


Article

Implications of Food Culture and Practice on the Acceptance of Alternative Meat

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Abstract: To investigate the influence of food culture on the acceptability of meat substitutes, in 2023 we conducted a questionnaire survey on men and women aged 18–69 years (N = 1681) in Japan, a country with a food culture that regards soya as a meat substitute, focusing on ‘meaning’ in the theory of practice. Analysis of three groups—a flexible group who accept foods processed from soya as meat, a strict group who do not accept such foods as meat, and an intermediate group—showed that the flexible group tended to be more positive about the consumption of meat substitutes than the other groups. However, the flexible group was not simply more accepting, as they expressed aversion and anxiety in response to other questions. Food culture, i.e., what is understood to be meat, influences the acceptability of alternative meats. When examining the social acceptability of meat alternatives in the future, it is also important to look at social practices and historical and cultural backgrounds in a multilayered way, in addition to factors that have been emphasized in previous studies, such as consumers’ decision-making process.

Keywords: alternative meat; cultured meat; soy meat; social acceptability; meat substitute; clean meat; food culture; consumer; practice theory; questionnaire survey



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1. Introduction

Environmentally sustainable food consumption (ESFC) is a key issue from many perspectives, including being able to meet climate change targets, coping with population growth, and healthy eating [1]. According to the United Nations [2], approximately one-third of greenhouse gas emissions are attributed to the food system, with livestock production accounting for a large share [3]. The issue of a protein crisis has also been identified as a result of population growth. A sustainable food system requires moving away from the current industrial animal agriculture, which is predicated on principles of mass production and consumption, and looking for new protein sources. What, then, should we eat instead of meat? To answer this question, many companies and scholars globally have engaged in exploring and advancing meat alternatives, such as cultured meat made from cultured animal cells and plant-based meat made from plant-derived materials, which attempt to replicate the appearance, texture, and taste of the meat that we presently consume. Cultured meat is expected to be able to alleviate concerns related to climate change, animal welfare, and public health, as well as the environmental concerns associated with conventional meat [4–8].

Whether emerging meat substitutes can replace conventional meat is controversial. The dietary practice of “eating meat” has been uncritically accepted as a “natural, normal, and necessary” social practice [9]. Is the new practice of “eating meat substitutes” acceptable? Does the consumption of plant-based foods or cultured cells replace the practice of “eating meat”?

Much research on sustainable consumption has focused primarily on consumers’ decision-making processes. It is known that consumers have positive attitudes toward

sustainable food consumption, but their behavior is inconsistent, and there is a gap between attitudes and behavior [10,11]. To bridge this gap, a significant number of studies have been conducted, mainly in psychology and similar fields, in search of a means to promote behavior change by intervening in consumers' decision-making processes [1]. Previous studies on the acceptability of alternative meats, such as cultured meat, have also focused on the consumer's decision-making process, indicating the importance of the consumers' profiles and information about alternative meats [12,13]. For example, acceptance, including willingness to purchase, increases in response to positive information about cultured meat, whereas willingness to try the meat does not increase [14]. The naming of the meat alternative is important, and the name affects the acceptability of the cultured meat [15]. There have been attempts to raise awareness of meat alternatives and to offer meat alternatives in combination with meat-based alternatives [16].

By contrast, practice theory has found that studies focusing on individual decisions and choices, such as the attitude–behavior gap, fail to capture the practical, collective, sequential, repetitive, and automatic aspects of consumption [17]. Practice theory has developed from its roots in the work of sociologists such as Bourdieu [18] and Giddens [19], and has been influenced by science and technology studies and actor–network theory. More recent works include the publications of Theodor Schatzki [20,21] and Andreas Reckwitz [22]. Alan Warde positions social practice theory as an approach that overcomes the limitations of the individualistic approach, and, in particular, suggests that because eating is a habit repeated on a daily basis, it is appropriate to consider it as a practice in the sense of social practice theory, rather than as a result of rational decision making by individuals [17,23]. Elizabeth Shove, a leading theorist of practice theory, identifies materials, competences, and meanings as three elements in the emergence and establishment of new practices [24]. We consider that it is important to understand what meaning eating meat has for the consumer in addition to the materials of the new meat substitutes and consumers' understanding of the related information and their decision making. This paper examines the ways in which consumers' understanding of eating meat influences their willingness to eat meat substitutes.

Japan is an interesting country to consider in terms of the meaning of eating meat. Among Asian countries, it has a shorter history of meat consumption in its food culture [25], and there is diversity in the meaning of eating meat. There is a strong preference for meat quality, especially concerning beef consumption, with a consumption orientation that emphasizes quality in terms of taste, texture, and appearance, including highly marbled Wagyu beef [26]. Japan is one of the leading beef importing countries despite its annual per capita beef consumption of 7.4 kg, which is lower than the United States' 26.1 kg and the OECD's 14.5 kg as a whole (consumption of beef and veal in 2018) [27]. Examining how meat substitutes are, or are not, accepted in a country that prioritizes quality to a significant extent could provide insights into the challenges of assessing social acceptability in numerous countries that do not share this perspective. In fact, alternative meats are not entirely new to Japan. Meat has been prohibited numerous times throughout the lengthy history of Japan, beginning with the prohibition of meat in 675 against the backdrop of Buddhist teachings that abhor animal slaughter. Concurrently, a vegetarian cooking culture developed in which plant proteins were substituted for meat. Soybeans, in particular, were referred to as the "meat of the field" and were utilized as a substitute for or nutrient supplement to meat. Today, hamburgers and other dishes made with tofu or okara (a byproduct of the production of tofu or soymilk from soybeans) are still eaten at home. In Japan, with this history, the food culture of how people ate meat and processed soy products and the shared meaning of eating meat there, may influence the social acceptability of eating meat and alternative meat [25].

