リッカート尺度における選択肢数は重要か
―英語を専門としない学生からの示唆―

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Abstract

先行研究に基づき、本研究はリッカート尺度における選択肢数と日本人大学生の英語に対する態度への効果を再検討する。特に、本研究は英語を専門としない学生を対象に調査を行った。先行研究に倣い、まず、4段階（強制選択）尺度を用いた調査を実施し、さらに1週間後、5段階尺度（中立の選択肢を含む）を用いた調査を行った。調査は日本の国立大学に所属する163名の学生に実施された。本研究の協力者に関しては、リッカート尺度上の中立の選択肢を含めることで、英語学習に関する学生の意見がより正しく反映されたものとなったとの結論を得た。

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Likert or Leave 'Em: Does Scale Size Matter?
A Look at Non-English Majors.

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Introduction

In an initial study last year, the same researchers here used two different Likert scales to look at Japanese university students and their attitudes toward English learning. The goal of the research was to see if the results would be altered in a meaningful way between a forced choice survey and one with a neutral option. The subjects included both English and non-English majors, and incidental to our original research question, we found that a difference between these two groups was clearly identifiable. In an effort to focus our results more on the difference in surveys than the difference in survey takers, we decided to exclude the English majors from the subject pool and include 94 additional survey results that were originally collected from the non-English majors, therefore creating a more robust number of subjects for this homogeneous group.

This study was conceived in order to re-examine and confirm the findings with a suitably large sample size, but with the aim of eliminating the bias that the English majors brought to the table: being that as English majors, they were more likely to have stronger opinions, either positive or negative, on the items of our survey than non-English majors, and therefore be less likely to be impacted by a forced choice survey.

As was presented in the original paper, and as it equally applies to this current study, this following background is again given for the convenience of the reader, with additional commentary brought about through the previous paper.

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Background

First developed by psychologist Rensis Likert in 1932, the Likert scale has been a mainstay in scholarly research ever since. It provides a simple system for measuring survey-takers' attitudes, opinions, and or feelings toward the item in question. As a scale, it traditionally is made up of five points, although there are variations where the scale ranges from only two and up to ten degrees of opinion. The five basic answer options tend to be: "strongly agree" to "agree" to "neither agree nor disagree" to "disagree" to "strongly disagree". In order to avoid bias, the points on a well-constructed scale should be separated by an equal distance, and there should be an equal number of both positive and negative response options.

In looking at the literature written about Likert scales, it soon becomes apparent that there is no true consensus on any aspect of the scale. There are arguments for and against using fewer/more options, as well as arguments for/againsthaving an even number of answer options, thus forcing an opinion. Dawes (2008) determined that a 5- to 7-point scale showed statistical significance in determining a higher mean score than when using a 10-point scale. In contrast, the president of Beall Research and Training, Anne Beall (2009), makes a strong argument recommending the use of a 10-point scale. Her argument is based in three core areas: smaller necessary sample size, higher level of sensitivity at measuring differences, and greater statistical reliability and validity.

J.D. Brown (1988, 2000, 2001, 2011) has written extensively on the subject of Likert scales. And though these scales are ubiquitous in research, he identifies basic problems many teachers face when using Likert scales. First of all, should the scale of measurement be considered nominal, ordinal, interval, or a ratio? A second problem he identifies is that of dealing with what he describes as those who "sit on the fence" by using an even number of answer options to force students to voice an opinion one way or the other. This is a problem he says, because in some cases, there may be students who have a truly neutral position on an item in question.

As Likert scales are usually measured in a 1, 2, 3 fashion, Johns (2010) points out that the numerical difference between 1 and 2 or between 3 and 4 are equal, and can be measured. However, he asks if the same can the same be said about the difference between "strongly agree" and "agree", or "strongly disagree" and "disagree". In an individual's own mind, where is that line drawn? And isn't it probable that individuals might draw that line differently?

Another aspect to the Likert scale that may have bearing on results is that of culture. Lee et al. (2002) found that when comparing Japanese and Americans, the Japanese were more likely to choose the neutral answer than the Americans, especially when it came to expressions of positive feelings. Chen et al (1995) found that Japanese and Chinese were less likely to express an extreme response, and proposed that this could be the result of these societies being more group minded

than individualistic. Therefore, an expression of agreement or disagreement would be moderated so as not to stand out from the group.

