ベストワースト尺度法によるコンセプト型国際シェアハウスに関する大学生選好分析

A Best–Worst Scaling on Preferences of University Students for Concept-type International Shared Houses in Japan

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獨協大学の有意抽出学生サンプルとベストワースト尺度法を用いて，仮想的に草加市に建設すると仮定したコンセプト型国際シェアハウスに関する留学生および日本人学生の選好をパイロットスタディとして抽出した．予備的分析の結果，設備・インテリア・デザイン・本棚などをシェアハウスに整備する際に，日本人学生サンプルについては，まず居住者支援と日本の食や観光の関心に沿ったエンターテインメント要素を求め，そのあとにビジネスやキャリア形成を気にかけていることが示唆された．一方で，欧米中心の留学生サンプルについては，日本の観光や食といったエンターテインメント要素と居住者支援を求め，日本語や日本文化に関心を寄せ，そののちにビジネスやキャリア形成を求めていることが示唆された．また，選好の不確実性に配慮して，サンプル抽出や質問紙設計をさらに洗練すべきことも確認した．

Utilizing a purposive sample of foreign and Japanese students at Dokkyo University in Japan and best–worst scaling, we formulated a hypothetical concept-type international shared house in Soka, Japan, as a pilot study. The preliminary results suggest that in implementing facilities, interiors, design, bookshelves, and so on in shared houses, Japanese students in our sample first want residential assistance, then, entertainment such as tourism or Japanese food and other cultural interests; then they may start to care about business or their future career. In contrast, the foreign students in our sample, especially European and American foreign students, want entertainment such as tourism or food secured, then residential assistance, then Japanese language and culture, and lastly, business or career development. In addition, we confirmed the need to use a more sophisticated sampling strategy and design for the questionnaire, so as to take such factors as preference uncertainty into consideration.

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1. Introduction

There have been an increasing number of foreign students in Japan since the project on welcoming 100,000 students from overseas (*Ryugakusei Juman-nin Keikaku*) enacted by the Cabinet of Prime Minister Yasuhiro Nakasone, subsequently followed by another aiming at 300,000 students by the Cabinet of Prime Minister Yasuo Fukuda (Okada and Okada[16]). In 1983, there were just 10,408 foreign students studying in Japan, increasing to 171,122 students in higher education institutions by 2016.[i] To exploit better this latent foreign "fandom" with Japan and to obtain highly skilled and educated foreign human resources, one of the urgent issues facing policymakers is to conduct policy innovations to increase the number and improve the environment surrounding foreign students in Japan. One possible measure is to attend to the construction of residential dormitories in Japanese universities and colleges to house these foreign students.

In the case of university dormitories, the idea of a shared house has been enjoying attention, especially as it principally focuses on international educational purposes regarding social exchange between foreign and Japanese students and/or communities around universities. Among shared houses in particular, the concept-type shared house has become of interest in the Japanese private housing market, an approach that predetermines the concept to which residents would aspire and which then invites and collects residents in accordance with that concept.[ii] The expectation is that concept-type shared houses more effectively promote social interaction between students. However, there are currently limited instances of the concept-type shared house found among university dormitories, not least in Japan; access to such houses is necessary to enable research into student housing demand so that effective and efficient decisions can be made about university housing. Thus, we conducted a best–worst scaling (BWS) survey at Dokkyo University as a pilot study.

The remainder of the paper is organized as follows. Section 2 discusses related studies in the area. Section 3 details our survey design and the econometric method employed. Section 4 summarizes the results, provides a discussion, and sets out some topics for future research.

2. Literature Review

When discussing the policies on welcoming more students to Japan from overseas, Fukushima[6] used an anecdote that when Prime Minister Yasuhiro Nakasone traveled to South East Asia and met those who had once been foreign university students in Japan, he was shocked to hear that these past students aspired to letting their children study in Europe or the USA instead. Fukushima[6] suggested that in the "global competition era," foreign students are one reserve for skilled workers in Japan, especially given the difficulty of skills flowing down to unskilled workers. In addition, as foreign students are good candidates for future "fandom" of a country, it has become an urgent issue to conduct policy to attract foreign students, especially in Japan.