Limited research has been conducted regarding the social acceptability of meat substitutes among consumers in Japan. In a survey that asked consumers about their willingness to eat cultured meat, the influence of Japanese cultural values is indicated by citing unnaturalness as the most important factor in social acceptability [28]. Due to the fact that meat

consumption is deeply ingrained in society, with strong ties to religion, history, culture, etc., the social acceptability of meat substitutes and their importance to food culture and food must be thoroughly examined. This study examines the acceptance of meat substitutes among Japanese consumers. Several previously conducted studies have demonstrated that meat alternatives support a sustainable food system [29]. However, they can only be considered sustainable if they not only contribute to the reduction in greenhouse gas emissions, but also are accepted by people and become an established practice.

In relation to the advancement of alternative meat promotion in Japan, cultured meat remains uncommercialized despite ongoing research and development efforts by universities and companies. Although a novel food framework is observed in European commission, no new food framework exists in Japan. Therefore, it is difficult to discuss the formulation of regulation. The Japanese Agricultural Standards for Soybean Meat Foods has been established in 2022. Retort pouches resembling hamburgers, meatballs, or dried soybean meat rehydrated in water are available in major supermarkets and online stores. However, the market is still small, and soy meat is not widely available.

Increasing attention is being given to meat alternatives, and these substitutes are appearing in mass media with increasing frequency. The understanding of alternative meat is not always uniform, and it is referred to in a wide variety of ways. Both positive and negative views of alternative meats exist.

This study was conducted to examine the perception of alternative meats in Japanese society. Japanese society places a high value on the quality of meat but historically has had a food culture that regards vegetable protein as meat. Can new meat alternatives derived from soya be accepted in isolation from Japanese food culture? The food culture in which processed soya products have long been consumed in place of meat may react to the unnaturalness that consumers perceive with respect to cultured and plant-based meat, influencing the level of acceptance [13].

To examine these points mentioned above, we investigated the names and connotations of meat substitutes as they appear in newspaper articles and organized the terms used in relation to meat substitutes. We then used these terms to determine consumers' understanding of meat substitutes and their intention to consume them through a questionnaire survey.

2. Materials and Methods

2.1. Survey of Alternative Meat Names in Newspaper Reports

To examine how alternative meat is referred to in the mass media, we conducted a survey of terms that appeared in newspaper articles [30]. The newspapers surveyed were Yomiuri, Asahi, and Mainichi, which together account for 82.3% of the total newspaper circulation in Japan (average from July to December 2021, [31]). The period covered by the survey was the period available in each company's database (Asahi: 1879 to 17 June 2022; Yomiuri: 1874 to 17 June 2022; Mainichi: 1872 to 17 June 2022). The 17 terms used in the search were extracted from two Japanese books on meat substitutes [32,33].

Focusing on the number of terms related to meat substitute foods in newspaper reports, we determined that "soy meat" has appeared since the 2010s, whereas other terms have appeared and increased rapidly since 2018. A total of 390 articles contained the target term found during the study period, with "Daizu meat (soy meat)" (156 articles) being the most common, followed by "Daitai-niku (alternative meat)" (130 articles), "Baiyo-niku (cultured meat)" (65 articles), "Syokubutu-niku (Plant Base Meat)" (15 articles), "Daizu-niku (soy meat)" (13 articles), "fake meat" (6 articles), "clean meat" (4 articles), and "Daitai-meat (meat substitute)" (1 case) (Figure 1). The following factors contribute to this phenomenon: an increase in foreign tourist arrivals to Japan since the late 2010s, accompanied by growing interest in vegetarianism and heightened newspaper coverage of soy-based foods and menus; the commencement of deliberations regarding agricultural and forestry standards for "soy meat foods" in Japan in the fall of 2020; and the Ministry of Agriculture, Forestry, and Fisheries' intention to establish a "soy meat food category" in 2020. Various factors may have influenced this trend, including the establishment of the Foodtech Public-Private

Council at the Ministry of Agriculture, Forestry and Fisheries in 2020, which initiated discussions on meat substitute foods, and the January 2020 publication of a translated book on cultured meat [34].