Finally, in last year's study (Miller & Levin, 2014) on the same topic, the one this follow-up study is based on, it was discovered that in a subject group consisting of both English and non-English majors, the non-English majors opted for the neutral choice 67 percent of the time, forming a group distinct from the English majors. This result raised the question about the extent to which researchers need to consider the relationship between survey scale and survey takers. It was suspected that non-English majors do indeed have more neutral attitudes than their English major counterparts.

Method

As in last year's study by the same authors, the purpose of this study was see what, if any, effect the addition of a neutral position would have on a survey regarding students' attitudes about the study of English. Moreover, the purpose was also to confirm tentative findings regarding non-English majors by using an expanded subject pool. Again, the authors did not pay attention to exactly what the students' attitudes were, but to how the attitudes changed when they went from a survey forcing them to choose either positive or negative to a survey offering them a neutral choice.

Participants

Two surveys were administered to 163 students at one Japanese, national university in Aichi prefecture. Students from this university included both 1st- and 3rd-year students, and all were non-English majors. All students in the study completed both surveys. The breakdown of students is as follows (see Table 1):

Table 1
Breakdown of participants

Student	Survey 1	Survey 2
1st-year	N=57	N=57
3rd-year	N=106	N=106
Female	N=16	N=16
Male	N=147	N=147

Instrument and Administration

During the last two weeks of a 15-week semester in the spring of 2013, students were given a 14-item, bilingual English-interest survey (see Appendix). The first survey given employed a forced-choice Likert scale containing only four options: *strongly disagree* (1), *disagree* (2), *agree* (3) and *strongly agree* (4). For the second survey, the same survey was given with a fifth (neutral) answer

option added: *strongly disagree* (1), *disagree* (2), *neither agree nor disagree* (3), *agree* (4) and *strongly agree* (5). For the second survey, students were told there had been a problem with the first survey and asked to take it again. That the second survey contained a new set of answer options was not mentioned to the students.

Analysis

An initial data analysis was conducted using a spreadsheet to acquire frequencies and percentages. Later statistical tests were run using a popular statistical software package. These tests included the *Fisher's exact test* to determine statistical significance between survey items, and an *independent samples t-test* to determine the difference between summed means. The alpha for significance was set at the customary .05 level for this field and type of research.

Research question

Will the inclusion of a neutral option (*neither agree nor disagree*) on a Likert-scale English-interest survey alter the results in a meaningful way?

Results

Frequencies and percentages

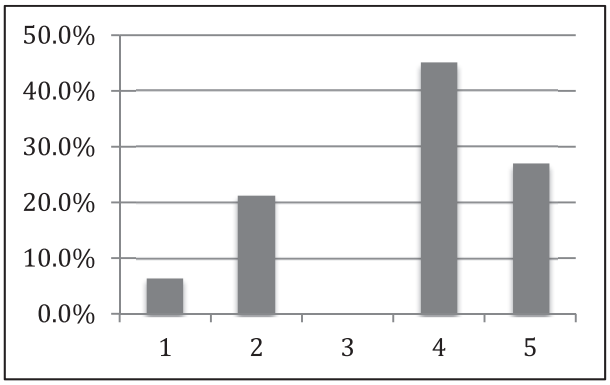
To simplify the process of identifying changes, if any, in student preference for the neutral option (*neither agree nor disagree*), the four-option, forced-choice survey was recoded as follows for entry into the spreadsheet: *strongly disagree* (1), *disagree* (2), *agree* (4) and *strongly agree* (5). The data were then compared with the second, five-option survey.

Overall counts: For the first survey (N=163), there were 152 instances of *strongly disagree*, 487 of *disagree*, 1027 of *agree* and 616 instances of *strongly agree*. Based on 2,282 instances overall, these numbers result in 6.7%, 21.3%, 45%, 27%, respectively (see Table 2 for percentages and Figure 1 for graphical display).

