) [range] | 49.38 (17.92) [18–88] | 50.2 (16.19) [18–79] |
| Women | 55.25 % | 49.80 % |
| Men | 44.75 % | 50.20 % |
| University-educated | 38.87 % | 48.96 % |
| Ethnic minority | 17.16 % | – |
| Mean trust: general, 1–7 (SD) | 3.57 (1.61) | 3.11 (1.55) |
| Mean trust: government, 1–7 (SD) | 2.68 (1.53) | 3.1 (1.48) |
| Mean trust: social media, 1–7 (SD) | 2.44 (1.28) | 3.36 (1.25) |
| Mean risk-taking, 0–10 (SD) | 4.85 (2.14) | 4.64 (1.96) |
| Mean left-right, 0–10 (SD) | 4.85 (2.16) | 4.99 (1.55) |

(trust in other people); trust in the government (as the institution which regulates food produce); and whether the respondent trusts social media. Also included is a variable for how willing the respondent is to take risks. Finally we include a political variable: the left-right position.

2.1. Analysis

Table 3 presents the mean findings on food consumption and perceptions. In both the UK and Japan, we asked respondents about eight food categories: 1) Seaweed; 2) Fish and Seafood; 3) Tofu; 4) Nuts; 5) Chicken; 6) Beef; 7) Pork; 8) Beans and Lentils. For each of the food types, we asked respondents: 1) How frequently they eat that food (where 1 is “Never” and 7 is “Every day”); 2) How healthy or unhealthy they see that food as (1 means “Extremely unhealthy” and 7 means “Extremely healthy”); 3) How likely they are to eat that food (1 means “Extremely unlikely” and 7 means “Extremely likely”); and 4) how difficult or easy it is for them to buy that food (1 means “Extremely difficult” and 7 means “Extremely easy”).

It should be noted that although seaweed was included alongside some protein-rich foods in the survey, this does not imply nutritional equivalence. Unlike meat or legumes, seaweed typically plays a supplementary rather than primary role in most diets. The aim of including it in this broader food list was to assess perceived acceptability and familiarity, not to equate its dietary function with that of traditional protein sources.

As can be seen in **Table 3**, there are notable differences in food consumption, perceived healthiness, likelihood of consumption, and ease of purchase between Japan and the UK. Seaweed stands out as a culturally distinct food, with significantly higher consumption in Japan (mean = 4.73) than in the UK (mean = 1.49). Despite both populations rating seaweed as relatively healthy (UK = 5.42, Japan = 5.55), the likelihood of eating it follows the same pattern as consumption, with Japanese respondents (5.07) expressing greater willingness than their UK counterparts (3.47). Availability also differs, as Japanese respondents find seaweed easier to buy (4.95) than those in the UK (3.85), suggesting that both cultural familiarity and access influence its consumption. It should be noted that some consumers in the UK may

Table 3
Mean food consumption patterns and perceptions.

| Food | Currently eat | | View as healthy | | Likely to eat | | Easy to buy | |
|-------------------|---------------|-------|-----------------|-------|---------------|-------|-------------|-------|
| | UK | Japan | UK | Japan | UK | Japan | UK | Japan |
| Seaweed | 1.49 | 4.73 | 5.42 | 5.55 | 3.47 | 5.07 | 3.85 | 4.95 |
| Fish and Seafood | 3.95 | 4.88 | 5.88 | 5.45 | 5.59 | 5.21 | 6.12 | 4.56 |
| Tofu | 1.56 | 4.96 | 4.88 | 5.59 | 2.79 | 5.26 | 4.97 | 5.51 |
| Nuts | 3.87 | 3.71 | 5.68 | 5.18 | 5.55 | 4.8 | 6.35 | 4.42 |
| Chicken | 4.79 | 4.93 | 5.44 | 5.17 | 6.03 | 5.23 | 6.45 | 5.2 |
| Beef | 3.52 | 4.02 | 4.39 | 4.73 | 5.36 | 5.09 | 6.23 | 4.09 |
| Pork | 3.14 | 5.1 | 4.16 | 5.01 | 4.88 | 5.25 | 6.15 | 5.13 |
| Beans and Lentils | 3.85 | 5.11 | 6.08 | 5.62 | 5.35 | 5.2 | 6.25 | 5.3 |

consume seaweed in dishes such as sushi without explicitly recognising it as such, which may complicate the relationship between reported consumption and actual intake. Unpacking this is beyond the scope of our analysis.

