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Derivation of Tourism Activity Ability and Study of Travel Promotion Effects for Elderly People

Ayako Sawada[1*] and Takashi Oyabu[2]

[1]Community and Culture Department, Hokuriku Gakuin Junior College, 11 Mitsukoji, Kanazawa 920-1396, Japan
[2]Nihonkai International Exchange Center, 2-31 Toiya, Kanazawa 920-0061, Japan

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The population of elderly people aged 70 and over is expected to continue to increase until around the year 2048 in Japan, and this population group is considered to be important for the domestic travel market. However, the number of overnight trips of the elderly is lower than the average. For the elderly to go on sightseeing trips without anxiety contributes to improving their well-being. The authors are carrying out research on travel promotion by deriving tourism activity ability. We define it as "the ability to enjoy sightseeing without being tired the next day at the destination". In this study, a sightseeing tour was conducted with 17 elderly people aged 65 and over as subjects. Principal component analysis was performed on the data measured as objective and subjective indices, and tourism activity ability was derived. A heart rate sensor was used as one of the objective indices. In addition, we conducted a questionnaire survey on changes in awareness of tourism by knowing one's own tourism activity ability. Although the results of the survey showed almost no statistically significant difference, the results indicated that targeting elderly people with health concerns may promote tourism trips.

1. Introduction

Owing to an estimated rapid aging of the world's population in the next half century, elderly people are expected to become the most important segment of the tourism industry in the future.(1) According to a Eurostat report,(2) regarding the European Union (EU) residents, "Tourists aged 65+ were more likely to make longer tourism trips, trips within their country of residence (domestic trips)". Japan's population peaked at 128.08 million in 2008 and has since entered a long-term process of population decline. However, the population of people over 65 years old was 34 million in 2015 and is estimated to increase until around 2042. According to the 2020 White Paper on Tourism,(3) travel spending in Japan in 2019, before the impact of COVID-19, was 27.9 trillion yen. Of this amount, consumption by foreign visitors to Japan was 4.8 trillion yen, accounting for only about 17% of the domestic travel market. Increasing the number of trips and days of travel by the elderly in Japan is an effective countermeasure to the

*Corresponding author: e-mail: sawada@hokurikugakuin.ac.jp
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shrinking domestic tourism market due to population decline and also contributes to the improvement of the well-being of the elderly.

According to the 2019 Travel and Tourism Consumption Trends Survey,[4] the average number of trips for sightseeing and recreation with overnight stays in Japan in 2019 was 2.23, which is above average for both men and women in their 60s. However, for those in their 70s, the number of trips decreased to 1.24 for men and 1.09 for women, and even less for those in their 80s. According to the 2019 edition of Tourism Facts and Intentions,[5] economic and time constraints tended to be the most common reasons for not making overnight sightseeing trips among Japanese people as a whole, whereas health reasons accounted for the highest percentage among those aged 70 and older. Concerns about physical health have been reported as a major barrier in the past in Japan and also in other countries. Fleischer and Pizam[6] found in a survey of Israelis that disincentives to travel change with age, with health reasons becoming more prominent among those over 65 years of age. Nyaupane *et al.*[7] reported in a survey of Americans that time and economic reasons were generally a factor for those under 59, while health reasons were a factor for those over 75. Also, regarding EU residents, 46% of those over 65 who did not travel reported that health reasons were an issue.[8]

Furthermore, a survey on elderly people's lifestyles and travel[9] reported that one of the major factors that reduce the number of trips for those aged 70 and older is the inability to keep pace with others and a strong desire not to cause trouble. If it is possible to objectively demonstrate the extent to which the elderly are able to engage in tourism activity, this could lead to greater confidence in their ability to travel. We have objectively demonstrated it using a heart rate sensor.

2. Purpose of This Study

Typical physical fitness measurements for the elderly include the measurement items and judgment criteria of the Ministry of Education, Culture, Sports, Science and Technology's "New Physical Fitness Test" for those aged 65–79 years in Japan. In addition, some studies[10] have been conducted to evaluate physical fitness in the elderly, not from the viewpoint of being fast, high, or strong, but more importantly whether they have sufficient physical abilities necessary for independent daily living, by measuring daily activities in which various physical fitness elements are comprehensively demonstrated and evaluating them as daily living activity ability. Thus, although there have been studies related to physical fitness and daily living activity ability among the elderly, few studies have attempted to derive such ability from walking and vital signs at tourist attractions. It is difficult to determine the extent to which a person is able to act with actual tourist attractions if only physical fitness and daily life activity ability are ascertained. In this study, we propose a new index of tourism activity ability to the conventional physical assessment index for the elderly, aiming to promote tourism trips.