Table 2

Overall frequencies and percentages (survey 1)

	strongly disagree	*disagree*	*agree*	*strongly agree*
Instances (2,282 total)	152	487	1027	616
% of Total	6.7%	21.3%	45%	27%



(1=Strongly Disagree 2=Disagree 3=(*Not an option in this survey*) 4=Agree 5=Strongly Agree)

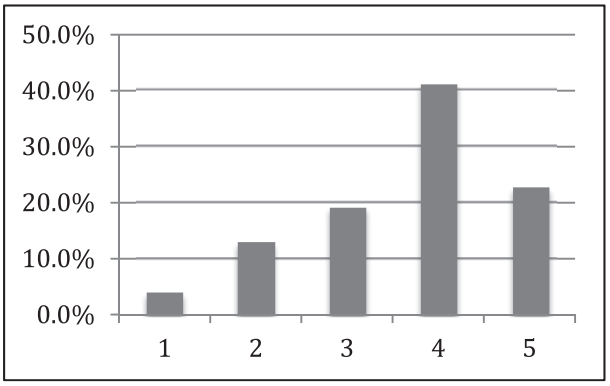
Figure 1. Graphical display of overall percentages (survey 1)

For the second survey (N=163), there were 93 instances of *strongly disagree*, 296 of *disagree*, 437 of *neither agree nor disagree*, 937 of *agree* and 519 instances of *strongly agree*. Based on 2,282 instances overall, these numbers result in 4.1%, 13%, 19.1%, 41.1%, 22.7%, respectively (see Table 3 for percentages and Figure 2 for graphical display).

Table 3

Overall frequencies and percentages (survey 2)

	strongly disagree	*disagree*	*neither agree/disagree*	*agree*	*strongly agree*
Instances (2,282 total)	93	296	437	937	519
% of Total	4.1%	13%	19.1%	41.1%	22.7%



(1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree)

Figure 2. Graphical display of overall percentages (survey 2)

Neutral option frequency: In addition to the overall change seen above, a further analysis was taken to determine how many subjects opted for the neutral option and how many times they did so. Here we see that of the 163 subjects who took the second survey—which included the neutral

option (*neither agree nor disagree*)—32 subjects did not opt for it at all. 25 subjects chose it 1 time; 36 did so 2 times; 21, 3 times; 23, 4 times; 9, 5 times; 6, 6 times; 3, 7 times; 3, 8 times; 1, 9 times; 1, 11 times and three subjects chose the neutral option 13 times (see Table 4 for neutral option frequency by number of subjects with percentages and Figure 3 for graphical display by numbers of subjects).

Table 4

Neutral option frequency by number of subjects with percentages (rounded up) (survey 2)

Neutral Option	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Students	32	25	36	21	23	9	6	3	3	1	0	1	0	3
% of N (163)	20%	15%	22%	13%	14%	6%	4%	2%	2%	1%	0%	1%	0%	2%

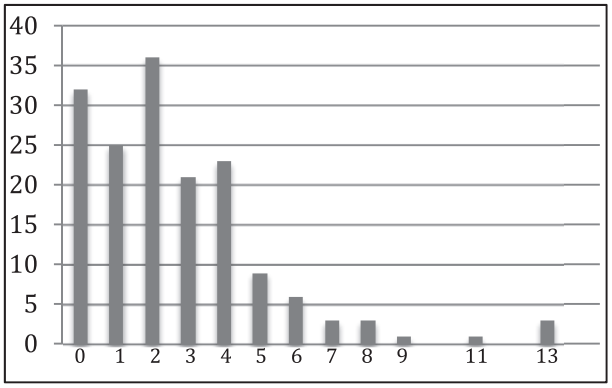


Figure 3. Graphical display of neutral option frequency by number of subjects (survey 2)

Percentages by school year: Finally, for frequencies and percentages, we looked at the percentage of neutral option instances by school year. It was determined that the 1st-year students represented 35 percent of all neutral option instances; 3st-year students represented 65 percent of all neutral option instances (percentages were rounded up; see Figure 4 for graphical display).

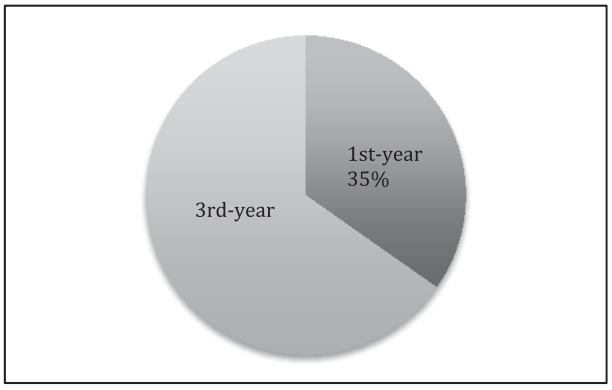


Figure 4. Percentage of neutral option instances by school year

Statistical analysis 1

For this analysis, the aim was to see what the ramification of including a neutral option would be in a statistically meaningful way. For this procedure, a crosstabulation was set up using a popular statistical package. First, the two surveys were compared to see if the inclusion of the neutral option in survey 2 would result in statistical differences for the 14 survey items when compared to the survey 1 (no neutral option). Responses from all subjects were included. Next, the subjects were divided into two groups (1st-year and 3rd-year students) and were compared within each survey to determine any changes resulting from the neutral option in survey 2.