Fish and seafood consumption is high in both countries but is more prevalent in Japan (4.88) than in the UK (3.95). However, UK respondents perceive it as slightly healthier (5.88) than their Japanese counterparts (5.45). Interestingly, while fish is perceived to be much easier to purchase in the UK (6.12) than in Japan (4.56), willingness to eat it is nearly identical in both countries.

Tofu exhibits a stark cultural contrast which is comparable to seaweed. Japanese respondents eat tofu far more frequently (4.96 vs. 1.56) and find it easier to purchase (5.51 vs. 4.97). Additionally, they rate tofu as healthier (5.59 vs. 4.88), which may contribute to their greater likelihood of consuming it (5.26 vs. 2.79).

Chicken consumption is remarkably similar in both countries (UK = 4.79, Japan = 4.93), with both populations rating it relatively easy to buy (UK = 6.45, Japan = 5.20) and expressing high likelihood of consuming it (UK = 6.03, Japan = 5.23). This consistency suggests that chicken is a globally accepted staple.

Red meats such as beef and pork show differences in both consumption and perception. Japanese respondents eat more pork (5.10 vs. 3.14) and slightly more beef (4.02 vs. 3.52). However, UK respondents rate beef as less healthy (4.39) than Japanese respondents (4.73), with pork following a similar pattern (UK = 4.16, Japan = 5.01). Availability is higher in the UK, particularly for beef (6.23 vs. 4.09), yet willingness to eat these meats is relatively similar across countries.

Beans and lentils reveal another difference in dietary habits. Japanese respondents consume them more frequently (5.11 vs. 3.85) and find them slightly healthier (5.62 vs. 6.08). However, UK respondents rate them as easier to buy (6.25 vs. 5.30), suggesting that availability alone does not drive consumption.

Overall, Japan exhibits higher seaweed and tofu consumption, reflecting deep-rooted cultural dietary practices. Western foods like beef and chicken are more easily available in the UK, but consumption differences persist, likely due to ingrained dietary habits. Accessibility alone does not always dictate food choices; cultural familiarity plays an important role in shaping dietary patterns.

However, these findings are descriptive in nature and tell us little about the underlying factors that shape the four key dimensions of seaweed consumption: current intake, ease of purchase, likelihood of future consumption, and perceived health benefits. To address this, we conduct regression analyses to examine the individual-level factors associated with each of these outcomes.

Table 4 presents the results of our regression models. There are four questions across the two countries of our study. The first question (presented in Models 1 and 2) asks how often respondents eat seaweed. Models 3 and 4 ask respondents how easy it is to buy seaweed, where 1 means extremely difficult and 7 means extremely easy. Models 5 and 6 ask respondents how likely they are to eat seaweed and finally Models 7 and 8 ask respondents how healthy they think seaweed is.

Our independent variables are a left-right scale (0 to 10, where 0 is left and 10 is right), willingness to take risks (low to high, also 0 to 10),

Table 4
Regression models.