This study has two purposes. One is to derive tourism activity ability. The other is to determine whether elderly people's understanding of their own tourism activity ability contributes to the promotion of sightseeing trips. It has been reported that elderly people walk more than usual at tourist destinations, leaving them tired the next day and unable to fully enjoy

the remaining part of the trip.[11] On the basis of this, we define tourism activity ability as "the ability to enjoy sightseeing without being tired the next day at the destination". The three hypotheses of this study are as follows.

(1) Compared with before the derivation of tourism activity ability, tourism motivation will develop after derivation.
(2) Compared with before the derivation of tourism activity ability, anxiety about traveling will be reduced after derivation.
(3) Compared with before the derivation of tourism activity ability, willingness to travel will increase after derivation

3. Derivation of Tourism Activity Ability

3.1 Fatigue due to tourism activity

Fatigue can be broadly classified into physical fatigue and mental fatigue, and most of the fatigue that people feel is a combination of both.[12] Many people feel mental fatigue in crowded or unsafe places, even in sightseeing activities. However, previous studies have reported that walking for 30 min improved the overall comfort level of the psychological state[13] and also the psychological benefits of walking, with negative emotions decreasing and positive emotions increasing after one hour of outdoor walking.[14] Therefore, it is considered that tourism activity in a safe and secure environment is perceived mainly as physical fatigue due to walking rather than mental fatigue.

Although not many studies have measured fatigue from sightseeing activities, Kudo *et al.*[15] developed a system for wheelchair users and the elderly, which makes use of a wearable device and a smartphone to suggest when to take a break on the basis of the user's heart rate, location, and temperature. Munemori *et al.*[16] are developing a system that uses a smartwatch and a smartphone to prompt a person to take a break when they are physically fatigued on the basis of heart rate, location, number of steps, and elevation. The system measures fatigue on the basis of heart rate and number of steps as objective indicators of fatigue.

3.2 Method of derivation

3.2.1 Subjects

The subjects were general homebound elderly people aged 65 years or older residing in Kanazawa City, Ishikawa Prefecture in Japan. Recruitment was conducted at a community center in Kanazawa City, and 21 people were asked to cooperate in 2019. Self-monitoring was conducted using an activity meter HJA-306 (Omron) to determine the amount of daily activity.[17] Prior to the self-monitoring, an explanatory meeting was held for the subjects, at which instructions on how to use the activity meter were given. The subjects' stride length was measured and personal settings were made along with their height, weight, date of birth, and gender. The personalized activity meters were distributed to the subjects, and the number of

steps taken per day and the amount of activity were measured by the subjects themselves during the month of October 2019.

An experimental tour was then scheduled to take place; however, some subjects withdrew due to poor health or other reasons while the tour was postponed due to COVID-19, leaving 17 subjects for analysis in this study. The breakdown included one male in his 60s, four in their 70s, and three in their 80s, with an average age of 76, and two females in their 60s, four in their 70s, and three in their 80s, with an average age of 74. The ages are as of October 1, 2021. This study was approved by the Research Ethics Review Committee of Hokuriku Gakuin University.

3.2.2 Outline of the experimental tour

An experimental tour was conducted at Kenrokuen Garden, which is designated as a special place of scenic beauty in Kanazawa City. Three courses were set up on the basis of the walking courses listed on the official page of Kenrokuen Garden, and a preliminary experimental tour was conducted.[18] The number of steps and the amount of activity were measured with an activity meter, and because the number of steps did not change significantly between the 60-min and 90-min courses, three guided tours were set up by extending the course distances as follows.

Course A: 40 min, 700 m (with no ups and downs)

Course B: 60 min, 1300 m (with some ups and downs)

Course C: 90 min, 2000m (with steep stairs)

The subjects participated in the three courses on different days, asking questions of the guides and taking pictures, just as regular travelers do. To observe the subjects, the study was conducted four times on each course between October and November 2021 in groups of a maximum of five people to prevent the group from becoming too large. Tour guides were briefed on the purpose of the study and asked to follow the route and time. A photograph of the experimental tour is shown in Fig. 1.

