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Brief Report

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Intersectional Influence of Socioeconomic Status and Cooking Behavior on Dietary Habits: A Nationwide Cross-Sectional Study in Japan

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Abstract: This study investigated the intersecting influence of socioeconomic status and cooking behavior on dietary habits using nationwide Japanese data. The study measured the frequency of balanced meals and breakfast intake as indicators of healthy eating habits and used subjective economic status, subjective spare time, and cooking behavior as the independent variables. It employed multivariate logistic regression analyses to elucidate the relationships among these variables. The results demonstrated that even among economically poor or time-constrained individuals, those preparing meals from ingredients were more likely to eat balanced meals and breakfast than those relying on commercial food or rarely cooking. This finding suggested that cooking behavior can mitigate disparity in healthful eating due to socioeconomic conditions. The study added new insights into the impact of combining socioeconomic status and cooking behavior on dietary habits, which highlights the potential of promoting cooking behaviors, such as teaching cooking skills, as a strategy for reducing socioeconomic dietary disparities.

Keywords: health disparity; diet; cooking; breakfast intake; balanced meal intake; cross-sectional study; Japan; adult

1. Introduction

The World Health Organization defines the social determinants of health as "the non-medical factors that influence health outcomes." Moreover, "in countries at all levels of income, health and illness follow a social gradient: the lower the socioeconomic position, the worse the health" [1]. Typical factors are economic ones such as income. A number of empirical studies, such as a meta-analysis of multilevel studies, demonstrate that economic inequality is related to mortality and self-rated health [2]. In addition, a review article explores the causal relationship between income inequality and health [3].

Economic inequality is linked to negative impacts on health through unhealthy behaviors such as unhealthy dietary habits [4]. Individuals with better socioeconomic status tend to consume a diet rich in whole grains, vegetables, fruits, lean meat, and seafood, whereas those with lower socioeconomic status tend to consume a diet high in refined grains, potatoes, fatty meats, and fried food [5]. Additionally, individuals with lower socioeconomic status are more likely to be obese [6]. One contributing factor is the tendency to consume low-cost, time-efficient food high in energy density and low in nutrient density [5–7]. In Japan, the National Health and Nutrition Survey and various previous studies report that such dietary disparities due to economic status exist [8–16]. Thus, strategies for addressing this dilemma are required.

Another social factor related to dietary habits is time availability. For example, it is known that the earlier people get up in the morning and have more time to spare, the more frequently they consume breakfast [17]. In addition, busyness and lack of time are the most common reasons for failing to acquire healthy eating habits [18]. In the behavioral economics field, the lack of money and lack of time are discussed under the same concept of scarcity [19]. When money and time are in a state of scarcity, people focus on them and neglect other aspects of living [19]. Eating healthy is no exception.

Therefore, strategies for correcting the dietary disparity caused by economic factors as well as by the amount of time available are also important.

Cooking is a promising strategy for reducing dietary disparity. Previous studies suggest that individuals who cook and prepare regular meals more frequently exhibit healthier diets [20–27]. In general, cooking for oneself allows one to prepare a well-balanced meal at a lower cost than eating out or eating processed foods. Thus, a common expectation is that even individuals under poor economic circumstances would be more likely to eat a well-balanced meal by cooking. In addition, those who lack sufficient time will likely eat out or eat processed food instead of cooking, but they may eat healthier meals by making prioritizing cooking in their use of time. However, no studies examine whether or not cooking mitigates dietary disparity through economic or time status.

The current study explores the intersectional influence of socioeconomic status and cooking behaviors on the establishment of healthful dietary patterns. It advances the proposition that the act of cooking may function as an intervention for attenuating nutritional disparity across socioeconomic divisions.

2. Materials and Methods

2.1. Study design and data

This study is cross-sectional in nature. Data were derived from The Survey of Attitude Toward Shokuiku (Food and Nutrition Education) for 2020 by the Ministry of Agriculture, Forestry and Fisheries of the Social Science Japan Data Archive, Center for Social Research and Data Archive [28,29]. This survey is conducted annually to ascertain current public attitudes toward nutrition education and to serve as reference for future promotional measures for food and nutrition education. In 2020, it was conducted in December on those aged 20 years and older in Japan. It used a stratified two-stage random sampling method to reach 5,000 people out of which 2,395 (47.9%) valid responses were received [28]. This study used 2,288 (45.8%) responses without missing values for the required variables.