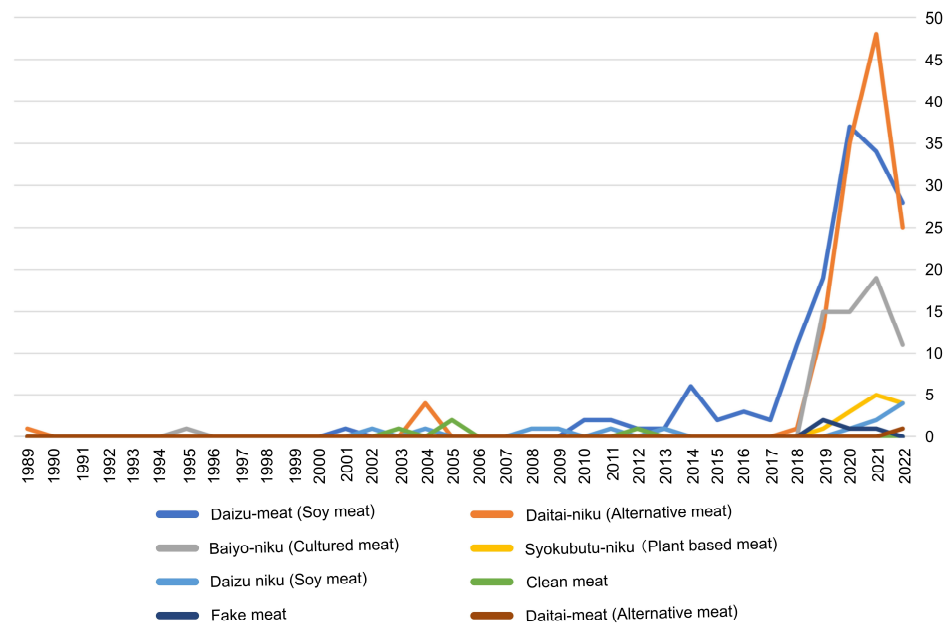


Figure 1. Number of search term occurrences in each year and their trends. Source: Fujiwara (2023) [30].

Furthermore, we analyzed the three words “Daizu meat (soy meat)”, “Daitai-niku (meat substitute)”, and “Baiyo-niku (cultured meat)” that appeared at the top of the list using KHCoder [35], which is a tool to draw a network of words with similar occurrence patterns, i.e., words with a strong degree of co-occurrence, connected by lines. The textual data were gathered and analyzed in Japanese using a KH coder (see Appendix A). English translation is attached to the results of analysis. We visualized word relationships for 390 collected articles by co-occurrence network command, and confirmed that “soybean meat” and “alternative meat” were the words with the strongest degree of co-occurrence. The terms “soy meat” and “meat substitute” were found to occur frequently together. Since 2018, “soybean meat”, which has been commercially available for a considerable period, has also been referred to as “alternative meat”, thereby increasing its market presence. In the co-occurrence network for “alternative meat”, words such as “vegetarian” and “vegan” were found, but not words related to Japanese food culture and history, such as “vegetarian cuisine” (Figure 2).

2.2. Online Survey

We conducted an internet survey to examine how food culture in Japan relates to people’s attitudes toward and willingness to eat alternative meat. The survey was commissioned by a research company (Macromill Inc., Tokyo, Japan) and recruited from the company’s registered male and female members aged 18–69 years living in Japan. Participants were given a participation reward in accordance with the company rules. To examine differences by attribute, the respondents were allocated equally by age and gender, and 1681 valid responses (821 men and 860 women) were received. Although no allocation of residential area was made, approximately half of the respondents lived in urban areas, which generally reflects the actual demographics of the population. The survey period was 17–20 March 2023. Data cleansing was performed by (1) eliminating those who responded in a short time (representing the top 3% of all respondents) and (2) excluding respondents who gave the same answer consecutively (228 respondents). All procedures were carried out according to the approved guidelines of the local ethics committee of the Faculty of

Arts and Science, Kyushu University (#202206). All study procedures were performed according to the principles described in the Helsinki Declaration.

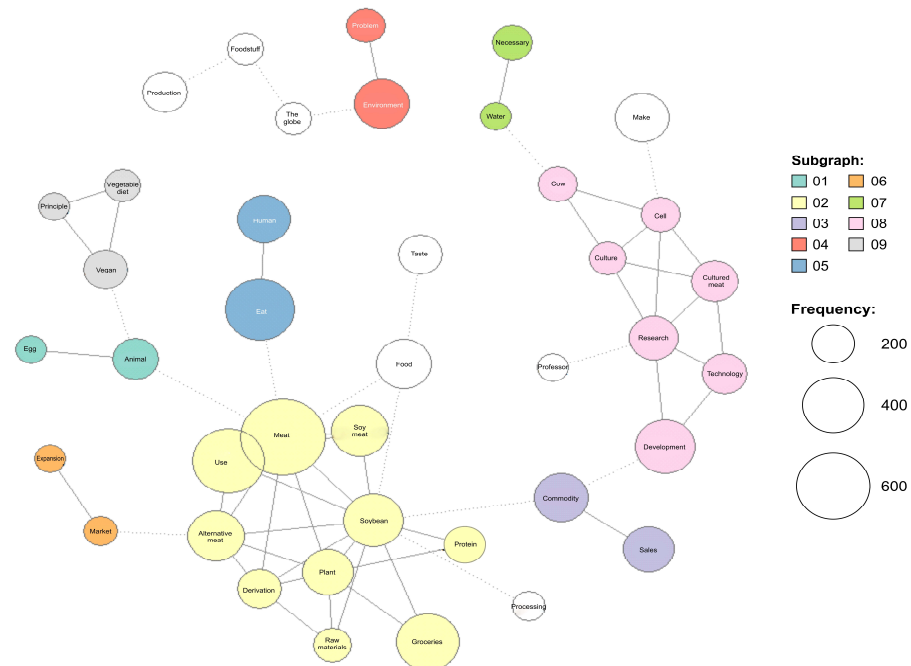


Figure 2. Co-occurrence network (covalent network). Source: Fujiwara (2023) [30].