Fig. 1. (Color online) Experimental tour.

3.2.3 Experimental protocol

Heart rate, amount of activity, and number of steps were measured as objective indices to derive tourism activity ability. In addition, two types of fatigue surveys were conducted as subjective indices, as described below. The procedure is shown in Fig. 2. The subjects completed Fatigue Level Survey A at home on the morning of the day they participated in the experimental tour and the morning of the next day (from 30 min after waking up to eat breakfast). Fatigue Level Survey B was conducted immediately before and after the tour, and the subjects participated in the tour while wearing heart rate sensors and activity meters.

3.2.4 Measurement of heart rate and calculation of exercise intensity

A heart rate sensor WHS-3 (manufactured by Union Tool) was used to measure heart rate variability during participation in the experimental tour. Electrode pads were attached to the subjects. A photograph of this is shown in Fig. 3. The exercise intensity per minute was calculated from the one-minute average of the heart rate using Eq. (1).

$$HRR(\%) = \frac{C - R}{M - R} \times 100 \tag{1}$$

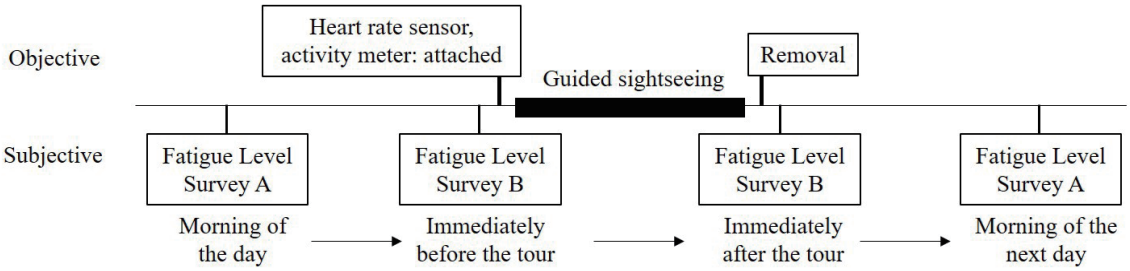

Fig. 2. Experimental procedure.

Fig. 3. (Color online) Heart rate sensor used for measurement.

Heart rate reserved (HRR) is the exercise intensity, C is the current heart rate, R is the resting heart rate, and M is the maximum heart rate. The maximum heart rate is generally obtained by subtracting the age from 220; however, it has been noted that it has a tendency to be estimated lower in the elderly, so it was calculated using Eq. (2), which solves this problem.[19]

$$M = 207 - \left(Age \times 0.7 \right) \tag{2}$$

The resting heart rate was calculated from the average value during the following 3 min after the participants sat on a chair in an indoor space by Kenrokuen Garden for 5 min before the start of the experimental tour in Course A. It has been pointed out that measuring a resting heart rate is difficult and unrepeatable because heart rates change with slight environmental changes and mental states.[19] In this study, the resting heart rate calculated by the aforementioned method was compared with the lowest heart rate before the start of the tour after the heart rate sensor was attached in Courses B and C. The results showed that for the resting heart rate in Course B or C, in some cases, the pre-tour heart rate was lower than the calculated resting heart rate. Honda[20] pointed out that it is necessary to check the variation of the resting heart rate over time and to consider at which point the heart rate should be considered the resting heart rate, rather than simply looking at the heart rate immediately before the start of work. In this study, the subjects wore the heart rate sensor for the first time when measuring their resting heart rate. Therefore, since the heart rate may have been higher due to tension, the lowest of the calculated resting heart rate and the heart rate before the tour of Course B or Course C were used as the resting heart rate.

An example of the measurement results is shown in Fig. 4. The subjects' resting heart rate was 85, and the HRR 30, 40, and 50% lines obtained from Eq. (1) are shown in the figure. Then, the number of HRR exceeding 40% was counted.