| | Dependent variable: | | | | | | | |
|-------------------------|----------------------|---------------------|---------------------|---------------------|-----------------------|---------------------|---------------------|---------------------|
| | Often eat seaweed | | Easy to buy seaweed | | Likely to eat seaweed | | Seaweed is healthy | |
| | UK 1 | Japan 2 | UK 3 | Japan 4 | UK 5 | Japan 6 | UK 7 | Japan 8 |
| Left-right | -0.026* (0.013) | 0.071*** (0.024) | -0.037 (0.027) | 0.054** (0.022) | -0.084*** (0.031) | 0.087*** (0.021) | -0.040** (0.019) | 0.089*** (0.022) |
| Willing to take risks | 0.041*** (0.013) | 0.035* (0.019) | 0.076*** (0.026) | 0.066*** (0.017) | 0.091*** (0.029) | 0.040** (0.017) | -0.004 (0.018) | 0.001 (0.018) |
| Trust social media news | 0.040* (0.022) | 0.011 (0.031) | -0.011 (0.043) | 0.047 (0.029) | 0.027 (0.05) | 0.003 (0.027) | -0.026 (0.03) | 0.041 (0.029) |
| Trust Government | 0.025 (0.019) | 0.041 (0.027) | 0.077** (0.038) | 0.045* (0.025) | 0.0003 (0.044) | 0.038 (0.024) | -0.012 (0.026) | 0.044* (0.025) |
| General trust | 0.017 (0.017) | 0.050** (0.025) | 0.022 (0.035) | 0.028 (0.023) | 0.065 (0.04) | 0.028 (0.022) | 0.044* (0.024) | -0.025 (0.023) |
| Ethnic minority | 0.441*** (0.071) | | 0.263* (0.142) | | 0.418** (0.163) | | -0.124 (0.098) | |
| University educated | 0.097* (0.055) | 0.220*** (0.075) | 0.186* (0.11) | 0.082 (0.068) | 0.485*** (0.126) | 0.074 (0.064) | 0.277*** (0.076) | 0.138** (0.068) |
| Women | -0.034 (0.053) | 0.265*** (0.075) | 0.063 (0.105) | 0.343*** (0.068) | 0.148 (0.12) | 0.396*** (0.065) | 0.265*** (0.073) | 0.222*** (0.069) |
| Age | -0.007*** (0.002) | 0.017*** (0.002) | -0.001 (0.003) | 0.013*** (0.002) | -0.004 (0.004) | 0.010*** (0.002) | 0.004 (0.002) | 0.009*** (0.002) |
| Constant | 1.410*** (0.144) | 2.758*** (0.214) | 3.305*** (0.287) | 3.076*** (0.195) | 2.995*** (0.328) | 3.454*** (0.186) | 5.171*** (0.198) | 4.282*** (0.197) |
| Observations | 1263 | 1499 | 1262 | 1498 | 1262 | 1496 | 1263 | 1489 |
| R2 | 0.104 | 0.071 | 0.024 | 0.071 | 0.056 | 0.064 | 0.036 | 0.036 |

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

degrees of trust in social media news, government and other people (1 is no trust, 7 is high trust), binary variables based on whether respondents are ethnic minorities, university educated or women, and finally an age variable.

Looking at the regression models in Table 4, we find clear cross-cultural variations between the UK and Japan across four key dimensions of seaweed acceptance: current consumption, ease of purchase, likelihood of future consumption and perceived health benefits.

Firstly, current seaweed consumption reveals stark cultural contrasts. In the UK, respondents from ethnic minorities significantly report higher consumption, which may reflect retained dietary habits from countries with established seaweed traditions. Education also emerges positively, suggesting that university-educated individuals in the UK are more open to novel and health-conscious dietary practices. Conversely, in Japan, frequent consumption is strongly associated with right-leaning political orientations, aligning seaweed with traditional dietary customs and cultural identity. Additionally, women in Japan consume seaweed significantly more than men, indicating gendered dietary patterns absent in the UK.

Regarding ease of purchasing seaweed, the UK data shows that university education and institutional trust (particularly in government) correlate positively with perceived accessibility. This likely reflects greater familiarity with international foods and trust in regulatory systems that ensure product safety and availability. In Japan, ease of purchase is significantly higher among women and older individuals, potentially due to traditional market access or established purchasing routines. Risk-taking tendencies in both countries correlate positively with perceived accessibility, suggesting openness to exploring food markets broadly enhances perceptions of availability.