The survey questionnaire incorporated the subsequent explanatory text due to the fact that although foods that imitate vegetable protein as meat are readily obtainable in Japan, the term “Daizu meat (soy meat)” is not yet widely recognized, and cultured meat is not well known. The impression of cultured meat varies depending on its name [6]. Hence, to avoid biased impressions, we used the term “cultured meat (cell-cultured meat)” for half of the survey participants and the term “clean meat” for the other half. Explanatory text has been added for each term with reference to the report on attitudes toward meat [36], as follows:

[Description of Daizu meat (Soy Meat)]

Daizu meat (Soy meat) is a food product that uses vegetable protein extracted from soybeans as the main ingredient to reproduce the taste and texture of meat. Hamburgers, burger patties, soybean meat, beef bowls, and yakiniku ribs are sold domestically and internationally and are increasingly found in restaurants and retail stores. Recently, soybean meat made from sprouted soybeans containing an increased quantity of amino acid content, or umami, has been developed and marketed with improved flavor and no additives. The phrase “alternative meat” is frequently applied to soybean meat in Japan. From this point forward, it shall be referred to as “soybean meat” in this survey.

[Description of Cultured Meat (Cell Culture Meat)/Clean Meat]

Cultured meat (cell-cultured meat)/clean meat is produced by artificially cultivating edible animal cells. Except for the cell harvesting process, the meat is produced artificially in a room without using existing livestock. In December 2020, the Singapore government approved the world’s first domestic sale of cultured chicken. This meat is described as “cultured meat (cell-cultured meat)/clean meat” in this survey.

To examine the diversity of values regarding meat consumption, the survey asked respondents about their values regarding meat authenticity. The participants were instructed to select the option that most closely matched the given statements A through E concerning whether or not they constituted “eating meat”. The scale consisted of five possible responses: agree, somewhat agree, neither agree nor disagree, not so much agree, and disagree.

- A. Eat a 100% beef hamburger.
- B. Eat a hamburger that is 75% beef and 25% processed soy.
- C. Eat a hamburger that is 50% beef and 50% processed soy.
- D. Eat a hamburger made from 25% beef and 75% processed soy.
- E. Eat a hamburger that is 100% processed soy.

The respondents were subsequently categorized into three groups based on whether they showed a flexible attitude (Acceptable; agree, somewhat agree, or neither agree nor disagree) or a strict attitude (Reject; not so much agree or disagree) toward each item as ‘eating meat’: the flexible group (N = 560) with the most flexible understanding, the strict group (N = statistical analysis 168), and the intermediate group (N = 808). The schema for classification is displayed in Table 1. In this paper, we consider that A: eating a 100% beef hamburger is eating meat, and the higher the mixture of non-meat substances (in this case soya), the further away it is from eating meat. Therefore, for example, if a respondent answered “I agree” to the statement “E eats 100% soya hamburgers” but “I don’t agree” to the statement “A eats 100% beef hamburgers” or “B eats 75% beef and 25% soya hamburgers”, the response was considered invalid as containing inconsistent values and excluded from the analysis (N = 145).

Table 1. Classification of values for meat authenticity.

| Group Name | Conditions |
|---------------------------------------|--|
| Flexible group (N = 560) | A, B, C, D, E: All “acceptable” |
| Strict group (N = 168) | Any of the following A: “Accept” and B, C, D, E: “Reject” A,B: “Accept” and C, D, E: “Reject” |
| Middle group (N = 808) | Any of the following A, B, C: “Accept” and D, E: “Reject” A, B, C, D: “Accept” and E: “Reject” |
| Excluded as invalid answers (N = 145) | Other inconsistent responses e.g., A, B: “Reject” and C,D,E: “Accept”, etc. |

Whether or not the five items from “A. Eat a hamburger made from 100% beef” to “E. Eat a hamburger made from 100% processed soy” are considered “eating meat”.

First, to determine the characteristics of each group, we identified which age groups and genders the respondents belonged to in each group. Next, respondents were asked questions about their willingness to eat soy and cultured meat, as shown in Table 2.

Table 2. Intentions to eat soybean meat and cultured meat.

| Soy Meat | Cultured/Clean Meat |
|--|--|
| 1. I would like to try soy meat once. | 1. I would like to try [cultured/clean meat] once it becomes commercially available. |
| 2. I would like to eat soy meat regularly. | 2. I would like to eat [cultured/clean meat] regularly when it becomes commercially available. |
| 3. I would like to eat less conventional meat and instead eat soy meat. | 3. I would like to eat less conventional meat and instead eat [cultured/clean meat] when it becomes commercially available. |
| 4. I would like to eat less conventional meat and instead eat soy meat. | 4. I would like to eat [cultured/clean meat] without changing the amount of conventional meat that I eat when it becomes commercially available. |
| 5. I would like to eat soy meat when conventional meat is hard to find. | 5. I would like to eat [cultured/clean meat] when conventional meat is hard to find. |
| 6. I would prefer to eat conventional processed soy products (tofu, natto, thick fried tofu, etc.) rather than soy meat. | 6. I would prefer to eat conventional processed soy products (tofu, natto, thick fried tofu, etc.) rather than [cultured meat/clean meat]. |
| 7. Soy meat is disgusting and gross; therefore, I do not buy it. | 7. [Cultured meat/clean meat] is disgusting and gross; therefore, I do not buy it. |
| 8. I have concerns about the safety of soy meat; therefore, I do not buy it. | 8. I have concerns about the safety of [cultured meat/clean meat]; therefore, I do not buy it. |
| | 9. [Cultured meat/clean meat] causes a loss of human involvement with nature; therefore, I do not buy it. |

2.3. Statistical Analysis

Statistical analyses were performed using IBM SPSS STATISTICS version 29.0.0.0. We first cross-tabulated three groups (Flexible/Strict/Middle) and gender, age, education, household income, region (urban/other), and frequency of eating meat items. Next, we analyzed how far intention to eat soya meat and cultured meat differed for the three groups: cross-tabulations and chi-square tests were conducted to compare the responses and to confirm the adjusted remainder. *p*-values are shown below the table, where $p < 0.05$ is considered to indicate statistical significance for all analyses.