Iwasaki[8] discussed some of the measures aimed at attracting foreign students to Japan, including: 1) the provision of lectures in English; 2) a reconsideration of lecturing style; and 3) provision of housing for foreign students. Iwasaki[8] argued that all these measures required significant amounts of capital and labor, requiring drastic reform and time to work. This presents some problems for individual educational institutions. First, while lectures in English may be an effective way to attract foreign students, foreign students also come to Japan aspiring to learn Japanese in the first place. Accordingly, there would be a significant discrepancy between student demand and university supply. Second, some features of the reconsidering of lecture style include small group or workshop-type delivery. While it is desirable to use lectures with many students, a change to small class delivery would require more classes and consideration of which fields of study are fit for these styles, and this would naturally impact upon how effective and efficient it would be to overcome the current situation.

Accordingly, we believe it is easier to direct our attention to the matter of student housing.[iii] One reason is that it is relatively easy to conduct a demand analysis of foreign students for dormitories along with their needs and wants in learning the Japanese language. Housing area regulation is also effective in alleviating some negative externalities of university students such as noise (Munneke et al.[14]). In addition, there is the positive effect of dormitory accommodation on students' (cumulative) grade point averages (GPAs) as an indicator of academic performance (Sacerdote[18], Zimmerman[22], and Bangchang[2]). While Wang et al.[21] indicated that there was a negative effect of residence hall accommodation on the GPA of male undergraduates, and that males should still be encouraged to be involved in the residence hall, it seems valuable to carefully

construct university dormitories and the surrounding communities.

In Japan, several universities have constructed university dormitories to focus on international education or the social exchange between foreign and Japanese students (Suzuki et al.[19]). Indeed, foreign and Japanese students are not only sharing common space but also residential space, such as shared houses in private universities such as Nanzan University, Ritsumeikan Asia Pacific University, and Waseda University. Moreover, there are universities such as Tohoku University and Nagoya University that have constructed university dormitories where foreign and Japanese students live together. Alongside these developments, there is increasing attention to shared houses (especially of the concept type) in the private housing market for young people in Japan. Importantly, concept-type shared housing seems better able to promote social interaction between university students.

When considering the construction of new university dormitories, demand-side analysis should be taken into account.[iv] In estimating consumer demand or the preference for residential space, three methods are evident in existing studies: the revealed preference method, such as the hedonic price function (e.g. Van Ommeren and Zijl[20]); the analytic hierarchy process (AHP) in the operation research literature (e.g. Gawlik et al.[7]); and the stated preference approach in the form of choice experiments (e.g. Ohdoko and Tsuge[15]). However, these methods have at least some limitations. For instance, while the hedonic approach is a promising approach in terms of the accuracy of the estimates, it is necessary to gather data on the "existing" house market, which makes it difficult to analyze "nonexisting" options such as new dormitories not yet constructed (see e.g. Louviere et al.[11]). By comparison, survey respondents easily understand an AHP, and there are many methodological improvements in estimation regarding things such as choice consistency issues. However, paired comparison-type surveys resemble the Likert scale, and this may make it difficult for respondents to rate attributes clearly because of responses that choose relatively obscure items, such as "somewhat important." In addition, although a welfare measure is required to conduct cost benefit analysis, it is requisite for AHP to assume a certain utility function, and utility theory does not yet fully support the statistical methods used in AHP.[v] Lastly, a choice experiment approach can estimate the willingness-to-pay as one welfare measure, but

the burden of response is a critical issue (see e.g. Louviere et al.[10]).

Fortunately, BWS, an approach increasingly conducted especially in health economics, can overcome these problems. BWS is a stated preference method, which enables us to analyze a hypothetical situation, or "nonexisting" products. BWS instructs respondents to choose a best and worst option, and this enables them to rank options clearly and to alleviate the burden of response. In addition, while choice experiments ask respondents to state just the best alternative from several options, BWS identifies not only the best, but also the worst, a process, which significantly increases the information elicited from respondents. According to Louviere et al.[10], there are three types of BWS format: object case (Case 1), profile case (Case 2), and multi-profile case (Case 3). An object case focuses on measuring the preference for the set of items or objects that consists of a single attribute. A profile case measures the preference for the attributes of profiles, where respondents choose a single attribute in each profile consisting of multi-attributes. A multi-profile case measures the preference for the attributes of profiles, where respondents choose a single profile or option as the best or worst in each choice set consisting of multi-attributes. In particular, as an object case seems to better alleviate the burden of response than a choice experiment approach or a choice of a single alternative from multi-attribute options, we employ Case 1 BWS to estimate the preferences for the concept of a shared house.