Future likelihood of consuming seaweed highlights another

intriguing cultural divide. In the UK, likelihood strongly correlates with education, ethnic minority status and left-wing political orientation, reflecting seaweed's association with progressive dietary trends and multicultural influences. In Japan, however, right-wing respondents show significantly greater likelihood, underscoring the traditional rather than innovative appeal of seaweed. Risk-taking remains influential in both contexts, consistently predicting willingness to experiment with unfamiliar foods.

Perceptions of seaweed's health benefits also differ. In the UK, education and being female are strong positive predictors, reinforcing the association of seaweed with health-conscious dietary practices and nutritional awareness. Ethnic minorities in the UK, despite higher consumption rates, tend to rate seaweed's health benefits less positively, possibly due to differing cultural health narratives. Conversely, Japanese respondents who identify politically toward the right and women show significantly stronger positive health perceptions, reflecting deep-rooted cultural and traditional dietary beliefs about seaweed's nutritional value. Trust variables play nuanced roles: general institutional trust positively influences health perceptions in both contexts, but trust in government specifically elevates health perceptions significantly in Japan alone.

These findings collectively underscore the complexity in promoting seaweed as a sustainable dietary alternative. Cultural context heavily shapes both current behaviour and future willingness, with educational attainment, political orientation, ethnic background, gender and risk-taking attitudes serving as pivotal predictors. Understanding these dynamics is important for effectively positioning seaweed within diverse dietary cultures.

3. Discussion

Consistent with H1, respondents especially in the UK with university degrees were more likely to consume seaweed and express positive attitudes toward its inclusion in their diet. This aligns with broader literature linking higher education to openness to new diets, environmental awareness and health consciousness (Govaerts & Olsen, 2024; Maksan et al., 2025). In the UK, where seaweed is culturally novel or often perceived as unfamiliar, education likely acts as an agent for exposure to global cuisines and sustainability discourses. Educated individuals may also reside in urban areas with easier access to international or sustainability-conscious food retailers, which are more likely to stock seaweed as products (Pickering & Tanaka, 2025). Moreover, these consumers may score lower on the Food Neophobia Scale, indicating a greater willingness to experiment with unfamiliar foods. On the other hand, the relationship was not significant in Japan where seaweed is a deeply integrated component of the national diet. This suggests that education does not differentiate seaweed consumption in Japan because familiarity already normalises its presence across the Japanese population, which minimizes the influence of education-based exposure or awareness. This cross cultural contrast ties to the theoretical claim of food neophobia, supporting the argument that food is culturally relative. Seaweed is not considered novel in Japan, thus the role of education in dietary openness is neutralised.

H2 receives partial support. In the UK, younger respondents are significantly more likely to report current seaweed consumption, though age does not significantly predict future willingness to consume it. In Japan, the pattern is reversed, with older individuals more likely to consume and express interest in seaweed, likely reflecting the ingrained role of seaweed in traditional diets. Nonetheless, age remains a theoretically important factor in shaping openness to novel foods, particularly in Western contexts where seaweed is less culturally embedded. This finding is consistent with Maksan et al. (2025) in which it is argued that those who identify as younger and highly educated are more receptive to dietary innovations. Similarly, Young et al. (2022) highlighted that Millennial and Gen Z consumers are drawn to the nutritional values and environmental benefits of seaweed, aligning with the food motivation theory outlined by Renner et al. (2012). Younger individuals are more likely to have a lower food neophobia score, which may be due to their exposure to global cuisines and diets from increased travelling, social media and international environments. Additionally, younger individuals are exposed to more information on sustainability narratives, which may enhance the value of seaweed as an environmentally responsible choice. In Japan, age was not a strong differentiator of attitudes, much like education, likely because seaweed is already a culturally familiar food across demographic groups. Since seaweed is not perceived as innovative or sustainable, but rather embedded in the traditional national diet, consumption is habitual across all age groups. However, given Japan's aging population, it remains relevant to explore whether younger Japanese individuals will maintain these traditional diets or shift toward a more Westernised diet overtime, potentially resulting in less consumption of seaweed.