3. Results

3.1. Attributes of Each Group

Attributes such as age group and gender were cross-tabulated, and a chi-square test was used to determine how they affected the meat authenticity score. The results showed that age group had little effect (Table 3), while gender had a greater difference for men in the flexible group and women in the middle group (Table 4). We also conducted cross-tabulations for household income, education, and place of residence (urban/other), but no significant relationships were found for any of these. Furthermore, a cross-tabulation of frequency of eating meat per week and tolerance of meat authenticity showed that strictists were relatively more likely to be among those who reported eating beef or pork less than once a week.

Table 3. Cross table of values for the authenticity of meat across three age groups.

| | | | Authenticity Tolerance | | | Total Amount |
|--------------|----------------|--------------------|------------------------|--------|--------|--------------|
| | | | Flexible | Middle | Strict | |
| Age group | Under 20s | Frequency | 104 | 157 | 29 | 290 |
| | | Proportion (%) | 35.9% | 54.1% | 10.0% | 100.0% |
| | | Adjusted Remainder | −0.2 | 0.6 | −0.6 | |
| | 30–40s | frequency | 221 | 325 | 55 | 601 |
| | | Proportion (%) | 36.8% | 54.1% | 9.2% | 100.0% |
| | | Adjusted Remainder | 0.2 | 0.9 | −1.8 | |
| | 50–60s | frequency | 235 | 326 | 84 | 645 |
| | | Proportion (%) | 36.4% | 50.5% | 13.0% | 100.0% |
| | | Adjusted Remainder | 0.0 | −1.4 | 2.2 | |
| Total amount | frequency | 560 | 808 | 168 | 1536 | |
| | Proportion (%) | 36.5% | 52.6% | 10.9% | 100.0% | |

$p < 0.240$.

Table 4. Cross table of values for gender and meat authenticity.

| | | | Authenticity Tolerance | | | Total Amount |
|--------------|----------------|--------------------|------------------------|--------|--------|--------------|
| | | | Flexible | Middle | Strict | |
| Gender | Male | Frequency | 290 | 365 | 88 | 743 |
| | | Proportion (%) | 39.0% | 49.1% | 11.8% | 100.0% |
| | | Adjusted Remainder | 2.0 | −2.6 | 1.1 | |
| | Female | Frequency | 270 | 443 | 80 | 793 |
| | | Proportion (%) | 34.0% | 55.9% | 10.1% | 100.0% |
| | | Adjusted Remainder | −2.0 | 2.6 | −1.1 | |
| Total amount | Frequency | 560 | 808 | 168 | 1536 | |
| | Proportion (%) | 36.5% | 52.6% | 10.9% | 100.0% | |

$p < 0.05$.

3.2. Intention to Eat Soybean Meat

Significant differences by group were found for all items related to the intention of eating soy meat (<0.001). For the six items from “1. I would like to try soy meat once” to “6. I would like to prefer to eat conventional processed soy products (tofu, natto, thick

fried tofu, etc.) rather than soy meat”, the flexible group exhibited a relatively higher intention to consume soy meat, whereas the strict group demonstrated a comparatively lower inclination to eat soy meat. Some of the results are presented in Tables 5 and 6.

Table 5. Responses of each group regarding eating soy meat regularly.

| | | Agree | Somewhat Agree | Neither Agree nor Disagree | Not So Much Agree | Disagree | Total Amount |
|--------------|--------------------|-------|----------------|----------------------------|-------------------|----------|--------------|
| Flexible | Frequency | 86 | 161 | 241 | 55 | 17 | 560 |
| | Proportion (%) | 15.4% | 28.7% | 43.0% | 9.8% | 3.0% | 100.0% |
| | Adjusted Remainder | 3.0 | 6.3 | 2.3 | −6.1 | −7.3 | |
| Middle | Frequency | 93 | 133 | 325 | 167 | 90 | 808 |
| | Proportion (%) | 11.5% | 16.5% | 40.2% | 20.7% | 11.1% | 100.0% |
| | Adjusted Remainder | −0.7 | −3.9 | 0.8 | 3.2 | 0.6 | |
| Strict | Frequency | 6 | 17 | 38 | 50 | 57 | 168 |
| | Proportion (%) | 3.6% | 10.1% | 22.6% | 29.8% | 33.9% | 100.0% |
| | Adjusted Remainder | −3.6 | −3.5 | −4.7 | 4.3 | 10.3 | |
| Total amount | Frequency | 185 | 311 | 604 | 272 | 164 | 1536 |
| | Proportion (%) | 12.0% | 20.2% | 39.3% | 17.7% | 10.7% | 100.0% |

$p < 0.001$.