When comparing the two surveys (all subject included), results from the 2-sided Fisher's exact test (the chi-square test was eschewed due to some cells having a count of less than 5) indicated that *all* survey items met the alpha for significance (.05).

For the next analysis, for survey 1, results from the 2-sided Fisher's exact test indicated that no items on the survey met the alpha for significance (.05). There was no statistically significant difference between 1st-year and 3rd-year students.

For survey 2, the same procedure was carried out. For this survey, only one item met the alpha for significance. The two groups displayed a difference only on survey item 3; the rest showed no difference.

As we can see, the addition of a neutral option in survey 2 resulted in only one survey question giving different results when comparing the two groups of students (see Table 5 for a comparison of statistical analyses).

Table 5

Comparison of statistical analyses

Survey Item	1	2	*3	4	5	6	7	8	9	10	11	12	13	14
Survey 1	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Survey 2	X	X	O	X	X	X	X	X	X	X	X	X	X	X

(O=significant; X=not significant; *survey effect observed)

Statistical analysis 2

For this analysis, the coded data from the surveys were treated as interval data by summing the 14 coded responses from each subject. An independent samples t-test was carried out to determine if the summed means of responses for each subject differed significantly between surveys. Next, an independent samples t-test was carried out to determine if the summed means of responses for each subject differed significantly between the 1st- and 3rd-year groups within each survey.

The independent samples t-test between surveys indicated that there was no significant difference. Again, the same test carried out for the two groups within each survey indicated that there was no significant difference between the two groups in either survey.

Discussion

In the following discussion, each of the three types of analyses will be addressed to determine if, in fact, the inclusion of a neutral option on the second English-interest survey had an effect on subject responses.

At first look, we can see that there was a 19 percent shift in preference to the neutral option. This shift seemed to come from both sides of the *disagree/agree* spectrum. In the initial study, which included English majors, the shift seemed to mainly come from the *disagree* side of the spectrum. It appears that when forced to choose, these non-English majors were more truly ambivalent in their attitudes than the English majors, who, when given the chance to neither agree nor disagree, were more likely to opt for the neutral choice as opposed to selecting a "negative" opinion.

When examining the actual frequency at which subjects opted for the neutral choice, we get a picture somewhat similar to last year's study (Miller & Levin, 2014) using the same analysis. Here we see a lower number of students, 20 percent (33 percent in the previous study), did not opt for the neutral choice at all. There were fewer subjects that seemed satisfied with their agreement or disagreement when looking only at non-English majors. Still, 57 percent of the subjects opted for the neutral option only two times or less. And as in the previous study, it also seems that we can identify at least four outliers: one subject accounted for a total of 11 shifts to the neutral option; three accounted for 39 (out of 437 instances).

When looking at the neutral option choice by school year, we see a difference that mirrors the actual percentages of 1st-and 3rd-year students taking part in the study: 35% and 65%. With this group of subjects, it would seem that year in school has no bearing on opinions toward English education as measured by this particular measure. This seems to confirm the results from last year's study that also grouped the non-English majors into one homogeneous group.

In the statistical analyses, it was confirmed that, indeed, the inclusion of the neutral choice on the second survey resulted in a statistically significant difference. This result was not surprising given the total number of instances recorded for the neutral option in the second survey. And given the homogeneity observed earlier, it could be expected that there would be no difference between the 1st- and 3rd-year students within each survey. As expected, the results from survey 1 showed no statistical difference on any of the survey items between the two groups. On the second survey, only one item showed a statistical difference. It seems that the inclusion of the neutral option had almost no effect on the results for the two groups. This confirms the uniformity of this group of subjects.

Finally, the analyses using the independent samples t-test confirmed, first, that there was no difference between the summed means of the two surveys. We can see here that the shift to the

neutral option came from both sides of the spectrum. Secondly, with the next group of t-tests, again, we see that school year has no bearing on the results.

With a sample size of 163 non-English majors, one limitation from last year's study was addressed. However, within this current study, there is still the limitation of too few female subjects taking part. Gender differences may exist even in a group of subjects comprised of non-English majors. It may be illuminating if future studies on this subject took this into account.