This study was conducted using anonymous information from a previously completed survey and according to the ethical guidelines for life science and medical research involving human subjects in Japan [30].

2.2. Variables

2.2.1. Dependent Variables

As the dependent variables, the study used the frequencies of balanced meal intake and breakfast intake as healthy dietary habits.

The frequency of balanced meal intake was measured using the question "How many days per week do you eat a meal that includes a complete set of staple, main, and side dishes at least twice a day?" The item was rated using the following choices: *nearly every day*, *4–5 times/week*, *2–3 times/week*, and *little or nothing*. The following examples were given for each category of dishes: staple (e.g., rice, bread, and noodles), main (e.g., meat, fish, eggs, and soy products), and side (e.g., a small bowl or plate of vegetables, mushrooms, potatoes, and seaweeds) [28]. Previous studies demonstrated that adherence to the Japanese dietary guideline, which includes the concept of staple, main, and side dishes, reduces mortality rates [31,32]. In the Basic Plan for the Promotion of Food and Nutritional Education in Japan, increasing the number of people who eat meals with a complete set of staple, main, and side dishes at least twice a day was set as one of the goals [33]. Therefore, the categories *almost every day* and *not every day* (ref.) were used for analyses.

Frequency of breakfast intake was assessed using the following question: "Do you usually eat breakfast?" [28]. Responses were categorized using four choices, namely, *nearly every day*, *4–5 days/week*, *2–3 days/week*, and *little or nothing* [28]. Several meta-analyses reported that skipping breakfast is associated with the risk of obesity, type-two diabetes, and heart disease [34–39]. In the Basic Plan for the Promotion of Food and Nutritional Education in Japan, increasing the number of people

who eat breakfast every day is set as one of the goals [33]. Therefore, the study used the categories *nearly every day* and *not every day* (ref.) for analyses.

2.2.2. Independent Variables

The study used the intersectional variables of subjective economic status, subjective spare time, and cooking behavior as the independent variables.

For subjective economic status, the participants were asked about their current economic situation [28]. Responses were categorized using five choices, namely, *good*, *somewhat good*, *fair*, *somewhat poor*, and *poor* [28]. Previous studies found a correlation between subjective economic status and household income [11]. Furthermore, they found that subjective economic status is more strongly associated with dietary habits than household income [11]. Therefore, using subjective economic status as an indicator of economic status is appropriate. Responses were categorized into *good* (*good* and *somewhat good*), *fair*, and *poor* (*poor* and *somewhat poor*) for analyses.

The participants used five choices to rate subjective spare time, namely, *somewhat much*, *neither*, *somewhat less*, and *less* [28]. Although subjective spare time was not tested for criterion-related validity, previous studies confirmed a significant inverse association with household food waste [40]. In addition, previous studies reported an association between lack of time and unhealthy eating habits [41,42]. Responses were categorized into *much* (*much* and *somewhat much*), *neither*, and *less* (*less* and *somewhat less*) for analyses.

Cooking behavior was rated using the question, "Do you prepare your daily meals by yourself?" with the following options: I prepare most of my meals from ingredients (almost cook), I prepare meals by incorporating some commercial foods (partially cook), I prepare meals by using commercial foods for most things (do not cook), and I do not prepare meals by myself (do not prepare) [28]. Notably, an annotation was added to the question "Preparing meals includes not only cooking but also warming and serving meals. It does not include just buying a lunch box. Commercial foods include frozen foods, retort-pouch foods, and other foods that can be prepared as is or simply heated" [28].

In terms of cooking behavior and subjective economic status, the variables were combined to assess these intersectional influences: for each of the four categories of cooking behavior divided by the three categories of economic status, the study identified 12 categories of variables and used for analyses. The same was true for cooking behavior and subjective spare time.

2.2.3. Other Variables

This study used the following characteristics as covariates in multivariate analysis: gender (men, women), age (20–39, 40–59, 60–79, and 80 or more years), employment status (employed, self or family employed, and other), living region (city and town/village), agricultural experience (with and without), self-rated health (good, fair, and poor), and attitude toward healthy diet (with and without).