3. Material and Method

We conducted face-to-face interviews with foreign students in the International Communication Zone (ICZ) at Dokkyo University (hereafter, 1st Survey), before implementing the main survey comprising the BWS questions (hereafter, 2nd Survey).[vi] By first asking their wants before coming to Japan, and the reason they decided to study in Japan, especially at Dokkyo University, we could limit the options in the BWS choice sets.

Starting with the questionnaires of the Japan Tourism Agency and the independent administrative institution Japan Student Services Organization, modified in accordance with the student contexts at Dokkyo University, we created two questions as follows: "Please specify what you wanted to do with your life before coming to Japan" consisting of 15 items, and "Why did you decide to study in Japan, especially at Dokkyo University?" comprising 13

items.[vii] We asked respondents to choose up to three responses ranked in order. To engage effectively with foreign students of various nationalities, we prepared our questionnaire in English and provided this along with a translation in Japanese on the one sheet. We conducted our survey on May 9–16, 2017, and found that foreign students at Dokkyo University care about tourism in Japan, Japanese food, experiences of Japanese everyday life, Japanese pop culture, Japanese language and culture, Japanese society, and studies that match their field of interest.[viii] We created the BWS choice sets based on these expressed wants.

We then discussed the BWS choice sets in the 2nd Survey with eight undergraduates in a social survey seminar at Dokkyo University. During the discussion, we conducted interviews with an expert of international economics and another on Japanese language education for foreign students. In addition, we reviewed a previous example at Akita International University, where concept-type shared housing is already available for foreign and Japanese students.[ix] Table 1 provides the 10 concepts created.

According to Louviere et al.[(10)], balanced incomplete block design (hereafter, BIBD) should be conducted in creating Case 1 BWS choice sets. We employed R 3.3.2 (R Core Team[(17)]) and the class "support.BWS" (Aizaki et al.[(1)]). To alleviate the burden of response in the university student sample, we limited ourselves to 10 choice sets with 10 items, 3 items in each choice set, and 3 occurrences of each item over all the choice sets.[x] We provided every BWS choice set with the scenario in the appendix.

Our questionnaire is as follows.[xi] First, we questioned respondents about their individual characteristics, such as gender, grade, faculty, or graduate school, how many months they have been at Dokkyo University, nationality, occupancy of residence, and living situation. Second, we provided them with a list of the concepts of the hypothetical international shared house in Soka City, Japan, where we told them that concepts are considered when implementing facilities, interiors, design, bookshelves, and so on. We then asked whether they were willing to live in the concept house and could understand the concepts. Third, we provided the 10 BWS questions using an identical answer and question order for all respondents (the questions are in the appendix, with a summary in Table 2). Finally, we asked the respondents about their career plans after graduation. In addition, we prepared two versions: one in English and the other in Japanese. For simplicity and ease of comparison, we utilized identical questions and questionnaire forms for both foreign and Japanese students.[xii]

When analyzing BWS data, it is common to employ a multinomial or a conditional logit model with maximum difference (maxdiff) model. Suppose a random utility of choosing k as the best item and k′ as the worst $U_{kk'} = [v(k) - v(k')] + \alpha\varepsilon_{kk'}$, where $v(\cdot)$ denotes the deterministic component of indirect utility, $\varepsilon_{kk'}$ the error component depends an independent Gumbel, or Type I extreme value distribution, and α the scale factor which is proportionate to the variance of the error component. The individual choice probability then becomes the well-known multinomial or conditional logit model:

$$P_{BW}(ii'|X) = \Pr([v(i) - v(i')] + \alpha\varepsilon_{ii'} \geq [v(j) - v(j')] + \alpha\varepsilon_{jj'}, \forall j, j' \in M, j' \neq j])$$

(Eq.1)

$$P_{BW}(ii'|X) = \frac{\exp([v(i) - v(i')]/\alpha)}{\sum_{j,j' \in M, j' \neq j} \exp([v(j) - v(j')]/\alpha)}$$

(Eq.2)

where X denotes items in a choice set, and M all items in the BWS questions.