Conclusion

Regarding our original research question: will the inclusion of a neutral option (*neither agree nor disagree*) on a Likert-scale English-interest survey alter the results in a meaningful way, it seems that the answer is "yes." This finding in itself justifies the current study, because in the previous study, with a group comprised of both English majors and non-English majors, our results were both "yes" and "no."

There was clearly a difference between survey results when a neutral option was included. This difference resulted from the opinions given by a group comprised of only non-English majors from one Japanese university. As was concluded from the previous study, upon which this one is based, non-English majors appear more ambivalent toward English language education. Or in the larger scheme of things, this ambivalence confirms the initial recommendation from the previous study, which states that researchers need to seriously consider the relationship of their subjects to the survey items when deciding the type of Likert scale to employ. As was stated in the previous study, "the inclusion of a neutral option can be an easy out for students who don't wish to voice their opinions, but not including it can force an unintended/uninformed answer out of students who are truly neutral."

By comparing the studies from last year and this, we can really see this idea played out. When English majors were included, it seemed that they would rather voice a neutral opinion than a negative one. However, here, with this study, we can see that these non-English majors were more likely making unintended choices, swaying both positive and negative, because they lacked the option of an answer that reflected their true neutrality on the item in question.

With this study we were able to get a clear answer to our research question: scale size does indeed matter. Furthermore, we received strong confirmation of our earlier finding that in order to choose the proper scale size, researchers must think not only of their survey items, but of their survey subjects as well.

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Appendix

Bilingual Class Survey Questions

1 = 全く同意できない　2 = 同意できない　*3 = どちらともいえない　4 = 同意できる　5 = とても重要である
(1 = strongly disagree)　(2= disagree)　* (3= neither agree nor disagree)　(4 = agree)　(5 = strongly agree)

私が英語を勉強しているのは。。。
(I am taking English because. . .)

1. 英語圏の国に旅行したときに必要だから
   (I want to use English when I travel to an English-speaking region.)
   1 □　2 □　3 □　4 □　5 □
2. 自分の専門科目の必修として外国語を勉強する必要があるから
   (I need to study a foreign language as a requirement for my major.)
   1 □　2 □　3 □　4 □　5 □
3. 日本に滞在する英語話者と会話ができるようになりたいから
   (I want to be able to converse with English speakers in Japan.)
   1 □　2 □　3 □　4 □　5 □
4. イギリス、アメリカの文化、歴史、文学などに興味があるから
   (I am interested in English/American culture, history, or literature.)
   1 □　2 □　3 □　4 □　5 □
5. 自分の将来の職業に英語が役立つかもしれないから
   (I am interested in English/American culture, history, or literature.)
   1 □　2 □　3 □　4 □　5 □
6. 英語を話す友人や知り合いと共に英語を使えるようになりたいから
   (I want to be able to use it with English-speaking friends/acquaintances.)
   1 □　2 □　3 □　4 □　5 □
7. 外国語の必修科目として英語が必要だから
   (I need English to fulfill the foreign language requirement.)
   1 □　2 □　3 □　4 □　5 □
8. 日本語以外の言語も話せるようになりたいから
   (I want to be able to speak more languages than just Japanese.)
   1 □　2 □　3 □　4 □　5 □
9. 世界をより理解するために他文化について学びたいから
   (I want to learn about another culture to understand the world better.)
   1 □　2 □　3 □　4 □　5 □
10. 英語ができれば、より良い仕事につけるかもしれないから
   (English may make me a more qualified job candidate.)
   1 □　2 □　3 □　4 □　5 □
11. 外国語の学習はバランスのとれた教育の一環であると思うから
   (I think foreign language is part of a well-rounded education.)
   1 □　2 □　3 □　4 □　5 □
12. 英語は世界の中で重要な言語だと思うから
   (I feel that English is an important language in the world.)
   1 □　2 □　3 □　4 □　5 □
13. 英語の知識があれば、他者との競争に有利だと思うから
   (I feel that a knowledge of English will give me an edge in competing with others.)
   1 □　2 □　3 □　4 □　5 □
14. 英語のネイティブスピーカーとコミュニケーションがとりたいから
   (I want to communicate with native speakers of English.)
   1 □　2 □　3 □　4 □　5 □

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* *neither agree nor disagree* not included as an option in the first survey