Table 6. Responses of each group regarding eating less conventional meat and more soy meat.

| | | Agree | Somewhat Agree | Neither Agree nor Disagree | Not So Much Agree | Disagree | Total Amount |
|--------------|--------------------|-------|----------------|----------------------------|-------------------|----------|--------------|
| Flexible | Frequency | 78 | 154 | 238 | 67 | 23 | 560 |
| | Proportion (%) | 13.9% | 27.5% | 42.5% | 12.0% | 4.1% | 100.0% |
| | Adjusted Remainder | 4.8 | 6.9 | 2.3 | −6.3 | −7.8 | |
| Middle | Frequency | 62 | 118 | 318 | 199 | 111 | 808 |
| | Proportion (%) | 7.7% | 14.6% | 39.4% | 24.6% | 13.7% | 100.0% |
| | Adjusted Remainder | −2.2 | −4.1 | 0.5 | 4.1 | 1.0 | |
| Strict | Frequency | 2 | 11 | 40 | 50 | 65 | 168 |
| | Proportion (%) | 1.2% | 6.5% | 23.8% | 29.8% | 38.7% | 100.0% |
| | Adjusted Remainder | −3.8 | −4.2 | −4.2 | 3.1 | 10.5 | |
| Total amount | Frequency | 142 | 283 | 596 | 316 | 199 | 1536 |
| | Proportion (%) | 9.2% | 18.4% | 38.8% | 20.6% | 13.0% | 100.0% |

$p < 0.001$.

However, we cannot find this tendency in other questions. The flexible group was generally in agreement with the statement “7. Soy meat is disgusting and gross; therefore, I do not buy it”, whereas the strict group was predominantly in disagreement. We found no discernible tendency among the flexible group members to be more receptive to soy meat, which contradicted our expectations. There may be other factors related to aversion that are separate from the authenticity of the meat.

3.3. Intention to Eat Cultured Meat

Significant differences by group were found for all items on willingness to eat cultured meat (<0.001). The results showed that the flexible group consumed a greater proportion of the cultured/clean meat on average, especially for the four items from “1. I would like to try [cultured/clean meat] once it becomes commercially available”, to “4. I would like to eat [cultured/clean meat] without changing the amount of conventional meat that I eat when it becomes commercially available”, whereas the strict group consumed a lesser proportion. Some of the results are presented in Tables 7 and 8.

However, this pattern was not observed in the remaining items, particularly in the following three items “7. [Cultured meat/clean meat] is disgusting and gross, so I do not buy it”, “8. I have concerns about the safety of [cultured meat/clean meat], so I do not buy it”, and “9 [Cultured meat/clean meat] causes a loss of human involvement with

nature, so I do not buy it”, The “strict group” showed a distinct stance of either “agree” or “disagree”, whereas the “flexible group” showed an indeterminate stance, with the most frequent response being “undecided”. Several results are presented in Tables 9 and 10.

Table 7. Responses of each group regarding eating cultured/clean meat regularly.

| | | Agree | Somewhat Agree | Neither Agree nor Disagree | Not So Much Agree | Disagree | Total Amount |
|--------------|--------------------|-------|----------------|----------------------------|-------------------|----------|--------------|
| Flexible | Frequency | 40 | 97 | 267 | 96 | 60 | 560 |
| | Proportion (%) | 7.1% | 17.3% | 47.7% | 17.1% | 10.7% | 100.0% |
| | Adjusted Remainder | 5.4 | 7.6 | 5.3 | −5.4 | −8.4 | |
| Middle | Frequency | 14 | 46 | 292 | 247 | 209 | 808 |
| | Proportion (%) | 1.7% | 5.7% | 36.1% | 30.6% | 25.9% | 100.0% |
| | Adjusted Remainder | −4.3 | −5.7 | −2.4 | 5.2 | 3.4 | |
| Strict | Frequency | 3 | 7 | 40 | 42 | 76 | 168 |
| | Proportion (%) | 1.8% | 4.2% | 23.8% | 25.0% | 45.2% | 100.0% |
| | Adjusted Remainder | −1.4 | −2.6 | −4.3 | 0.0 | 7.5 | |
| Total amount | Frequency | 57 | 150 | 599 | 385 | 345 | 1536 |
| | Proportion (%) | 3.7% | 9.8% | 39.0% | 25.1% | 22.5% | 100.0% |

$p < 0.001$.

Table 8. Responses of each group regarding eating less conventional meat and more cultured/clean meat.

| | | Agree | Somewhat Agree | Neither Agree nor Disagree | Not So Much Agree | Disagree | Total Amount |
|--------------|--------------------|-------|----------------|----------------------------|-------------------|----------|--------------|
| Flexible | Frequency | 34 | 94 | 278 | 88 | 66 | 560 |
| | Proportion (%) | 6.1% | 16.8% | 49.6% | 15.7% | 11.8% | 100.0% |
| | Adjusted Remainder | 4.9 | 7.4 | 6.6 | −6.6 | −7.9 | |
| Middle | Frequency | 14 | 49 | 274 | 261 | 210 | 808 |
| | Proportion (%) | 1.7% | 6.1% | 33.9% | 32.3% | 26.0% | 100.0% |
| | Adjusted Remainder | −3.4 | −4.8 | −4.2 | 6.5 | 3.0 | |
| Strict | Frequency | 1 | 3 | 45 | 42 | 77 | 168 |
| | Proportion (%) | 0.6% | 1.8% | 26.8% | 25.0% | 45.8% | 100.0% |
| | Adjusted Remainder | −2.0 | −3.6 | −3.4 | −0.1 | 7.5 | |
| Total amount | Frequency | 49 | 146 | 597 | 391 | 353 | 1536 |
| | Proportion (%) | 3.2% | 9.5% | 38.9% | 25.5% | 23.0% | 100.0% |

$p < 0.001$.