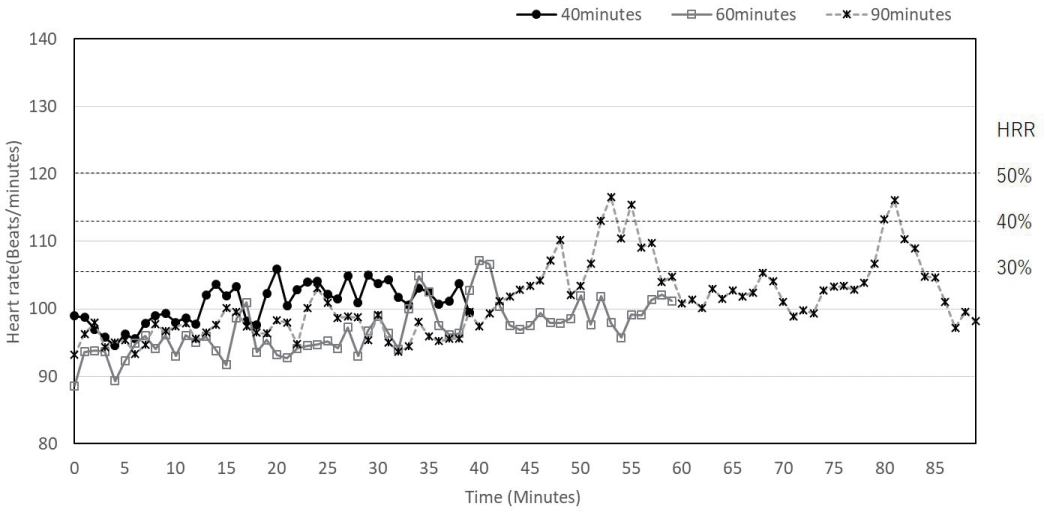

Fig. 4. (Color online) Example of heart rate measurement.

3.2.5 Measurement of activity and number of steps

Using the same activity meter used in the self-monitoring, we measured the amount of activity and the number of steps during the experimental tour. The amount of activity and number of steps during each tour were calculated on the basis of the difference between the values immediately before and immediately after the tour.

3.2.6 Subjective measurement of fatigue level

The Japanese version of the Multidimensional Fatigue Inventory (hereinafter referred to as "MFI")[21] was used as Fatigue Level Survey A in Fig. 2, and the Visual-analog Scale (hereinafter referred to as "VAS") was used as Fatigue Level Survey B.

The MFI consists of 20 items with five factors: "general tiredness", "physical tiredness", "decreased activity", "decreased motivation", and "mental tiredness". As mentioned earlier, it is considered that people feel mainly physically tired during tourism activities, so responses to four items of "physical tiredness" (physically able to do many things, physically very well, feeling physically able to do only a little, and feeling physically unwell) on a 5-point scale were included in the analysis.

The VAS was created as a scale for subjectively assessing pain intensity; however, it is also used to assess fatigue.[22] It consists of marking the degree of fatigue on a 100 mm horizontal line. MFI and VAS were performed before and after the tour, and the difference between the two was used to evaluate the degree of fatigue.

3.2.7 Statistical analysis method

Principal component analysis was performed by SPSS (ver. 25) on the data obtained in the experiment on the number of steps, amount of activity, the number of HRR exceeding 40%, MFI (physical fatigue), and VAS. There is a directly proportional relationship between the values of the Borg Scale,[23] a representative index of subjective exercise intensity, and heart rate. Forty percent of HRR is between "fairly light" (35.7%) and "somewhat hard" (50%) on the Borg Scale.[24] Arif *et al.*[25] defined the state of fatigue as the state of walking stability affected when HRR exceeded 60% due to bicycle pedaling exercise. However, the number exceeding 40% was used in this study because, during sightseeing activities, people basically move slowly while visiting objects and listening to explanations.

3.3 Results of derivation

The results of the principal component analysis are shown in Table 1. The signs of the factor loadings for the first and third principal components are partly negative. The signs of the factor loadings for the second principal component are all positive. Therefore, the second principal component is considered to represent "overall fatigue level" because the value of the second principal component increases as the values of all variables increase.

Table 1
Results of principal component analysis.