2.3. Analysis

The study first described the characteristics according to cooking behavior and conducted Chi-square tests. It then presented detailed proportions of each dependent variable according to subjective economic status, subjective spare time, and cooking behavior and, once again, perfomed Chi-square tests. Subsequently, it presented the proportions of each dependent variable for each of the 12 categories that were created by the combination of cooking behavior with subjective economic status or subjective spare time. Finally, the study examined the relationships between each dependent variable and these 12 categories using univariate and multivariate logistic regression analyses that were adjusted for characteristics. In the logistic regression analyses, the study defined the reference categories as individuals whose cooking behavior was *almost cook* and whose economic situation was *good* or had *much* spare time. Lastly, it calculated odds ratios (OR) and 95% confidence interval (95% CI) for each category.

Analyses were conducted using IBM SPSS Statistics for Windows, version 28.0 (IBM Japan, Ltd., Tokyo, Japan), and Microsoft Excel 2019 (Microsoft Japan Co., Ltd., Tokyo, Japan) was used to create the figures. Significance level was set to 5% (two-tailed test).

3. Results

3.1. Characteristics of the Participants

Table 1 presents the characteristics of the participants for each cooking behavior. The result of the Chi-square test, *gender*, *age*, *employment status*, *agricultural experience*, *self-rated health*, *attitude toward healthy diet*, *subjective economic status*, and *subjective spare time* were significantly related to cooking behavior.

Table 1. Characteristics of the participants.

	Cooking behavior								
	Almost cook		Partially cook		Do not cook		Do not pre-pare		
	n	%	n	%	n	%	n	%	*p*
	677		972		193		446		
Gender									
Men	136	20.1	339	34.9	134	69.4	373	83.6	<0.001
Women	541	79.9	633	65.1	59	30.6	73	16.4	
Age (years)									
20 to 39	111	16.4	172	17.7	58	30.1	94	21.1	<0.001
40 to 59	202	29.8	372	38.3	72	37.3	144	32.3	
60 to 79	314	46.4	372	38.3	52	26.9	172	38.6	
80 or more	50	7.4	56	5.8	11	5.7	36	8.1	
Employment status									
Employed	267	39.4	482	49.6	124	64.2	268	60.1	<0.001
Self- or family em-ployed	82	12.1	103	10.6	16	8.3	58	13.0	
Other	328	48.4	387	39.8	53	27.5	120	26.9	
Living region									
City	479	70.8	653	67.2	142	73.6	299	67.0	0.166
Town/village	198	29.2	319	32.8	51	26.4	147	33.0	
Agricultural experience									
Without	196	29.0	328	33.7	91	47.2	154	34.5	<0.001
With	481	71.0	644	66.3	102	52.8	292	65.5	
Self-rated health									
Good	450	66.5	569	58.5	73	37.8	231	51.8	<0.001
Fair	124	18.3	240	24.7	66	34.2	120	26.9	
Poor	103	15.2	163	16.8	54	28.0	95	21.3	
Attitude toward healthy diet									
Without	56	8.3	213	21.9	109	56.5	166	37.2	<0.001
With	621	91.7	759	78.1	84	43.5	280	62.8	
Subjective socioeco-nomic status									
Poor	152	22.5	269	27.7	80	41.5	130	29.1	<0.001
Fair	216	31.9	326	33.5	50	25.9	135	30.3	
Good	309	45.6	377	38.8	63	32.6	181	40.6	
Subjective spare time									
Less	151	22.3	283	29.1	61	31.6	125	28.0	0.018

Neither	150	22.2	211	21.7	47	24.4	105	23.5
Much	376	55.5	478	49.2	85	44.0	216	48.4

p: chi-square test

3.2. Dietary Habits According to Subjective Economic Status, Subjective Spare Time, and Cooking Behavior

Table 2 presents the proportions of individuals eating balanced meals and breakfast, which are categorized according to subjective economic status, subjective spare time, and cooking behavior. The better the subjective economic status and the more the spare time available, the more frequently the individuals ate balanced meals and breakfast. In terms of cooking behavior, the frequency of eating a balanced meal was higher for the *almost cook* group, while the frequency of eating breakfast was higher for the *almost cook* and *partially* ' groups. All results from the chi-square test were significant.

Table 2. Dietary habits according to subjective economic status, subjective spare time, and cooking behavior.

