

An Empirical Study on the Effects of the Beach on Mood and Mental Health in Japan

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Abstract

The purpose of this study was to evaluate whether beach-going affects the mood and mental health of Japanese people, and to examine gender-based differences with regard to these effects of beach-going. We used a short version of Sakano et al.'s Mood Inventory to measure tension and excitement, fatigue, depressive, anxious, and refreshed moods; and the General Health Questionnaire (GHQ-12) to measure mental health. We randomly selected data from 180 people in Japan, including 104 males (57.8%), and 76 females (42.2%). Based on the participants' degree of enthusiasm for going to the beach, they were categorized into three groups: the high enthusiasm group, moderate enthusiasm group, and low enthusiasm group. The findings of this study showed that (1) a high degree of enthusiasm for beach-going had a greater significant effect on mood and mental health than did moderate and low degrees of enthusiasm for beach-going. There were vast differences in scores on the subscales assessing depressive mood, anxious mood, and refreshed mood, and the GHQ-12 scores, among the three groups, and (2) for males, the differences in the mood inventory and GHQ-12 scores among the high, moderate, and low enthusiasm groups were more pronounced and significant than they were for females. Although the females did not differ much in terms of the quality of their mood and mental health status, there was a slight difference among the three groups. These results suggest that especially for Japanese males, the beach has a great influence on improving mood and mental health.

Keywords: Beach environment; Mood; Mental health; Gender difference; Three varying degrees of enthusiasm for beach-going

Introduction

The World Health Organization (2001) has reported that "a quarter of individuals suffer from mental or behavioral disorders both in developed and developing countries". Until 2020, mental disorders will increasingly become the largest problem relating to ill health [1]. In Japan, Kawakami et al. [2] confirmed that both men and women were at great risk for developing mental health problems. Therefore, addressing the mental health problem is a socially relevant issue.

Previous studies that have investigated within-subject aspects have frequently shown that an environment with nature affects mood and mental health [3-5]. Pretty [6] conducted a study that involved systematically reviewing the literature on the effects of an environment with nature. The findings revealed that there are three levels of engagement with nature that contribute to mental health. These levels are viewing nature (referring to viewing nature through mediums such as a window and books), incidental exposure to nature (e.g., walking, reading amidst nature), and direct participation with nature (e.g., camping and farming). Furthermore, the prevalence of physical activity among the general population is a predictor of the mental health of the population. In other words, whether the overall levels of physical activity are consistently higher than the overall levels of non-activity plays an important role in mood and mental health, especially depression and anxiety [7-9].

The beach is a type of environment that is replete with nature's beauty; people enjoy relaxing beach scenes in terms of looking at the blue sea, running on the soft sand, and soaking up the sunshine. In addition to enjoying and admiring beach scenes, people also enjoy engaging in beach activities like boating, fishing, surfing, scuba diving, and other watersports. Ashbully et al. [10] reported that in Southwest England, approximately 15 families, which included 24 parents, reported a major improvement in health and wellbeing that was related to being in beach environments. The beachfront is recognized as a

nature environment that often exerts a positive effect on individuals from the viewpoint of improving their level of psychological health [11].

On the basis of these findings, this paper shows that investigating the effects of exposure to a beachfront provides an understanding of what influences the mood and mental health of Japanese people. Japan is an island country with many beaches. However, until now, the effects of manipulating geographical advantages to improve psychological health are unclear. It is assumed that beaches are required to improve mood and mental health to the greatest extent possible so that people can maintain a positive mood and mental health; therefore, maximizing the potential development of beach environments is important.

The present study investigated the hypothesis that a beach environment positively influences mood and mental health. Therefore, using data obtained by administering two questionnaires, a short version of Sakano et al.'s Mood Inventory and the General Health Questionnaire (GHQ-12), we investigated the factors influencing mood and mental health. We aimed to (1) examine how three degrees of enthusiasm (high, moderate, and low) for going to the beach have differing effects on mood and mental health status (basic attributes), and to (2) evaluate the three degrees of enthusiasm for going to the beach on the basis of gender, and investigate the association of these gender-based differences with mood and mental health (Figures 1-3).