	First principal component	Second principal component	Third principal component
Amount of activity	0.933	0.095	0.190
Number of steps	0.930	0.237	0.050
HRR 40%	−0.325	0.718	0.006
VAS	0.107	0.481	−0.791
MFI (physical fatigue)	−0.224	0.567	0.610
Eigenvalue	1.90	1.13	1.04
Cumulative Explanation Rate	38.1	60.7	81.4

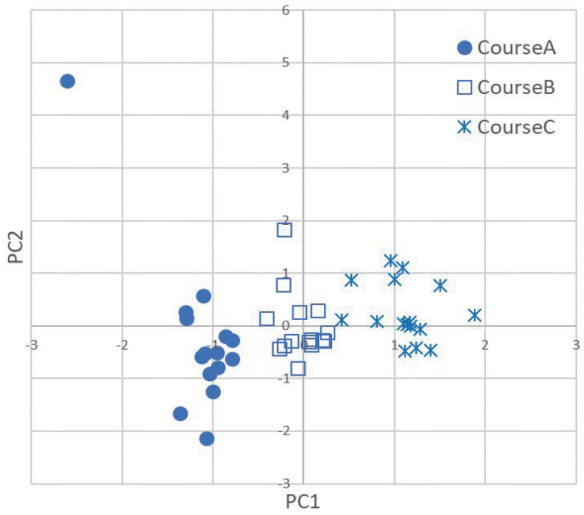

Fig. 5. (Color online) Scatter plot of principal component scores.

Figure 5 shows a scatter plot of the principal component scores. Focusing on the second principal component (vertical axis), we find that there are many negative values, i.e., cases of decreasing fatigue, in Course A. In Course B, there are many cases near zero, and in Course C, there are more positive cases, although the values are not large. The subjects often commented that they "felt refreshed", "had fun", and "were not tired at all", especially in Course A, which is generally consistent with the results of the second principal component scores.

In this study, the following four categories were used to classify tourism activity ability.

A: Able to participate without problems in a 90-min, 2.0 kilometer tour with ups and downs.
B: Able to participate without problems in a 60-min, 1.3 kilometer tour with some ups and downs.
C: Able to participate without problems in a 40-min, 700 meter tour with no ups and downs.
D: Problems participating in a 40-min, 700 meter tour with no ups and downs.

The subject with a second principal component score of 4.66 in Course A sat on the bench many times during the tour because she was tired. The number of times the HRR exceeded 40% was 36 of 40 min. This subject declined to participate in Courses B and C after participating in

Course A. The other subjects did not show any signs of fatigue during the tour, and the HRR exceeded 40% for one subject in the 40-min tour (4 min), four subjects in the 60-min tour (two subjects for 1 min, one subject for 3 min, and one subject for 4 min), and eight subjects in the 90-min tour (three subjects for 1 min, one subject for 2 min, two subjects for 3 min, one subject for 4 min, and one subject for 5 min). On the basis of the results of the second principal component scores and the condition during the tour, the subject with a second principal component score of 4.66 was given a D grade and the other subjects were given an A grade.

4. Tourism Promotion Effects

4.1 Survey method

To investigate the effects of tourism promotion, a 5-point questionnaire on tourism motivation, travel anxiety, and willingness to travel was administered prior to the experimental tours. After the completion of all experimental tours, the tourism activity ability was derived and the results were sent to the subjects. The following is a summary of the feedback provided to the subjects.

- Tourism activity ability (A–D grade)
- Number of steps and activity during the tour
- Change in heart rate during the tour (line graph)
- Change in VAS and MFI before and after the tour (line graph)

The graph of heart rate changes with lines for 30, 40, and 50% HRR according to the subject, accompanied by a subjective exercise intensity correspondence chart, showed the extent to which fatigue was expressed. In addition, one month of self-monitoring data for 2019 was also shown. It is considered that the number of steps and the amount of activity in daily life affect tourism activity ability. However, owing to the influence of COVID-19, the experimental tour was conducted two years later and too much time had elapsed, so this data is provided for reference only.

After this feedback, in addition to the same questionnaire items as before the experimental tour, a free-text questionnaire survey was conducted on the impressions of understanding the tourism activity ability and on the changes in the subjects' attitudes toward future sightseeing trips. The items related to tourism motives were created by combining general motives with motives specific to the elderly, referring to the awareness survey of the Japan Travel Bureau Foundation[26] and previous studies.[27,28] Items related to travel anxiety were based on the top four concerns about domestic overnight travel in the results of a questionnaire survey of elderly people aged 65 and older.[29]

4.2 Results of survey

Table 2 shows the results of the five-level evaluation of tourism motivation. The table shows the mean values of the 17 subjects before and after they grasped their own tourism activity ability. In addition, the table shows the results of the paired t-tests on whether there is a

Table 2
Results of questionnaire survey on motives for tourism.