Table 9. Responses of each group regarding cultured meat/clean meat being disgusting and gross.

| | | Agree | Somewhat Agree | Neither Agree nor Disagree | Not So Much Agree | Disagree | Total Amount |
|--------------|--------------------|-------|----------------|----------------------------|-------------------|----------|--------------|
| Flexible | Frequency | 40 | 127 | 296 | 60 | 37 | 560 |
| | Proportion (%) | 7.1% | 22.7% | 52.9% | 10.7% | 6.6% | 100.0% |
| | Adjusted Remainder | −2.8 | 0.8 | 3.2 | −1.4 | −2.2 | |
| Middle | Frequency | 87 | 170 | 377 | 107 | 67 | 808 |
| | Proportion (%) | 10.8% | 21.0% | 46.7% | 13.2% | 8.3% | 100.0% |
| | Adjusted Remainder | 1.0 | −0.5 | −0.7 | 1.3 | −0.6 | |
| Strict | Frequency | 27 | 34 | 56 | 21 | 30 | 168 |
| | Proportion (%) | 16.1% | 20.2% | 33.3% | 12.5% | 17.9% | 100.0% |
| | Adjusted Remainder | 2.8 | −0.4 | −3.9 | 0.1 | 4.4 | |
| Total amount | Frequency | 154 | 331 | 729 | 188 | 134 | 1536 |
| | Proportion (%) | 10.0% | 21.5% | 47.5% | 12.2% | 8.7% | 100.0% |

$p < 0.001$.

Table 10. Concerns regarding the safety of cultured meat/clean meat.

| | | Agree | Somewhat Agree | Neither Agree nor Disagree | Not So Much Agree | Disagree | Total Amount |
|--------------|--------------------|-------|----------------|----------------------------|-------------------|----------|--------------|
| Flexible | Frequency | 45 | 128 | 298 | 58 | 31 | 560 |
| | Proportion (%) | 8.0% | 22.9% | 53.2% | 10.4% | 5.5% | 100.0% |
| | Adjusted Remainder | −2.6 | −0.5 | 4.0 | −1.1 | −2.3 | |
| Middle | Frequency | 95 | 198 | 361 | 96 | 58 | 808 |
| | Proportion (%) | 11.8% | 24.5% | 44.7% | 11.9% | 7.2% | 100.0% |
| | Adjusted Remainder | 1.4 | 0.8 | −1.5 | 0.5 | −0.7 | |
| Strict | Frequency | 25 | 37 | 55 | 23 | 28 | 168 |
| | Proportion (%) | 14.9% | 22.0% | 32.7% | 13.7% | 16.7% | 100.0% |
| | Adjusted Remainder | 1.8 | −0.5 | −3.8 | 0.9 | 4.7 | |
| Total amount | Frequency | 165 | 363 | 714 | 177 | 117 | 1536 |
| | Proportion (%) | 10.7% | 23.6% | 46.5% | 11.5% | 7.6% | 100.0% |

$p < 0.001$.

4. Discussion

While previous studies of the acceptability of cultured meat have mainly focused on consumer profiles, the information presented to consumers and the decision-making processes based on it, herein, with the aid of a practice theory perspective, focus on how consumers have so far made sense of the practice of eating meat and made it into a daily practice, as well as on the acceptability of meat alternatives. We have investigated whether eating meat mixed with processed soy products could be considered eating meat, i.e., whether the acceptability of alternative meat differs in relation to attitudes toward the authenticity of meat.

First, we identified how attitudes towards meat authenticity are formed. Although processed soya products have long been considered a substitute for meat in Japanese food culture, not all Japanese consumers agree, and differences were seen in their attitudes today. This difference may be more influenced by daily eating habits, such as the frequency of eating meat, than by attributes such as age, gender, or region of residence. Further research is needed to clarify what eating habits are influencing this.

Second, it was found that different attitudes towards meat authenticity influence willingness to eat soybean meat. Respondents in the flexible group had significantly higher eating intentions for soybean meat in six categories, ranging from ‘1. I would like to try soya meat once’ to ‘6. We would prefer to eat conventional processed soybean products (tofu, natto, thick fried tofu, etc.) rather than soybean meat’. This may be due to the fact that the meaning of eating meat in this group depends on a food culture that regards processed soybean products as meat rather than meat that is real at the cellular level. However, this was not the case for the two items ‘7. I don’t buy soya meat because it is disgusting and gross’ and ‘8. I don’t buy soya meat because I have concerns about its safety’; rather, the flexible group tended to express dislike and concern about soya meat. This may be because they see processed soya products as ‘meat’ and are therefore trying to carefully assess how soya meat differs from conventional processed soya products. It should be noted that even those with flexible attitudes who regard consider soybean products to be meat do not fully embrace soybean meat. The above findings indicate that attitudes toward authenticity with respect to meat are influenced by food culture, i.e., the understanding of eating meat, which in turn influences the intention to eat soy meat and cultured meat.

As prior research has shown, the adoption of information [13,14] and naming [15] may influence the consumer’s choice. Furthermore, how consumers interpret “eating meat alternatives” within their own food culture will have an important impact on meat alternative acceptance. This point is discussed further below using practice theory.