However, it is difficult to analyze and communicate the results of a BWS with the maxdiff model because it is necessary to understand the relevant econometric methods and to program the statistical software. Fortunately, Marley and Islam[(13)] have proven that the best minus worst (B–W) score is a sufficient statistic for the multinomial logit maxdiff model.

We can simply calculate the B–W score with a spreadsheet as follows. To start, we count the frequency with which each item is chosen as the best item for all the respondents (this is the Best Score) and then do the same for the worst item (which is the Worst Score). We then calculate the B–W scores by subtracting the Worst Score from the Best Score. Lastly, because we present each item three times because of the BIBD for each respondent, we normalize the B–W scores to three.

We conducted the 2nd Survey from 6–26 June. 2017, at Dokkyo University.[xiii] For simplicity, we employed purposive sampling. We surveyed three subgroups of students. The first subgroup comprises Japanese and foreign students at ICZ, which is a proxy for the latent demand of Japanese and foreign students for the shared house. The second subgroup comprises students at Dokkyo International Amity Club (DIAC), where there are foreign and Japanese students interacting positively and exchanging socially and internationally, and whose population size is 225 persons.

Table 1: Proposed Concept of Hypothetical International Shared House in Soka City.

Concept	Examples
1) Tourism in Japan	Japanese public transport, staying in a Japanese-style inn, nature tours, experience farming/fishing villages.
2) Japanese Food Culture	Japanese food, Japanese table manners, Japanese (traditional) foodstuffs.
3) Japanese Pop Culture	Japanese anime/manga, cosplay, visiting film settings, maid café.
4) Japanese Everyday Life	Participation in the Japanese community, rules for sorting garbage, disaster evacuation.
5) Japanese Language Research	Japanese reading/writing/speaking, Japanese honorific expression, Japanese language research.
6) Japanese Traditional Culture	Japanese tea ceremony/flower arrangement/calligraphy, bonsai, Japanese festival (Matsuri), kimono, castle/samurai/ninja, Japanese shrines and temples.
7) Fitness	Zen meditation, ancient Japanese martial arts, yoga, stretching, weight training.
8) Business Customs	Grooming and appearance, conversation, customer services, visiting companies, people skills.
9) Career Development	Career development/art of applying the Japanese language.
10) Japanese Shopping Customs	Queuing, discounting, conversations with shop staff.

The third subgroup is Keiwakan, which is a women's dormitory for Japanese students in their first and second year, and which we include as a proxy for those favorable to living in a dormitory and living with other students, with a population size of 161 persons. We obtained the responses of 47 persons from the ICZ sample, which includes 11 foreign students; 60 persons from the DIAC sample (26.7% ≃ 60/225), which includes 5 foreign students and 55 Japanese students; and 85 persons from the Keiwakan sample (52.8% ≃ 85/161). Overall, we obtained responses from 22.2% ≃ 16/72 of foreign students, where the population size of foreign students was 72 persons at the time of the 2nd Survey.[xiv]

4.　Results and Discussion

We first summarized the willingness to live in the hypothetical international concept-type shared house for Japanese and foreign students. Overall, 135 persons in the Japanese sample stated they were willing to live in this situation and 39 were unwilling (2 samples with no answer), while 12 persons in the foreign sample were willing and 4 were unwilling. In addition, there is no observed difference across nationalities within the foreign samples. Although the sample size is limited, most respondents seemed positive about social interaction in the international shared house.