Motivation to take an overnight trip in Japan ($N = 17$)	Before deriving tourism activity ability	After deriving tourism activity ability	Significance probability (both sides)
1. To seek out delicious food at travel destinations	4.059	3.882	0.455
2. To get away from everyday life	3.353	3.412	0.842
3. To create memories	3.882	3.706	0.422
4. For family friendship	3.471	3.824	0.138
5. For recreation and rest	3.412	3.529	0.579
6. To experience something beautiful	4.118	4.059	0.718
7. To be exposed to the unknown	3.882	3.882	1.000
8. To be impressed	4.118	4.059	0.718
9. To enjoy the company of friends	3.529	3.765	0.260
10. To deepen knowledge and education	3.588	3.412	0.484
11. To get to know the local people and their way of life	3.353	3.176	0.455
12. To visit memorable places	3.176	2.941	0.260
13. To improve health	2.882	3.294	0.030
14. To share experiences with other tourists	2.471	2.706	0.216
15. To reward oneself for a job or for all hard work accomplished	3.294	3.176	0.683
16. To go while healthy	4.412	4.176	0.163
17. To spend time with colleagues	2.765	2.765	1.000
18. To shop	2.941	2.882	0.750
19. To seek new friends	2.118	2.294	0.332
20. To visit a place of one's dreams	3.529	3.235	0.289

Notes: *t*-test; $*p < 0.05$. Totally disagree, 1; not really agree, 2; neither agree nor disagree, 3; somewhat agree, 4; totally agree, 5.

Table 3
Results of questionnaire survey on travel anxiety.

Anxiety about going on a domestic overnight trip (group) ($N = 17$)	Before deriving tourism activity ability	After deriving tourism activity ability	Significance probability (both sides)
21. Carrying luggage	2.765	2.824	0.750
22. Restroom breaks	2.882	2.765	0.579
23. Length of walking distance	2.529	2.235	0.206
24. Can behave the same as other participants	2.118	1.765	0.163

Notes: *t*-test; $*p < 0.05$. Totally unanxious, 1; not really anxious, 2; neither anxious nor unanxious, 3; somewhat anxious, 4; totally anxious, 5.

difference between the means before and after derivation. The numbers on the left side are the numbers of the question items. Only item 13, "To improve health", shows a significant increase.

Results regarding travel anxiety are shown in Table 3. The after-derivation values for item 22, "Restroom breaks", item 23, "Length of walking distance", and item 24, "Can behave the same as other participants", were lower than the before-derivation values, indicating a decrease in anxiety, but no significant differences were observed.

The results regarding willingness to travel are shown in Table 4. For item 31, "Want to take an overnight trip (individual) in Japan", the after-derivation value was higher than the before-

Table 4
Results of questionnaire survey on willingness to travel.

Willingness to travel ($N = 17$)	Before deriving tourism activity ability	After deriving tourism activity ability	Significance probability (both sides)
31. Want to take an overnight trip (individual) in Japan	3.412	3.706	0.415
32. Want to take an overnight trip (group) in Japan	3.235	3.235	1.000

Notes: *t*-test; $*p < 0.05$. Totally disagree, 1; not really agree, 2; neither agree nor disagree, 3; somewhat agree, 4; totally agree, 5.

Table 5
Impressions of understanding tourism activity ability and future changes in awareness.

No.	Subjects' comments	Affect
1	I have always wanted to go on a sightseeing trip, but have never been able to do so. But this time, I was able to take a sightseeing trip, and I thought, "If I take it slow, I can make it happen! I am now even more eager to go on a trip. I wanted to visit temples when the COVID-19 disaster was less severe. I thought that I need to walk more every day.	• Confidence • Increased motivation for tourism • Importance of walking
2	I usually do not walk, but the results of this tourism activity ability have given me confidence in my ability to walk. I would like to enjoy traveling as much as possible while I still have physical strength.	• Confidence • Increased motivation for tourism
3	I also felt relieved to know that I am still able to walk. It is a good opportunity for me to actively enjoy going out and traveling from now on.	• Confidence • Increased motivation for tourism
4	I play golf once a week, except during the winter months, so I am confident in my ability to walk. I felt there was nothing I would need to consider for future trips. It was very enjoyable and meaningful for me to participate in this event. I was able to look at my activity objectively. I would like to take positive action in the future. Thank you very much.	• Objective confirmation • Willingness to be proactive
5	I was happy or relieved to receive an overall grade of "A" for my tourism activity ability. Although I had already done one-off walking measurements, I am grateful for the organized data that was presented to me. I would like to make use of this valuable experience in my walking and volunteer tourism guiding.	• Objective confirmation • Willingness to be proactive

Notes: ⎽ Confidence, ▁ Increased motivation for tourism, ... Objective confirmation, ﹏ Willingness to be proactive, ... Importance of walking.

derivation value, indicating an increase in willingness, but there was no significant difference. There was no change in item 32, "Want to take an overnight trip (group) in Japan".