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Methodology

Subjects

We administered the survey (between July and August 2014) to 180 people (104 males [57.8%] and 76 females [42.2%]), who were randomly selected from among people on Azur Maiko beach in Kobe, Japan. We explained the aim of the study to the participants. Further, the survey was anonymous, participation was voluntary, and the participants were given the right to withdraw their participation at any time. If the participants returned the completed questionnaire, it was considered as consent for their responses to be used in the study.

Questionnaire

In the present study, we analyzed data obtained from an anonymous, self-administered questionnaire survey on the effect of beaches on mood and mental health. The self-administered questionnaire included questions concerning socio-demographics (gender) and the degree of enthusiasm for going to the beach; the participants also had to complete a short version of Sakano et al.'s Mood Inventory and the GHQ-12 questionnaire.

The participants had to rate their degree of enthusiasm for going to the beach on a 5-point Likert scale (very enthusiastic, somewhat enthusiastic, neutral, not very enthusiastic, and not at all enthusiastic). On the basis of their responses, they were categorized into three groups: high enthusiasm group (very enthusiastic), moderate enthusiasm group (somewhat enthusiastic), and low enthusiasm group (neutral, not very enthusiastic, or not at all enthusiastic).

The original Mood Inventory by Sakano et al. [12] is a self-administered questionnaire designed to measure an individual's state of mood. The questionnaire has high reliability and validity. We used a short version of the original Mood Inventory developed by Sakano et al. Our short version had five subscales: tension and excitement, fatigue, depressive mood, anxious mood, and refreshed mood, and each subscale comprised three items. The participants had to indicate their responses by rating each item on a 4-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree). The score on each subscale was calculated by taking the mean of the item responses.

The General Health Questionnaire (GHQ) by Goldberg [13] is also a self-administered screening questionnaire designed for use in mental health consulting settings and aims to detect those with a diagnosable psychiatric disorder. For the measurement of mental health, we used the GHQ-12. The simplest version of the GHQ-12, which is a short version of the original GHQ-60, is a reliable and convenient self-rating questionnaire used to screen for minor psychiatric disorders. In this study, the GHQ-12 comprised twelve items. The participants were required to respond to each item on a 4-point Likert scale (1 = Strongly

Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree). The score of each subscale was calculated by taking the mean of the item responses.

To encourage all the participants to answer truthfully, we emphasized that their responses were anonymous, would be kept confidential, and would be analyzed collectively rather than individually. The participants were also told that there were no right or wrong answers to any of the items and that honest responses were of great importance. The privacy protection policy for personal and enrollment data was clearly stated in the questionnaire.

Statistical analysis

We excluded questionnaires with missing or incomplete data from our analysis. In our statistical analysis, we compared the inventory scores of the high enthusiasm, moderate enthusiasm, and low enthusiasm groups and also examined gender-based differences with regard to the effect of enthusiasm for going to the beach on the inventory scores.

We entered and analyzed the data using the Statistical Package for Social Sciences (SPSS, 2007) software. We conducted a one-way analysis of variance (ANOVA) and Tukey's HSD post-hoc analysis for multiple comparisons in order to summarize and interpret the descriptive data. Initially, descriptive analyses (Mean [M], Standard Error [SE], *p*-value [*p*]) were conducted to explore differences among the GHQ-12 and mood inventory subscale scores and to compare the scores of the high enthusiasm, moderate enthusiasm, and low enthusiasm groups. Furthermore, we also calculated the gender-based mean scores on the questionnaires and the prevalence of the degree of enthusiasm for going to the beach. We set the statistical significance at $p < 0.05$, $p < 0.01$.