	Eating balanced meals				Eating breakfast			
	Not every day		Nearly every day		Not every day		Nearly every day	
	n	%	n	%	n	%	n	%
	1444		844		423		1865	
Subjective socioeconomic status								
Poor	451	71.5	180	28.5	166	26.3	465	73.7
Fair	476	65.5	251	34.5	127	17.5	600	82.5
Good	517	55.6	413	44.4	130	14.0	800	86.0
				p < 0.001				*p <* 0.001
Subjective spare time								
Less	435	70.2	185	29.8	163	26.3	457	73.7
Neither	337	65.7	176	34.3	105	20.5	408	79.5
Much	672	58.2	483	41.8	155	13.4	1000	86.6
				p < 0.001				*p <* 0.001
Cooking behavior								
Almost cook	326	48.2	351	51.8	85	12.6	592	87.4
Partially cook	674	69.3	298	30.7	158	16.3	814	83.7
Do not cook	174	90.2	19	9.8	74	38.3	119	61.7
Do not prepare	270	60.5	176	39.5	106	23.8	340	76.2
				p < 0.001				*p <* 0.001

p: Chi-square test

3.3. Intersectional Influence of Socioeconomic Status and Cooking Behaviors on Dietary Habits

Figure 1 depicts the descriptive statistics for dietary habits according to combinations of cooking behavior and socioeconomic status (see Table A1 for detailed data on Figure 1). Additionally, Table 3 presents the results of logistic regression analyses.
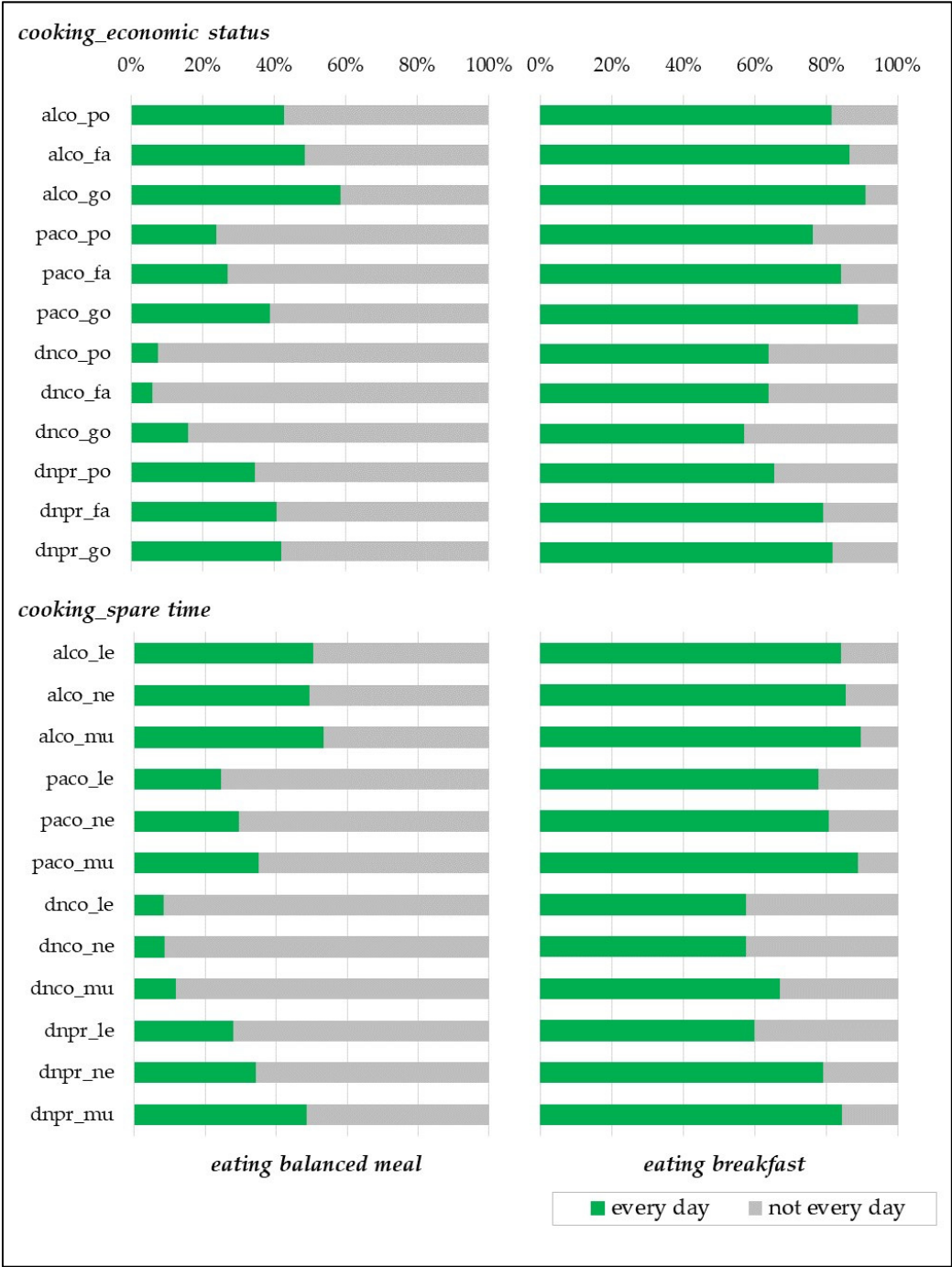
In the relationship between cooking behavior combined with economic status and the frequency of eating balanced meals, among individuals categorized under *almost cook,* those with *good* economic status ate more balanced meals daily than those with *poor* economic status (according to the adjusted model; OR: 1.555). However, when compared to those under the *almost cook* category with a *poor* economic status, those under the *partially cook* category with *poor* or *fair* economic status were significantly less likely to eat balanced meals daily (adjusted model; OR: poor: 0.500, fair: 0.511). In