Table 2 provides the means, standard deviations, and the absolute value of the coefficient of variation for the B–W scores[xv]. In terms of the mean B–W scores across all samples, concepts were ranked as follows: Japanese Everyday Life (0.542), Japanese Food Culture (0.457), Tourism in Japan (0.340), Japanese Traditional Culture (0.283), Japanese Language Research (0.040), Japanese Pop Culture (–0.200), Business Customs (–0.273), Japanese Shopping Customs (–0.281), Career Development (–0.403), Fitness (–0.462). For the Japanese subsamples, the ranking is identical given the larger sample size: Japanese Everyday Life (0.563), Japanese Food Culture (0.479), Tourism in Japan (0.339), Japanese Traditional Culture (0.299), Japanese Language Research (0.032), Japanese Pop Culture (–0.208), Business Customs (–0.269), Japanese Shopping Customs (–0.271), Career Development (–0.424), Fitness (–0.485). However, for the foreign student sample, the ranking differs somewhat: Tourism in Japan (0.354), Japanese Everyday Life (0.313), Japanese Food Culture (0.208), Japanese Language Research (0.125), Japanese Traditional Culture (0.104), Japanese Pop Culture (–0.104), Career Development (–0.167), Fitness (–0.208), Business Customs (–0.313), Japanese Shopping Customs (–0.396).

Before interpretation of the mean B–W

scores, we should note that the signs of the scores do not necessarily indicate their desirability, that is, a negative value does not necessarily denote undesirability, and vice versa. This is because the scores identify utility "differences" not the nominal value of utility itself. Rather, it denotes the relative importance within the employed items. Thus, we interpret every score as the ranking of items. In addition, because the Japanese sample more strongly influences the scores for all samples than the foreign sample, we split the samples to compare them.

From the results, it is clear that the Japanese student sample cares about Japanese everyday life in the first instance. This item includes participation in the Japanese community, the rules for sorting garbage, and disaster evacuation. In the previous example, the international concept-type shared house in Akita International University, there are residential assistants who are Japanese students. This suggests that our respondents also have a need for residential assistants. The next three places are Japanese food culture, tourism in Japan, and Japanese traditional culture. This suggests that the residential concepts include some entertainment, especially tourism and food or traditional culture.

The next two places are Japanese language research and Japanese pop culture, which suggests that the middle-ranked items more easily encompass preference uncertainty or heterogeneity. For obvious reasons, Japanese language research is not applicable to Japanese students so it is possible that there is preference uncertainty. The next three places are business customs, Japanese shopping customs, and career development. This suggests that Japanese students tend to care less about business, customs, or career. In particular, after they have residential assistance, they want entertainment and cultural staff, and only then do they start to care about business or their career. Fitness ranks last, which suggests that the Japanese respondents in our sample care less about exercise or working out because they are mostly female dorm mates.

In terms of the foreign student sample, it is clear that they care about tourism in Japan, followed by Japanese everyday life and Japanese food culture. This suggests that our foreign student sample also needs entertainment including tourism and food culture, and residential assistants. In the next three places are Japanese language research, Japanese traditional culture, and Japanese pop culture. This suggests foreign students want to study and learn about Japan after they acquire entertainment and residential assistance. We then have career development, fitness, business customs and Japanese shopping customs. In terms of career plans after graduation, foreign students identify that they want to: Work in Japan (7 persons); Work in their own country (2 persons); Work in a country other than Japan or their own country (2 persons); Study at an institution in their own country (2 persons); Others (2 persons); No answer (2 persons). This suggests that business or career development affairs should appear after securing entertainment, residential assistance, and Japanese language and culture.

Figs. 1 to 3 provide line plots of the relationships between the mean B–W scores and the coefficients of variation as a means to capture the variability of scores. These suggest that variations are increasing toward the middle-ranked items. It also suggests that there is more 1) choice inconsistency, 2) choice uncertainty, or 3) preference heterogeneity in the middle items than extremely preferred items. In the Japanese student sample, Japanese Language Research is the fifth-ranked item, but it has an extremely large coefficient of variation. This suggests that Japanese Language does not fit as a concept for Japanese students, so this seems to be an uncertain preference. On the other hand, the coefficient of variation is flatter in the foreign student sample than the Japanese sample. This suggests that the concepts we employed fit extremely well for foreign students so that they were able to respond more consistently or certainly.

Overall, we recommend the following when implementing facilities, interiors, design, bookshelves, and so on for shared housing. Japanese students in our sample first want residential assistance, then, entertainment such as Japanese food or tourism and other cultural interests; then they may start to care about business or their future career. In contrast, the foreign students in our sample want entertainment such as Japanese tourism or food secured, then residential assistance, then Japanese language and culture, and lastly, business or career development. In addition, we confirmed the need to use a more sophisticated sampling strategy and design for the questionnaire, so as to take preference uncertainty into consideration. When some of the items of BWS did not fit for the respondents, preference uncertainty could readily occur, as it did in our case.