Results

Degree of enthusiasm for going to the beach

Sixty-six participants (36.7%) were in the high enthusiasm group, 66 participants (36.7%) were in the moderate enthusiasm group, and 48 participants (26.6%) were in the low enthusiasm group.

The data in Table 1 show that there was a significant difference in increase ($p < 0.05$) in scores between the high and moderate enthusiasm groups only on the depressive mood subscale. With regard to scores on

the tension and excitement, fatigue, anxious, and refreshed mood subscales and on the GHQ-12, there were no significant differences with regard to variations in the participants' scores between the high and moderate enthusiasm groups. However, the mean scores on the fatigue ($M_1 = -0.152$), anxious mood ($M_1 = -0.106$), and the GHQ-12 ($M_1 = -0.141$) subscales showed an ascending trend, and the refreshed mood scores ($M_1 = 0.162$) showed a descending trend between the high and moderate enthusiasm groups; in other words, fatigue, anxiety, refreshed mood and mental health improved for those who had a high

Subscales	High-moderate			High-low			Moderate-low		
	M_1	SE_1	<i>p</i>	M_2	SE_2	<i>p</i>	M_3	SE_3	<i>p</i>
Tension and excitement	0.060	0.091	0.785	0.011	0.100	0.993	-0.050	0.010	0.874
Fatigue	-0.152	0.094	0.245	-0.110	0.103	0.534	0.042	0.103	0.913
Depressive mood	-0.237	0.093	*	-0.306	0.101	**	-0.069	0.101	0.775
Anxious mood	-0.106	0.112	0.609	-0.291	0.122	*	-0.185	0.122	0.284
Refreshed mood	0.162	0.124	0.396	0.417	0.135	**	0.255	0.135	0.146
GHQ-12	-0.141	0.061	0.054	0.236	0.067	**	0.094	0.067	0.334

* $p < 0.05$, ** $p < 0.01$ $M_1 = M$ (high) – M (moderate) $M_2 = M$ (high) – M (low)

$M_3 = M$ (moderate) – M (low)

Table 1: Three varying degrees of enthusiasm for beach going Means, SE, and *p*-values from the ANOVA and Turkey HSD post-hoc analysis.

degree of enthusiasm for going to the beach and worsened in the case of those who had a low degree of enthusiasm for going to the beach. This suggests that a high degree of enthusiasm for going to the beach had a greater influence on participants' moods and mental health than did a moderate degree of enthusiasm for going to the beach.

Moreover, by analyzing the scores of the high enthusiasm and low enthusiasm groups, we found that depressive mood, refreshed mood and GHQ-12 scores had strong significant effects ($p < 0.01$), and anxious mood had a significant effect ($p < 0.05$). No significant effects were found with regard to tension and excitement ($p < 0.993$), and fatigue ($p = 0.534$). These findings suggest that the effects of a high degree of enthusiasm for going to the beach on the participants' mood and mental health were more pronounced than the effects of a low degree of enthusiasm for going to the beach. Furthermore, the effects of going to the beach on the depressive mood, anxious mood, and refreshed mood subscale scores and the GHQ-12 scores were the most pronounced in the case of the high, moderate, and low enthusiasm groups.

On the mood inventory and GHQ-12, there was no significant difference in scores between the moderate and low enthusiasm groups. However, anxious mood ($M_3 = -0.185$) and refreshed mood ($M_3 = 0.255$) had small numerical values; for tension and excitement ($M_3 = -0.050$), depressive mood ($M_3 = -0.069$), and the GHQ-12 ($M_3 = 0.094$), somewhat moderate numerical values were obtained in the case of the moderate and low enthusiasm groups.

It is important to note that there was a tendency for the average mood and mental health scores to improve as the degree of enthusiasm for going to the beach increased. Specifically, from among all the subscales, vast differences in scores were obtained on the depressive mood, anxious mood, refreshed mood and GHQ-12.