addition, those under the *partially cook* category with a *good* economic status demonstrated a comparable likelihood to those who *almost cook* with a *poor* economic status in eating balanced meals daily. Furthermore, when compared to those under the *almost cook* category with a *poor* economic status, those under all economic status categories and under the *do not cook* category were significantly less likely to eat balanced meals daily (adjusted model; OR: poor: 0.214, fair: 0.136, good: 0.332). The study found no significant difference in the frequency of the consumption of balanced meals between the *almost cook* category with a *poor* economic status and all economic statuses under the *do not prepare* category.

In the relationship between cooking behavior combined with spare time and the frequency of eating balanced meals, the study found no significant difference in the frequency of eating balanced meals according to subjective spare time among those categorized as *almost cook*. When compared to those under the *almost cook* category with *less* spare time, those under all categories of subjective spare time and under the *partially cook* and *do not cook* categories were significantly less likely to eat balanced meals daily (adjusted model; OR: *partially cook* [less]: 0.378, [neither]: 0.432, [much]: 0.403; *do not cook* [less]: 0.163, [neither]: 0.148, [much]: 0.159). Compared with those under the *almost cook* category with *less* spare time, individuals under the *do not prepare* category with *less* spare time were significantly less likely to eat balanced meals daily (adjusted model; OR: 0.564). However, the study observed no significant differences when comparing these individuals with those under the *do not prepare* category with *neither* and *much* spare time.

In the relationship between cooking behavior combined with economic status and the frequency of eating breakfast, individuals under the *almost cook* and *partially cook* categories with *good* socioeconomic status ate breakfast more frequently (adjusted model; OR: *almost cook*: 1.930, *partially cook*: 1.868) compared with those under the *almost cook* category with *poor* economic status. Compared to those under the *almost cook* category with *poor* economic status, those under the *do not cook* category with *good* economic status were significantly less likely to eat breakfast (adjusted model; OR: 0.450). Individuals under the *do not cook* category with *poor* and *fair* economic status were nonsignificant; however, they were less likely to eat breakfast than those under the *almost cook* category with *poor* economic status. Furthermore, the study noted no significant differences when comparing these individuals with those under the *do not prepare* category with *fair* and *good* economic status. Those under the *do not prepare* category with *poor* economic status was nonsignificant; however, they were less likely to eat breakfast than those under the *almost cook* category with *poor* economic status.