To reiterate the theory of practice of Shove et al. [24], practice is formed by the combination of three elements: “materials”, “competences”, and “meanings” Materials include things, technologies, tangible physical entities, and the stuff out of which objects are made, whereas competences include skill, know-how, and technique. Furthermore, meanings

include symbolic meanings, ideas, and aspirations. For example, eating bread for breakfast is a result of three factors: the availability of a certain type and size of bread (materials), the ability to bake bread (competences), and the shared concept of eating bread for breakfast (meanings) [24] (pp. 44–45). Using this idea as a support, what elements will be combined when the practice of “eating meat alternatives” is established and takes root?

Our study has focused on “meanings”, how to understand eating meat. The practice of eating plant alternative meat has been shaped in relation to various “meanings”. Plant-based meat, such as soy meat, drew attention first from vegetarian and vegan consumers, then from the standpoint of meat consumption and health risks, animal welfare, and, more recently, sustainability [37]. There are no shared “meanings” of cultured meat at this time because it is an unknown food, but these novel food producers and retailers are attempting to promote meat alternatives by spreading narratives about what they hope to achieve once they are on the market [38]. It is a “knowledge fix” to help consumers make better-informed food choices, but it has been noted that providing information to change consumption or make it easier to understand is not as simple [39]. In practice theory, “meaning” emerges from socially shared understandings and practices rather than being formed causally once certain information is presented [24] (pp. 143). Attitudes toward meat authenticity, the study’s subject, are also toward consumer attitudes toward the meat studied in this study. The consumer will also play a role in shaping the meaning of “eating alternative meats”.

If the practice of “eating meat alternatives” is to take root, we must consider how market consumers understand “eating meat” and how “meaning” is formed through interaction with food culture and context.

We would like to consider the other two elements: “materials” and “competences”. First, in studies of “materials”, previous research has found that mimicry and efficiency are important for alternative meat acceptance [40]. In other words, alternative meat will be a “material” that can be produced more efficiently and will mimic conventional meat in all physical sensations such as appearance, smell, texture, and taste [41]. At this point, we cannot say that alternative meat is the same “material” as conventional meat, but we are slowly approaching that goal [41,42]. In terms of production efficiency, the production of cultured meat used to take a significant amount of money and time [40,43]. Despite challenges, researchers are working to develop an efficient and safe supply of alternative meat [44].

Second, consumers’ “competences” to handle and cook alternative meat are less discussed. According to one study, the absence of extra bone, fat, and blood may reduce mass and the need for refrigeration, with no significant differences for consumers observed when compared to conventional meat [6]. Alternative meat handling will necessitate the same level of expertise as traditional meat handling.

If alternative meat is a “material” like conventional meat, and the “competence” required to preserve and prepare it is the same, then it is the “meaning” that matters.

If we wish to establish meat alternatives as part of a new dietary practice, we need to take a multi-faceted view of not only the factors that can influence consumers’ decision making but also the ways in which consumers make sense of eating meat in their food culture. Although this study was conducted with Japanese consumers, as Pollan [45] points out in *The Omnivore’s Dilemma*, shared food practices and historical and cultural backgrounds in other countries may influence the acceptability of different meat-eating understandings and attitudes in that context. Therefore, when promoting alternative meat, it is necessary to pay attention to the importance of alternative meat in the context of the dietary habits developed in the country or region rather than emphasizing these benefits and imposing them on consumers.

5. Conclusions

Our study showed that the understanding of eating meat in food culture influences the acceptability of alternative meat, using Japan as a case study, which has historically had a cultural practice of using soya as an alternative meat. In this study, those in the group with a flexible understanding of what it means to ‘eat meat’ tend to be more receptive

to both cultured and soya meat, suggesting that food culture, i.e., values and flexibility toward conventional foods, may influence receptivity to new foods such as plant-based proteins and cultured meat.

Few studies have discussed the acceptability of alternative meats with a focus on regional and national food culture and customs. It is desirable to accumulate studies for countries other than Japan to further investigate the impact. This study clarifies that when conducting research on the acceptability of novel foods, future researchers should also focus on the food culture developed in the region.

Finally, three limitations of this study should be noted. First, when examining the acceptability of a food, it is important to consider whether respondents have actually eaten the food; however, this point was not considered in this study. Second, the online survey did not accurately represent the demographics of the Japanese population, as the respondents were recruited equally from each age group and gender. It was also biased because it was limited to registered monitors of research companies and people with access to the internet in Japan. Third, further verification is needed as to how the understanding of meat authenticity is formed. Future research should examine this further by surveying a larger sample in a wider geographical area or country. In some regions and countries, the influence of factors such as religion, customs, and beliefs would also need to be examined.

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Institutional Review Board Statement: All procedures were carried out according to the approved guidelines of the local ethics committee of the Faculty of Arts and Science, Kyushu University (Approval number #202206 and date of approval is 22 February 2023). All study procedures were performed according to the principles of the Declaration of Helsinki.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. (We included a section in the survey form explaining individual consent to participate in the survey, so that only those who agreed to participate were asked to participate).

Data Availability Statement: The datasets generated and/or analyzed in this study are available from the corresponding author on reasonable request.

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Appendix A

KH coder.

This is a tool to draw a network of words with similar occurrence patterns, i.e., words with a strong degree of co-occurrence, connected by lines. The textual data were gathered and analyzed in Japanese using a KH coder. The English translation is attached to the results of the analysis.

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