Degree of enthusiasm for going to the beach and gender

The overall proportion of the three groups with varying degrees of enthusiasm for going to the beach in the case of the 104 males was as follows: There were 31 participants in the high enthusiasm group, 44 participants in the moderate enthusiasm group, and 29 participants in the low enthusiasm group. For the 76 females, there were 35 participants in the high enthusiasm group, 22 participants in the moderate enthusiasm group, and 19 participants in the low enthusiasm group.

Tables 2 and 3 present the results pertaining to the association between gender and moods/mental health, and gender along with the effects of the gender-based differences in three levels of enthusiasm for going to the beach on mood and mental health. In the case of men, there were strong significant differences ($p < 0.01$) on fatigue, depressive mood, refreshed mood, GHQ-12 scores, and significant difference ($p < 0.05$) on anxious mood subscale. With regard to the mean tension and excitement ($p = 0.097$) was no significant difference. Furthermore, there were significant differences ($p < 0.05$) with regard to the effects of enthusiasm for going to the beach on fatigue, anxious mood, refreshed mood, GHQ-12 scores, and the depressive mood ($p < 0.01$) between the high and moderate enthusiasm groups. There was a greater effect of enthusiasm for going to the beach for refreshed mood and GHQ-12 scores in the case of the high-low enthusiasm group ($p < 0.01$) compared to the high-moderate enthusiasm group ($p < 0.05$).

For women, the only significant differences ($p < 0.05$) were with regard to the depressive mood and anxious mood subscales. With regard to the tension and excitement ($p = 0.072$), fatigue ($p = 0.586$), refreshed mood ($p = 0.640$), and GHQ-12 ($p = 0.676$) were no significant differences. Moreover, there were only significant differences ($p < 0.05$) on the depressive mood between the high and low enthusiasm groups,

Subscales	Males		Females	
	F	p	F	p
Tension and excitement	2.409	0.097	2.702	0.072
Fatigue	5.653	**	0.537	0.586
Depressive mood	7.617	**	2.943	*
Anxious mood	3.291	*	3.670	*
Refreshed mood	6.253	**	0.448	0.640
GHQ-12	9.551	**	0.393	0.676

* $p < 0.05$, ** $p < 0.01$

Table 2: Associations between gender and moods/mental health.

	Subscales	High-moderate			High-low			Moderate-low		
		M_1	SE_1	p	M_2	SE_2	p	M_3	SE_3	p
Males	Tension and excitement	0.048	0.147	0.944	0.328	0.154	0.089	0.281	0.169	0.226
	Fatigue	-0.498	0.148	*	-0.157	0.155	0.573	0.341	0.171	0.121
	Depressive mood	-0.533	0.137	**	-0.247	0.143	0.205	0.289	0.158	0.172
	Anxious mood	-0.454	0.180	*	-0.257	0.189	0.365	0.197	0.207	0.610
	Refreshed mood	0.408	0.207	*	0.762	0.217	**	0.424	0.238	0.183
Females	GHQ-12	-0.417	0.964	*	-0.416	0.101	**	-0.141	0.111	0.418
	Tension and excitement	-0.017	0.115	0.988	-0.260	0.127	0.108	-0.243	0.118	0.103
	Fatigue	0.093	0.122	0.727	-0.025	0.134	0.981	-0.118	0.124	0.610
	Depressive mood	-0.034	0.126	0.961	-0.303	0.130	*	-0.269	0.129	0.096
	Anxious mood	0.112	0.143	0.713	-0.280	0.158	0.182	-0.392	0.146	*
	Refreshed mood	0.013	0.156	0.996	0.145	0.172	0.677	0.132	0.160	0.688
	GHQ-12	0.028	0.077	0.927	-0.041	0.084	0.879	-0.692	0.078	0.650

* $p < 0.05$, ** $p < 0.01$ $M_1 = M(\text{high}) - M(\text{moderate})$ $M_2 = M(\text{high}) - M(\text{low})$