In the relationship between cooking behavior combined with spare time and the frequency of eating breakfast, the study observed no significant differences in the frequency of eating breakfast among all categories of subjective spare time and under the *almost cook* and *partially cook* categories. When compared with those under the *almost cook* category with *less* spare time, individuals under all spare time categories and the *do not cook* category were significantly less likely to eat breakfast (adjusted model; OR: less: 0.456, neither: 0.379, much: 0.477). Compared with those under the *almost cook* category with *less* spare time, individuals under the *do not prepare* category with *less* spare time were significantly less likely to eat breakfast (adjusted model; OR: 0.437). However, the study found no significant differences when comparing these individuals with those under the *do not prepare* category with *neither* and *much* spare time.

Figure 1. Dietary habits according to combinations of cooking behavior and socioeconomic status. Upper: Combination of cooking behavior and economic status; lower: combination of cooking behavior and spare time; left: percentage of individuals eating balanced meals twice per day; right: percentage of individuals eating breakfast; cooking (cooking behavior): alco (almost cook), paco (partially cook), dnco (do not cook), dnpr (do not prepare); economic status: po (poor), fa (fair), go (good); spare time: le (less), ne (neither), mu (much); (see Table A1 for detailed data on Figure 1).

Table 3. Relationship between dietary habits and combinations of cooking behavior and socioeconomic status: Logistic regression analyses.

		Crude model			Adjusted model		
		OR	95% CI	p	OR	95% CI	p
Eating balanced meals							
Cooking behavior	Economic status						
Almost cook	Poor	1	Reference		1	Reference	
	Fair	1.266	(0.833, 1.922)	0.268	1.074	(0.695, 1.657)	0.748
	Good	1.893	(1.277, 2.803)	0.001	1.555	(1.029, 2.348)	0.036
Partially cook	Poor	0.418	(0.272, 0.640)	<0.001	0.500	(0.320, 0.780)	0.002
	Fair	0.495	(0.330, 0.741)	0.001	0.511	(0.335, 0.779)	0.002
	Good	0.846	(0.577, 1.239)	0.391	0.777	(0.519, 1.162)	0.220
Do not cook	Poor	0.109	(0.044, 0.264)	<0.001	0.214	(0.084, 0.538)	0.001
	Fair	0.085	(0.025, 0.286)	<0.001	0.136	(0.039, 0.469)	0.002
	Good	0.253	(0.119, 0.533)	<0.001	0.332	(0.151, 0.729)	0.006
Do not prepare	Poor	0.709	(0.436, 1.149)	0.163	1.073	(0.633, 1.816)	0.793
	Fair	0.920	(0.574, 1.472)	0.729	1.212	(0.721, 2.038)	0.467
	Good	0.969	(0.626, 1.498)	0.887	1.071	(0.663, 1.728)	0.780
Cooking behavior	Spare time						
Almost cook	Less	1	Reference		1	Reference	
	Neither	0.961	(0.611, 1.509)	0.863	0.795	(0.496, 1.273)	0.341
	Much	1.133	(0.776, 1.654)	0.516	0.776	(0.517, 1.164)	0.221
Partially cook	Less	0.318	(0.209, 0.483)	<0.001	0.378	(0.244, 0.584)	<0.001
	Neither	0.411	(0.265, 0.634)	<0.001	0.432	(0.273, 0.682)	<0.001
	Much	0.530	(0.365, 0.767)	0.001	0.403	(0.270, 0.599)	<0.001
Do not cook	Less	0.088	(0.033, 0.232)	<0.001	0.163	(0.059, 0.441)	<0.001
	Neither	0.092	(0.031, 0.268)	<0.001	0.148	(0.048, 0.445)	0.001
	Much	0.132	(0.063, 0.273)	<0.001	0.159	(0.073, 0.343)	<0.001
Do not prepare	Less	0.384	(0.231, 0.635)	<0.001	0.564	(0.327, 0.972)	0.039
	Neither	0.515	(0.307, 0.860)	0.011	0.677	(0.387, 1.181)	0.169
	Much	0.933	(0.615, 1.414)	0.746	0.890	(0.557, 1.421)	0.627
Eating breakfast							
Cooking behavior	Economic status						
Almost cook	Poor	1	Reference		1	Reference	
	Fair	1.456	(0.826, 2.566)	0.194	1.175	(0.646, 2.134)	0.597
	Good	2.266	(1.288, 3.986)	0.005	1.930	(1.063, 3.501)	0.031
Partially cook	Poor	0.723	(0.440, 1.188)	0.201	0.896	(0.528, 1.517)	0.683
	Fair	1.190	(0.717, 1.973)	0.501	1.331	(0.777, 2.277)	0.297
	Good	1.801	(1.070, 3.031)	0.027	1.868	(1.075, 3.242)	0.026
Do not cook	Poor	0.397	(0.215, 0.733)	0.003	0.775	(0.395, 1.518)	0.457
	Fair	0.401	(0.197, 0.815)	0.012	0.765	(0.354, 1.651)	0.496
	Good	0.301	(0.157, 0.574)	<0.001	0.450	(0.222, 0.908)	0.026
Do not prepare	Poor	0.427	(0.246, 0.736)	0.002	0.665	(0.364, 1.215)	0.185
	Fair	0.863	(0.481, 1.547)	0.621	1.225	(0.644, 2.331)	0.536
	Good	1.013	(0.580, 1.768)	0.965	1.208	(0.656, 2.223)	0.544
Cooking behavior	Spare time						
Almost cook	Less	1	Reference		1	Reference	
	Neither	1.099	(0.586, 2.061)	0.767	0.818	(0.424, 1.576)	0.549
	Much	1.633	(0.944, 2.824)	0.079	0.949	(0.531, 1.697)	0.861
Partially cook	Less	0.660	(0.392, 1.108)	0.116	0.835	(0.486, 1.434)	0.514
	Neither	0.784	(0.450, 1.363)	0.388	0.818	(0.456, 1.465)	0.500
	Much	1.484	(0.882, 2.496)	0.137	0.986	(0.568, 1.711)	0.961
Do not cook	Less	0.254	(0.130, 0.496)	<0.001	0.456	(0.222, 0.932)	0.032
	Neither	0.255	(0.123, 0.526)	<0.001	0.379	(0.173, 0.829)	0.015
	Much	0.385	(0.205, 0.721)	0.003	0.477	(0.241, 0.943)	0.034
Do not prepare	Less	0.283	(0.161, 0.498)	<0.001	0.437	(0.237, 0.803)	0.008
	Neither	0.713	(0.375, 1.353)	0.301	0.969	(0.485, 1.934)	0.928
	Much	1.012	(0.572, 1.787)	0.968	0.805	(0.430, 1.504)	0.497