There are several topics for future research. First, our sampling strategies could be more sophisticated. Second, we may have to split the questionnaire design between Japanese and

foreign students as our existing design seems to better fit foreign than Japanese students. We should especially rearrange the provided concepts more exclusively and in a more sophisticated manner. Third, we should attempt to develop measures on choice consistency, choice certainty, and preference reversal in the BWS.[xvi] Fourth, we should attempt to capture preference heterogeneities, such as a cluster analysis, a generalized multinomial logit model (Fiebig et al.[(4)]) and latent class model (Flynn et al.[(5)]; Louviere et al.[(10)]). Finally, because the method of B–W scores can produce not only positive but also negative values, when discussing the results with members of the public not familiar with relative importance or dummy variables, it is common for them to misunderstand negative values. One solution is a Louviere weight (Louviere et al.[(12)]) to restrict the weighted values in a range from zero to one.
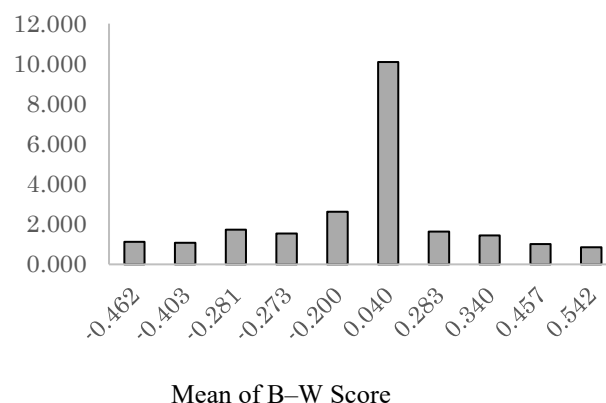
Acknowledgment

CV of B–W Score

Fig. 1: Absolute Value of Coefficient of Variation vs. Mean B–W Scores for All Samples
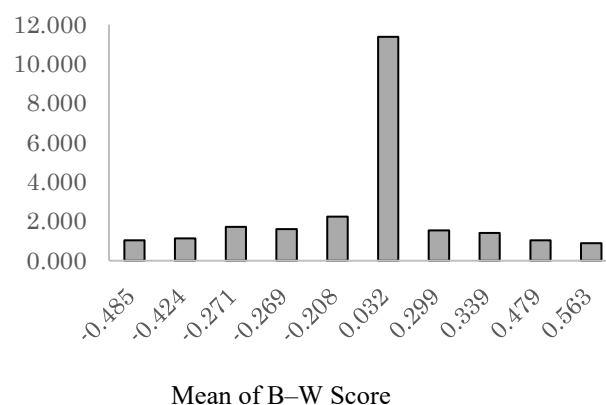
CV of B–W Score

Fig. 2: Absolute Value of Coefficient of Variation vs. Mean B–W Scores for Japanese Student Samples
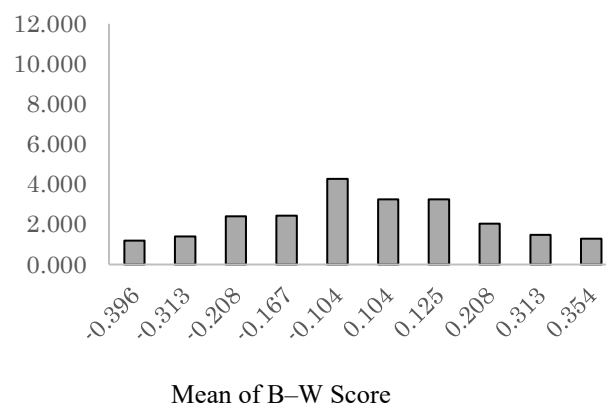
CV of B–W Score

Fig. 3: Absolute Value of Coefficient of Variation vs. Mean B–W Scores for Foreign Student Samples

Table 2: Summary of Best–Worst Scaling in the 2nd Survey.