$M_3 = M(\text{moderate}) - M(\text{low})$

Table 3: Three varying degrees of enthusiasm for beach going and males/females Means, SE, and P-values from the ANOVA and Turkey HSD post-hoc analysis.

and the anxious mood between the moderate and low enthusiasm groups. The analysis of the scores in the high-moderate, high-low, and moderate-low enthusiasm groups revealed no significant differences for tension and excitement, fatigue, refreshed mood, and GHQ-12 scores. However, the changes in scores for tension and excitement, fatigue, and GHQ-12 showed an ascending trend, and the changes in scores on refreshed mood showed a descending trend as the degree of enthusiasm decreased (indicating higher enthusiasm for going to the beach had a positive impact on tension and excitement, fatigue, refreshed mood, and the GHQ-12 scores).

The above results show that the degree of enthusiasm for going to the beach affected males' mood and mental health much more than it affected females' mood and mental health. In the case of depressive mood and anxious mood, for males and females from all the three groups, enthusiasm for going to the beach had a significant effect. This survey suggests that a beach environment results in improving mood and mental health in men more than it does in women.

Discussion

The impact of a beach environment on mood and mental health

In this study, we categorized the participants into three groups (low enthusiasm group, moderate enthusiasm group, and high enthusiasm group) based on their enthusiasm for going to the beach. We compared the mood inventory and GHQ-12 questionnaire scores of the participants from all the three groups. The statistical analysis showed that there was the greatest difference between the minimum and maximum values of the mood and mental health scores in the case of the groups with high and low enthusiasm for going to the beach, and there was only a slight difference between the high and moderate enthusiasm groups, and moderate and low enthusiasm groups. The high enthusiasm group differed significantly with regard to its good or bad mood rating and mental health-related items; the participants with high enthusiasm for going to the beach showed improved mood and mental health. In addition, the groups with a lower enthusiasm for going to the beach rated themselves as significantly weaker than did the high enthusiasm group, on the depressive mood, anxious mood, and refreshed mood subscales as well as the GHQ-12. There was no difference between the low, moderate, and high enthusiasm groups with regard to fatigue, and tension and excitement subscale scores (Figure 1)

These results indicate that beach-going frequency should predict the actual mood and mental health status of Japanese people. The

beach environment significantly improved the mental health and moods (depressed, anxious, and refreshed) of Japanese people. The improvement in mood after exposure to beach environments was higher than the improvement in mood after exposure to non-beach environments. However, there are subtle moods such as tension and excitement and fatigue, which did not improve mood scores in the three groups impacted by the beach in this short-term study. People in a pleasant environment tend to be in a better mood and recall happier personal memories; they are also more optimistic, have better mental health, and exercise more. The elements of a beach scene, namely, the pleasant blue sea, soft sand, and warm sunshine can reduce feelings of depression and anxiety, and enhance the feeling of being refreshed. Many studies have shown that physical activities have been promoted as a method for improving mood and mental health in individuals [14,15]. Beach activities such as swimming, surfing, and boating are extremely popular among many people. Many people go to the beach to play beach sports, and this may be one of the reasons that people with a higher level of enthusiasm for going to the beach have a better mood and mental health than those who have a lower level of enthusiasm. In this study, it has been confirmed that a beach environment enhances mental health benefits, and helps reduce the intensity of poor moods. The improved mood and enhanced mental health experienced by Japanese people, on account of going to the beach has the potential to produce additional psychological and behavioral changes that may further enhance a feeling of well-being.

Relationship between beach environment and gender-based mood and mental health

In particular, we also observed significant gender-based differences in the prevalence of mood status and GHQ-12 scores among the three groups with varying degrees of enthusiasm for going to the beach. The male-to-female ratio of the prevalence of mood and mental health status was significant and high. In the case of the two questionnaires administered to 180 general participants in Japan, for the males, the low enthusiasm, moderate enthusiasm, and high enthusiasm groups showed a greater difference in terms of fatigue, depressive mood, anxious mood, refreshed mood, and GHQ-12 scores (Figure 2). In the case of women, only depressive mood and anxious mood scores were significantly different across the three groups (Figure 3). This finding suggests that male Japanese people tend to have a more positive mood and better mental health, which were influenced by the beach environment, compared to the case of females in the Japanese general population.