Table 5 summarizes the open-ended responses and their impact on the subjects regarding their impressions of understanding tourism activity ability and changes in their attitudes toward future tourism trips. Although there were no statistically significant differences in almost all items of motivation for tourism (Table 2), anxiety about travel (Table 3), and willingness to travel (Table 4), comment Nos. 1–3 suggest that understanding tourism activity ability leads to confidence and increases willingness to take a tourism trip. From comment Nos. 4 and 5, it can be seen that the subjects were motivated to be more active in the future. In addition, comment No. 1, regarding daily walking, indicates that the respondent was aware of the importance of walking.

5. Discussion of Tourism Promotion Effects

The results of the responses to the tourism motives showed a statistically significant difference only for "To improve health". This partially supported Hypothesis 1. On the other hand, no significant differences were found for anxiety about travel and willingness to travel. Therefore, Hypotheses 2 and 3 were not supported.

As a reason for the support of Hypothesis 1, "To improve health", it is possible that the subjects felt the importance of health promotion by participating in a sightseeing tour and objectively understanding their own tourism activity ability, and that they realized that their sightseeing activity leads to health promotion.

A possible reason for the lack of support for Hypothesis 2 could be due to the subjects' originally low anxiety. The before-derivation values in Table 3 are less than 3 for all items. For item 23, "Length of walking distance", there were eight subjects whose before-derivation responses were 3 or more (neither anxious nor unanxious, somewhat anxious, or totally anxious). The mean value of these eight subjects before the derivation was 3.5, and after the derivation, it was 2.875, a statistically significant difference (5% one-sided, $p = 0.047$) in the paired t-test.

One possible reason why Hypothesis 3 was not supported could be due to the subjects' originally high willingness to travel. The before-derivation values in Table 4 are above 3 for both individual and group travel. For item 31, "Want to take an overnight trip (individual) in Japan", there were six subjects whose before-derivation responses were less than 3 (totally disagree, not really agree, neither agree nor disagree). The mean of these six respondents before the derivation was 1.667, and after the derivation, it was 3.0. Although there was no statistically significant difference, the willingness to travel increased significantly.

Although there was little support for three hypotheses, the comments in the open-ended responses confirmed that elderly people's understanding of their own tourism activity ability leads to greater confidence and an increase in their willingness to travel. The elderly people who improved their confidence tended to have less travel anxiety (Table 3). The elderly people who were recognized to have increased willingness to travel tended to have a higher willingness to travel individually (Table 4). Furthermore, although the subjects in this study had relatively low anxiety and high willingness to travel, the results indicated that the hypotheses could be supported if the subjects had high anxiety or low willingness to travel. These results suggest that elderly people with health concerns may reduce their anxiety about travel and increase their willingness to travel by understanding their own tourism activity ability. To verify this effect, it is necessary to conduct an experimental tour in which elderly people who are not in good health can participate without anxiety, on the basis of the issues raised in this study. In the future, it will be necessary to consider the number of experimental tours and their locations, and to develop new experimental tour methods.

6. Conclusions

In this study, we defined tourism activity ability as "the ability to enjoy sightseeing without being tired the next day at the destination" and conducted a sightseeing tour with elderly people

aged 65 or older as subjects. Principal component analysis was conducted on the data measured as objective and subjective indices. A heart rate sensor was used as one of the objective indices. The tourism activity ability was derived in four levels.

In addition, we examined whether understanding one's own tourism activity ability contributes to the promotion of sightseeing tours. Although the results of the questionnaire survey showed almost no statistically significant difference, the results indicated that targeting elderly people with health concerns may promote tourism trips. In the future, we would like to develop new experimental tour methods so that elderly people who are not in good health can participate in tours with peace of mind and aim to improve the well-being of the elderly.

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