Item of Concept	Best Score	Worst Score	B–W Score	Normalized B–W Score								
				All			Japanese Student			Foreign Student		
				Mean	SD	CV	Mean	SD	CV	Mean	SD	CV
1) Tourism in Japan	267	71	196	0.340	0.489	1.438	0.339	0.480	1.416	0.354	0.458	1.292
2) Japanese Food Culture	311	48	263	0.457	0.463	1.014	0.479	0.496	1.036	0.208	0.425	2.039
3) Japanese Pop Culture	83	198	−115	−0.200	0.523	2.618	−0.208	0.465	2.233	−0.104	0.444	4.266
4) Japanese Everyday Life	351	39	312	0.542	0.463	0.855	0.563	0.499	0.888	0.313	0.464	1.483
5) Japanese Language Research	114	91	23	0.040	0.403	10.085	0.032	0.366	11.378	0.125	0.406	3.249
6) Japanese Traditional Culture	220	57	163	0.283	0.463	1.637	0.299	0.462	1.545	0.104	0.338	3.249
7) Fitness	54	320	−266	−0.462	0.521	1.129	−0.485	0.500	1.031	−0.208	0.499	2.396
8) Business Customs	53	210	−157	−0.273	0.417	1.530	−0.269	0.432	1.605	−0.313	0.437	1.398
9) Career Development	50	282	−232	−0.403	0.433	1.075	−0.424	0.481	1.133	−0.167	0.406	2.437
10) Japanese Shopping Customs	64	226	−162	−0.281	0.488	1.735	−0.271	0.465	1.715	−0.396	0.474	1.197

Note: B–W Score calculated by subtracting Worst Score response frequencies from corresponding Best Score response frequencies. Normalized B–W Score calculated by dividing B–W Score with the number of items occurring (three occurrence). Because several best–worst scaling questions include no answers, the total frequencies do not equal the sample times the number of times the item occurred. SD – sample standard deviation. CV – absolute value of coefficient of variation.

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Appendix: Questions of Best–Worst Scaling

Suppose there was a new international shared house in Soka City, where both foreign and Japanese students at Dokkyo University may live. Please give your preferred concepts for a hypothetical international shared house. We aim to construct an international shared house, by taking into consideration these concepts when implementing facilities, interiors, design, bookshelves, and so on.

1) Below we will provide 10 sets of choices, which are created by incorporating 3 from the 10 concepts.

2) Suppose if you were to live in the shared house, please specify the most/least desirable concept in each choice set.

3) Please fill out all the choice sets because it is necessary for analysis.

<table>
<tr><td colspan="3" align="center"><Example></td></tr>
<tr><td>Most Desirable</td><td></td><td>Least Desirable</td></tr>
<tr><td align="center">□</td><td align="center">Item 1</td><td align="center">☑</td></tr>
<tr><td align="center">□</td><td align="center">Item 2</td><td align="center">□</td></tr>
<tr><td align="center">☑</td><td align="center">Item 3</td><td align="center">□</td></tr>
</table>

Please specify the most/least desirable concept.

Q-9-1. Which of the following combinations of concepts is most desirable and which is least desirable?

Most desirable		Least desirable
□	4) Japanese Everyday Life	□
□	8) Business Customs	□
□	9) Career Development	□

Q-9-2. Which of the following combination of concepts?

Most desirable		Least desirable
□	1) Tourism in Japan	□
□	3) Japanese Pop Culture	□
□	6) Japanese Traditional Culture	□

Q-9-3. Which of the following combination of concepts?

Most desirable		Least desirable
□	3) Japanese Pop Culture	□
□	4) Japanese Everyday Life	□
□	10) Japanese Shopping Customs	□

Q-9-4. Which of the following combination of concepts?

Most desirable		Least desirable
□	1) Tourism in Japan	□
□	7) Fitness	□
□	8) Business Customs	□

Q-9-5. Which of the following combination of concepts?

Most desirable		Least desirable

□	5) Japanese Language Research	□
□	6) Japanese Traditional Culture	□
□	9) Career Development	□

Q-9-6. Which of the following combination of concepts?

Most desirable		Least desirable
□	2) Japanese Food Culture	□
□	5) Japanese Language Research	□
□	10) Japanese Shopping Customs	□

Q-9-7. Which of the following combination of concepts?

Most desirable		Least desirable
□	2) Japanese Food Culture	□
□	6) Japanese Traditional Culture	□
□	7) Fitness	□

Q-9-8. Which of the following combination of concepts?