Trust in institutions, such as government, scientists and media, is a key factor in shaping public opinion and behaviour, hence our H3. Research by Siegrist (2021) demonstrates the importance of trust in risk perception and acceptance of new technologies and products, which is partially reflected in the results. In both countries general trust, together with trust in government and social media, demonstrate positive correlation with the current and future consumption of seaweed. However, the relationship between trust and perceptions of product accessibility and healthiness is less straightforward, with effects varying in direction between the two countries. In the UK, higher trust in social media is associated with viewing seaweed as more difficult to purchase and less healthy, while in Japan, the opposite pattern emerges. Similarly, trust in government predicts stronger beliefs in seaweed's health benefits in Japan, but shows no such association (or even a slightly negative one) in

the UK. These contrasting patterns likely reflect differences in how seaweed is framed within each country's media and institutional landscape. In Japan, seaweed is a familiar staple often promoted as a healthy and widely available food, whereas in the UK it is more likely to be perceived as an unfamiliar or niche product, sometimes framed as an inferior alternative to conventional foods. Prior research has shown that media play a powerful role in shaping food perceptions and consumer choices (Macintyre et al., 1998), and our findings suggest that institutional trust interacts with these narratives in context-specific ways. While our third hypothesis focused primarily on trust in government, the influence of media trust, while not a central focus of this study, emerges as a potentially important factor and warrants further exploration in future research.

H4 posited that individuals showing risk-taking tendencies show a more positive attitude toward seaweed consumption, grounded in the theoretical expectation that links openness to novelty and willingness to adopt unfamiliar or innovative dietary products. The results across all outcome variables in the UK and Japan consistently support this hypothesis. The findings show that individuals' level of risk-taking attitude was positively correlated with current consumption, perceived ease of purchase, future consumption intentions and beliefs about health benefits regarding seaweed. These results align with prior research, which suggests that those more comfortable with uncertainty are more open to dietary innovation and diverse food experiences (Dovey et al., 2008). The uniformity of influence on risk-taking across two culturally divergent contexts can indicate a disposition toward dietary experimentation. In the UK, where seaweed remains marginal, risk-taking appears as a trait that lowers psychological barriers to consuming seaweed posed by food neophobia and cultural unfamiliarity. While in Japan, where risk-taking also predicts high association, this trait may drive individuals to seek variations or explore alternative uses for the ingredient. Furthermore, the link between risk-taking and health perceptions of seaweed implicates food innovation strategies that target those inclined toward risks as early adopters. By identifying and mobilising highly risk-tolerant consumers, the familiarity of seaweed in the mainstream diet can be accelerated.

As outlined in H5, food and food systems are deeply political, particularly when sustainability is at stake, reflecting broader cultural values and social identities (Leach et al., 2020). Political orientation emerges as a consistent predictor of seaweed attitudes across both countries, though in opposite directions. In Japan, right-leaning respondents are significantly more likely to consume seaweed, view it as accessible and healthy, and express willingness to eat it in future. In the UK, these same positive associations are consistently observed among left-leaning respondents. This pattern strongly supports our hypotheses H5a and H5b, and aligns with previous findings linking dietary preferences to ideological orientation (Chuck et al., 2016; Karami et al., 2021; Mosier & Rimal, 2020; Sarić et al., 2020). While political identity influences food choices in both settings, the cultural positioning of seaweed (as traditional in Japan and novel in the UK) appears to shape the direction of that effect.

These findings suggest that if seaweed is to become a more widely accepted dietary option in countries like the UK, targeted efforts to normalise it will be essential. Such efforts could include public information campaigns, school-based food education and clear supermarket labelling. In the UK, celebrity chefs have helped to shape public dietary norms: Jamie Oliver's "Feed Me Better" campaign, for instance, significantly improved school nutrition and academic performance (Belot & James, 2011), illustrating the wider potential of chef-led interventions to shift food habits. Making seaweed more familiar across these various platforms may help reduce the psychological distance consumers feel from it, and reposition it as a viable, sustainable option.