OR: odds ratios; 95% CI: 95% confidence intervals (lower limits, upper limits)

Adjusted models: gender, age, employment status, living region, agricultural experience, self-rated health, attitude toward healthy diet.

4. Discussion

This study examined the intersectional influence of socioeconomic status and cooking behavior on dietary habits using data from a Japanese nationwide survey. The result indicated that individuals who prepared most meals from ingredients, even if they were economically poor or had little time to spare, were more likely to eat balanced meals than those who prepared their meals partially from commercial foods or rarely cooked. In addition, those who prepared the majority of meals from ingredients even if they were economically poor or had little time to spare were more likely to eat breakfast than those who rarely cooked. In summary, cooking behavior tended to partially mitigate the disparity in healthful eating habits due to economic status and spare time. Previous studies suggested positive associations between socioeconomic status, such as economic status and spare time, and dietary habits [5–19,40–42]. Additionally, they illustrated that cooking behaviors can lead to healthful eating habits [20–27]. However, no studies to date reported on the intersectional influence of socioeconomic status and cooking behavior on dietary habits. Thus, the current study provided important evidence for the possibility of positioning the promotion of cooking behaviors as a promising strategy for improving disparities in healthy eating habits due to socioeconomic status.

One method for encouraging cooking behaviors is improving one's cooking skills, such that individuals can utilize readily available, inexpensive items or leftovers from previous meals to prepare relatively balanced dishes even under economically challenging circumstances. Additionally, possessing cooking skills can expedite meal preparation, which, thereby, increases the likelihood of cooking even for those with time constraints. In fact, previous studies pointed to a positive relationship between cooking skills and healthy eating habits, nutritional status, and even social health. [21,43–45]. These studies also revealed that high levels of cooking skills are associated with high frequencies of cooking [44,45]. However, whether or not improved cooking skills can help mitigate dietary disparities related to socioeconomic status remained unclear. These issues require a detailed examination in the future.