Most desirable		Least desirable
□	2) Japanese Food Culture	□
□	3) Japanese Pop Culture	□
□	8) Business Customs	□

Q-9-9. Which of the following combination of concepts?

Most desirable		Least desirable
□	1) Tourism in Japan	□
□	9) Career Development	□
□	10) Japanese Shopping Customs	□

Q-9-10. Which of the following combination of concepts?

Most desirable		Least desirable
□	4) Japanese Everyday Life	□
□	5) Japanese Language Research	□
□	7) Fitness	□

i Independent administrative institution Japan Student Services Organization "The Growth and Increase Percentage in Number of International Students", http://www.jasso.go.jp/en/about/statistics/intl_student_e/2016/ref16_01.html (retrieved on September 26, 2017). On the other hand, in accordance with the unification of student visas, they have calculated the total number of international students including Japanese language institutes since 2011. When we focus just on the colleges and universities, 43,478 foreign students were in graduate schools, 72,229 were in colleges and universities, 1,530 were in junior colleges, 564 were in technical colleges, 50,223 were in professional training colleges, and 3,086 were in university preparatory course in 2016 in Japan, http://www.jasso.go.jp/about/statistics/intl_student_e/2016/index.html (retrieved on September 26, 2017) [Japanese only].

ii See e.g. SHARE STYLE, https://www.share-style.jp/ (retrieved on September 26, 2017).

iii Indeed, there is a shortage of housing for foreign students in Japanese higher education institutions. When we summarize the amount of international student housing set up by schools (46,382 students) and by public corporations, etc. (5,702 students), and general student housing set up by schools (6,748 students), such housing must accommodate 58,832 foreign students, http://www.jasso.go.jp/en/about/statistics/intl_student_e/2016/index.html (retrieved on September 26, 2017).

iv In the food study, Krystallis et al.[9] proposed the use of marketing research such as discrete choice methodology when considering new food products.

v Colombo et al.[3] compared an AHP (as the method elicits expert preferences) with a choice experiment (as the method elicits citizens' preferences). They assume a simple utility function in the AHP result.

vi The stated preference method should include focus group sessions before conducting a survey. This was not possible owing to the limitations of time and budget constraints.

vii Japan Tourism Agency "Consumption Trend Survey for Foreigners Visiting Japan", http://www.mlit.go.jp/kankocho/en/siryou/toukei/syouhityousa.html;

Independent administrative institution Japan Student Services Organization "Lifestyle Survey of Privately Financed International Students Questionnaire." http://www.jasso.go.jp/sp/about/statistics/ryuj_chosa/__icsFiles/afieldfile/2015/10/13/ryujchosa25p14.pdf (retrieved on September 26, 2017).

viii We omitted the results of the 1st Survey because of the space limitations of this paper, and we will provide them upon request.

ix Akita International University, http://web.aiu.ac.jp/campuslife/dormitory/ (retrieved on April 27, 2017).

x This may not be the formal BIBD as the balance should consider two co-occurring items in choice sets to capture second-order interaction effects independently with main effects. This is a limitation of the study and a topic for future research.

xi We omitted the demographics of the 2nd Survey because of the space limitations of this paper, and we will provide them upon request.

xii Some foreign students completed the questionnaire in Japanese.

xiii To improve the survey, it may be necessary to visit a foreign university and conduct the survey to identify the "true" latent demand, which we could not do because of time limitations and budget constraints. We instead treat current students as a proxy. Alternatively, we could focus solely on the preferences of current students at Dokkyo University.

xiv Within the sample of 16 foreign students, the nationalities were as follows: 1 from Germany; 3 from Korea; 3 from the UK; 1 from the USA; 1 from Spain; 2 from China; 2 from the Philippines; 1 with two nationalities (French and German); and 2 did not respond. Our sample is thus rather Europe focused, which is also a limitation.

xv For simplicity of presentation, we decided not to provide the results of statistical tests.

xvi Flynn et al.[5] and Louviere et al.[10] proposed the empirical scale parameter, simply calculated by squaring (normalized) B–W scores. However, it is possible for the parameter to confound the preference itself and its consistency. Thus, we should seek another method.