4. Conclusion

In this article we examined public attitudes toward seaweed in the

United Kingdom and Japan. With the challenges facing the world in terms of global warming and food sustainability, seaweed is by many seen as a factor that could contribute to the solution of some of these problems. However, in order to do so it is necessary that the public is willing to purchase and consume food products made from seaweed. The use of seaweed in diets is also cultural, with seaweed being a strong presence in some countries and almost absent in others. Using two very different countries, Japan and the United Kingdom, we explored the supply and the demand for seaweed as a food.

Our findings suggest that there are strong cultural variations: for instance, women in Japan are much more positive toward seaweed, whereas there is no effect of sex in the United Kingdom. In the UK there is a strong positive effect of having completed a university education, but there is no similar effect found in Japan. We find very minor and inconsistent effects of the three trust variables we include, but in both countries, we find a positive view toward seaweed by those who are willing to take risks. The most striking difference we find is in our political variable, which hammers home to the cultural difference. In Japan the more right-wing the respondent, the more positive view toward seaweed, while in the United Kingdom it is the more left-wing the respondent, the more positive toward seaweed they are. We argue that the reason we see this difference is due to seaweed being part of the traditional Japanese diet, which is supported by traditionalists and therefore also those that are more right-wing. In contrast, seaweed in the UK is seen as new and alternative and very much not a part of the traditional fare, which explains this difference.

Overall, our findings help shed light of one of the main challenges facing companies that wish to get consumers to eat more seaweed in countries that are currently not eating it, and indeed in keeping the market in countries that are. Public attitudes are not uniform, but they are necessary to understand in order for seaweed to become a more viable product for the consumer in a Western country like the United Kingdom.

Beyond individual-level predictors, our results suggest that effective promotion of seaweed in low-familiarity contexts like the UK will require broader cultural interventions. Stakeholders, including policymakers, food producers, and public health advocates, could consider initiatives such as school-based food education, media campaigns that normalise seaweed through positive framing, and supermarket-based nudges that increase visibility and trial. Marketing strategies that present seaweed as both trendy and nutritious, particularly when endorsed by influencers or integrated into familiar foods, may help bridge the cultural familiarity gap. These mechanisms of cultural food normalisation are of key importance if sustainable food sources like seaweed are to be adopted at scale.

Our results are by no means the final word on this topic. Further research is required, for instance experimental treatments on messaging and information regarding seaweed and its properties in terms of food. Future work should also address certain limitations of the present study. First, although seaweed offers nutritional benefits, its role in most diets, particularly in Japan, is that of a complementary rather than primary foodstuff. Our study did not differentiate between types or quantities of seaweed consumption, nor did it attempt to compare it directly to staple protein sources like meat or legumes. Second, while our survey asked generally about seaweed consumption, it did not include follow-up questions to assess respondent awareness of seaweed as an ingredient in composite foods such as sushi or packaged snacks. This may have introduced some variation in how seaweed familiarity was interpreted across cultural contexts. However, as an explorative study we have taken one step further in contributing to the growing literature on this topic.

Statement on ethics approval

Approval was granted for this study to be carried out by the College of Business, Arts and Social Science Research Ethics Committee, Brunel University London. Approval reference: 35290-LR-Jan/2022–37,313-1.

CRedit authorship contribution statement

Steven David Pickering: Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Mana Iwasaki:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Gadis Masita:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Alexandra Roskam:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Martin Ejnar Hansen:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Conceptualization. **Yosuke Sunahara:** Validation, Project administration, Investigation, Funding acquisition, Conceptualization.

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Declaration of competing interest

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

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Data availability

Full replication data, code and bilingual (English and Japanese) versions of the survey questions are available from the Harvard Dataverse, at: <https://doi.org/10.7910/DVN/LXCCIG>.

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