Furthermore, the study observed unique differences by outcome. When breakfast intake was used as the outcome, no difference existed in the percentage of eating breakfast daily between those who can *almost cook* and *partially cook*. However, when balanced meal intake was used as the outcome, a smaller percentage ate a balanced meal daily in the *partially cook* than the *almost cook* group. One implication from this result is that although partial cooking with commercial food is sufficient for simply eating breakfast, cooking most of the meal from basic ingredients is important from the perspective of a balanced diet. In addition, respondents who answered *do not prepare* include not only those who eat out or use take-out but also those whose family prepares meals at home. Therefore, interpreting the *do not prepare* responses is difficult and should be done with caution. Additional precise verification is required in the future.

Limitation

This study has several limitations. First, it was based on a sample of 2,288 responses out of 5,000 targeted individual with a relatively low response rate (45.8%). Thus, inherent bias may exist in the data due to the underrepresentation of those who did not respond. Then, it utilized a cross-sectional design; in other words, it was conducted at a single point in time. This type of design can identify correlations but cannot establish causality. It also heavily relied on self-reported data, which may be subject to recall or social desirability bias. For this reason, verifying this aspect using objective and subjective indicators would be desirable for future research.

Finally, the survey was conducted in Japan; thus, the findings may not be generalizable to other cultural or ethnic groups. Similar verification is desirable in diverse countries and regions apart from Japan. A more detailed verification is needed in the future due to the abovementioned limitations of this brief report.

5. Conclusions

This study revealed that individuals who frequently cooked from scratch despite the low economic status or limited spare time exhibited healthier eating habits by consuming more balanced meals and eating breakfast regularly. These findings suggested that promoting cooking behavior and teaching cooking skills could help mitigate disparities in healthy eating habits due to socioeconomic differences given a new perspective on public health intervention.

Institutional Review Board Statement: Not applicable. This study was exempt from applying the ethical guidelines for life science and medical research involving human subjects in Japan, because anonymous information was derived from a survey conducted prior to the study.

Informed Consent Statement: Not applicable.

Data Availability Statement: It is available by applying to the Social Science Japan Data Archive, Center for Social Research and Data Archive, which is affiliated with the Institute of Social Sciences, University of Tokyo.

Conflicts of Interest: The author declares no conflict of interest.

Appendix A

Table A1. Detailed data in Figure 1.

		Eating balanced meals				Eating breakfast			
		Not every day		Nearly every day		Not every day		Nearly every day	
		n	%	n	%	n	%	n	%
		1444		844		423		1865	
Cooking behavior	Economic status								
Almost cook	Poor	87	57.2	65	42.8	28	18.4	124	81.6
	Fair	111	51.4	105	48.6	29	13.4	187	86.6
	Good	128	41.4	181	58.6	28	9.1	281	90.9
Partially cook	Poor	205	76.2	64	23.8	64	23.8	205	76.2
	Fair	238	73.0	88	27.0	52	16.0	274	84.0
	Good	231	61.3	146	38.7	42	11.1	335	88.9
Do not cook	Poor	74	92.5	6	7.5	29	36.3	51	63.8
	Fair	47	94.0	3	6.0	18	36.0	32	64.0
	Good	53	84.1	10	15.9	27	42.9	36	57.1
Do not prepare	Poor	85	65.4	45	34.6	45	34.6	85	65.4
	Fair	80	59.3	55	40.7	28	20.7	107	79.3
	Good	105	58.0	76	42.0	33	18.2	148	81.8
	Spare time								
Almost cook	Less	75	49.7	76	50.3	24	15.9	127	84.1
	Neither	76	50.7	74	49.3	22	14.7	128	85.3
	Much	175	46.5	201	53.5	39	10.4	337	89.6
Partially cook	Less	214	75.6	69	24.4	63	22.3	220	77.7
	Neither	149	70.6	62	29.4	41	19.4	170	80.6
	Much	311	65.1	167	34.9	54	11.3	424	88.7
Do not cook	Less	56	91.8	5	8.2	26	42.6	35	57.4
	Neither	43	91.5	4	8.5	20	42.6	27	57.4
	Much	75	88.2	10	11.8	28	32.9	57	67.1
Do not prepare	Less	90	72.0	35	28.0	50	40.0	75	60.0
	Neither	69	65.7	36	34.3	22	21.0	83	79.0
	Much	111	51.4	105	48.6	34	15.7	182	84.3

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