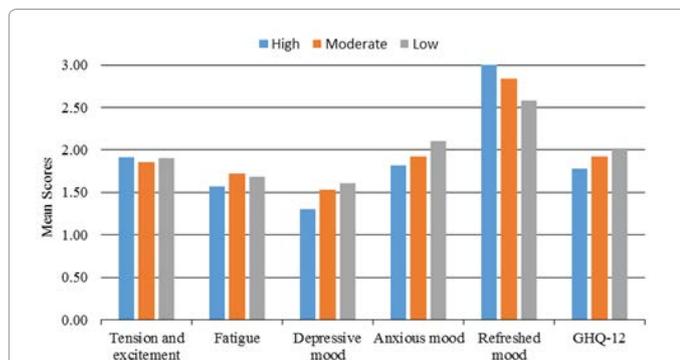


Figure 1: Mean scores for moods and mental health influenced by the three degrees of enthusiasm for going to the beach.

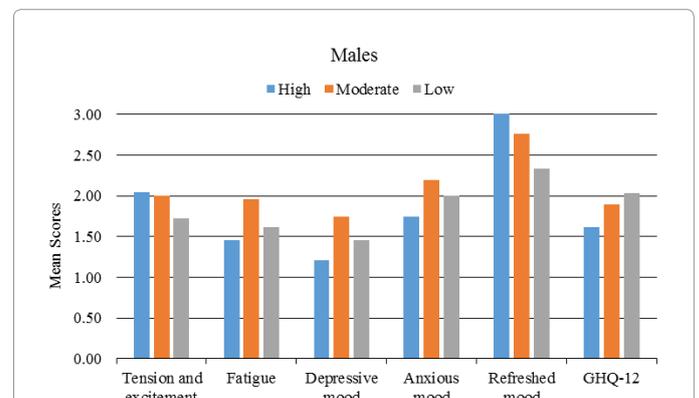
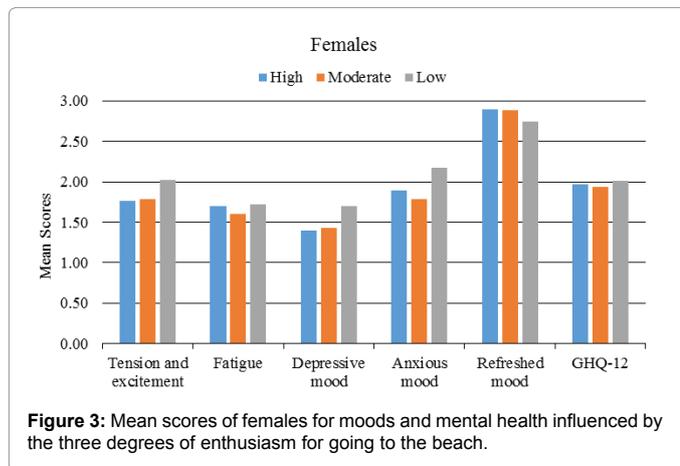


Figure 2: Mean scores of males for moods and mental health influenced by the three degrees of enthusiasm for going to the beach.



The main finding of this study was that a beach environment could improve males' mood and mental health across the three groups much more than it could in the case of the females. For men, going to the beach significantly generated a better mood, reduced feelings of fatigue and depression, and enhanced a refreshed mood and mental health performance. For the women, going to the beach only significantly lowered depressive and anxious mood scores. These results suggest that special attention should be paid to the fact that going to a beach does not greatly influence the mood and mental health of Japanese females. This finding that beach-going seldom improves females' mood and mental health may be due to several factors.

First, the fact that a large number of women are full-time housewives in Japan who are busy raising children, doing housework and so on, may result in a decline in women's mood. The lack of a significant effect of the beach environment on females was probably due to the fact that among the female beach-goers, the ratio of those who outsourced their housework was high. Further, some factors like fatigue, irritability, and weight gain can be attributed to quality of life problems. Women who go to beaches and those who do not face considerable conflict and stress with regard to caring for their families and are unable to relax and enjoy being at the beach for an entire day. In conclusion, a comparison of the stress and mental health disorder ratings of females with those of males suggests that the moods and mental health of females tend to be poorer. That is, females find it difficult to unwind and let go even when on a scenic and beautiful beach.

Second, women dislike the sun's ultraviolet rays, and to avoid the same, they prefer to stay at home rather than go to the beach. As was found in this study, beach-going produced no consistent adverse mood or mental health effects in the case of women. Unlike women, men do not mind the sun's ultraviolet rays, and they enjoy going to the beach rather than staying at home or working at their office.

Third, for men, the effect of the beach on moods and mental health were more positive than they were for women, and this difference was largely due to the fact that the men engaged in more beach activities such as fishing, swimming, and surfing, which improved their mental health and released their stress. Men who enjoyed engaging in different types of beach activities had better scores with regard to depression, fatigue, and confusion-related factors, as well as mental health. When women who did not engage in beach activities were compared to their male counterparts, it was found that beach-going had a smaller effect on moods and mental health in the case of the former; however, the women had significant depression and anxious scores. This finding

suggests that men and women need to engage in more beach activities.

Unlike the men in this study, the women in the three groups did not show a significant difference with regard to mood and mental health. However, a tendency was revealed for the women's mood and mental health scores to change (indicating good mood and mental health) once at the beach. Therefore, both men and women enjoy the beach environment when they go to the beach.

Conclusion

In this study, we measured and evaluated the effects of the beach environment on the mood of 180 Japanese people by using a short version of the Mood Inventory, and on their mental health by using the GHQ-12 questionnaire. The participants were beach-goers on Azur Maiko beach, Kobe, Japan. Moreover, we divided the males and females into three groups, each group having a different degree of enthusiasm for going to the beach, and we assessed all the participants' mood and mental health. We found a significant gender difference with regard to the effects of the beach environment on mood and mental health. Our results were as follows.

1. From among the three degrees of enthusiasm for going to a beach, a high degree of enthusiasm had the strongest significant effect on mood and mental health. In particular, the subscales measuring depressive mood, anxious mood, and refreshed mood, and the GHQ-12 showed that there were vast differences in scores among the three groups with varying degrees of enthusiasm. Therefore, it can be considered that the beach environment improves the mood and mental health of Japanese people.

2. The findings also indicate that in both men and women, the beach environment has a positive influence on mood and mental health. Furthermore, in men, there was a significant difference with regard to the mood inventory and GHQ-12 scores among the high, moderate, and low enthusiasm groups. Among the women, the difference among the three groups with regard to mood and mental health status was slight and almost not significant.

The issues and limitations of the present study should be addressed in future research. As the participants were categorized into three groups, the number of participants in each group was small. Moreover, the degree of enthusiasm for going to the beach was an ambiguous, self-reported measure, and additional tests should be used to complement the self-reported measures. Further, additional comparisons based on factors such as age should be conducted, to determine whether the beach environment influences mood and mental health on the basis of age. Further testing including a broader range of factors related to beach-going would also be helpful to determine if beach-going has creative, distinctive effects on other factors. Further studies need to be done to compare more factors that are affected by the beach environment.

As mentioned earlier, we believe that our results are highly significant and will provide a good reference point for studying the impact of the beach environment on mood and mental health in Japan. However, we will need to develop and encourage beach-going in a way that is trustworthy and such that positive moods and mental health are promoted.

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