The therapeutic effect of taking in the atmosphere of a forest

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Abstract — The concept of “Taking in the atmosphere of a Forest” (shinrin-yoku, in Japanese) was proposed in 1982 by the Japanese Forestry Agency to help people to relax and revitalize their body and soul (therapeutic effect). Previously, the therapeutic effect had been based on only empirical evidence. However, thanks to the rapid improvement of measurement technology and equipment, the government has been scientifically examining the therapeutic effect of forests and using the resulting data for the benefit of the public. The effect is thought to differ depending on the kinds of trees, the spatial structure and the specific atmosphere of the forest environment. Therefore, we decided to study the therapeutic effect of two old-growth forests. As a control, we selected a well-maintained artificial forest. We measured and compared the therapeutic effect on the subjects, paying attention to 1) their impression of the forest space and 2) how their feeling changed after walking through each forest. Consequently, we found that subjects considered the old-growth forests with huge trees as more sacred, more comfortable, more serene and more natural than the control forest. Moreover, in the control forest there was no difference in any of the indicators used in the survey, while in the old-growth forests the therapeutic effect was confirmed by several indicators.

Index Terms — Profile of mood states, Semantic differential method, Taking in the atmosphere of the forest (Sinrin-yoku), Therapeutic effect

1 Introduction

It is often said many people living in cities feel stressed for various reasons, lose their sense of the seasons, and lack sufficient physical activity. The concept of “Taking in the atmosphere of a forest” (shinrin-yoku in Japanese) was proposed in 1982 by the Japanese Forestry Agency to help people to relax and revitalize their body and soul [1]. In Japan, many people visit forests every year to alleviate stress, to feel refreshed or to improve their health, and have high expectations for the effect of shinrin-yoku.

Previously, the therapeutic effect of Shinrin-yoku had been based on only empirical evidence. However, due to the rapid improvement of measurement technology and equipment, the government and some universities have been examining it scientifically by physiological or psychological methods, and using the resulting data for the benefit of the public [2], [3], [4].

The therapeutic effect is thought to differ depending on the kinds of trees, the spatial structure and the specific atmosphere of the forest environment [5]. Against this backdrop, research was conducted on two old-growth forests and one control forest, for the following purposes: 1) to reveal the distinguishing features of the psychological effects of taking in the atmosphere of an old-growth forest, and 2) to examine the relationships among shinrin-yoku effect, spatial impressions, and forest environment.
2 Material and Methods

2.1 Study sites

We chose two old-growth forests as study sites (Fig. 1). The first is a forest in Koya Town, Wakayama Prefecture owned by a temple, consisting mainly of Japanese cedars 250 years old or older. Located on Koya Mountain, it was planted by Kukai in 816 and has been managed by Kongobuji Temple, the head temple of the Shingon sect of Buddhism (Fig. 2). The second is the Akazawa Recreation Forest in Agematsu Town, Nagano Prefecture, which consists of around 300-year-old Japanese cypresses, giving the illusion of a virgin forest with a mysterious atmosphere (Fig. 3).

As a control, we selected a well-maintained artificial forest in Gero City, Gifu Prefecture of Japanese cedars and cypresses planted about 50 years ago (Fig. 4). We measured and compared the effects on the subjects, paying attention to 1) their impression of the forest space and 2) how their feeling changed after walking through a forest.
2.2 Subjects

The subjects were 12 male university students aged from 20 to 24 in each study area. They were 36 subjects in total (Table 1).

2.3 Experiment method

After strolling in the forest for 15 minutes, the Semantic Differential Method (SDM) and Profile Of Mood Status (POMS) were used to learn 1) the subjects’ impression of the forest space (SDM) and 2) how their feeling changed after walking through the forest (Fig. 6).

3 Analytical results

3.1 Analysis of shinrin-yoku results

There was no significant difference in shinrin-yoku effects between the two old-growth forests. But compared with the control forest, vitality significantly increased in the old-growth forests. The old-growth forests also showed a significant reduction of tension and anxiety (Table 2).

3.2 Analysis of physical environment

The old-growth forests had fewer trees and less basal area at breast height, meaning that the views were less cluttered. They also had a higher relative light intensity than the control forest, meaning that their light environment had a more soothing effect (Table 3).
3.3 Evaluations of forest impressions

There was no significant difference between the two old-growth forests. However, compared to the control forest, SD criteria for the old-growth forests showed highly significant differences in naturalness, beauty, sense of spirituality, soothing ability, and wholesomeness (Table 4).

3.4 Analysis of differences in impressions

Four factor axes were obtained as a result of the factor analysis (Table 5): Comfort-aesthetics (Axis I), Mystique (Axis II), Understandability (Axis III), and Gentle coolness (Axis IV).

For the control forest, all factor scores of all criteria occurred within the negative range of at least one negative factor axis (Fig. 6). For the old-growth forests, numerous criteria were located within the positive ranges of both Comfort-aesthetics (Axis I; x-axis) and Gentle coolness (Axis IV; y-axis).
4 Discussion

4.1 Characterizing the psychological results of shinrin-yoku in old-growth forests

According to the analytical results (Table 2), taking in the atmosphere of an old-growth forest significantly increased the vitality criterion compared with the control forest. Furthermore, tension and anxiety were reduced, albeit at a low level of significance. However, because there was no significant difference in the values for tension and anxiety between the control forest and old-growth forests after the walks, it appears that before walking in an old-growth forest, subjects felt neither tense nor uneasy.

4.2 Understanding the interrelationship among shinrin-yoku effect, spatial impression, and forest environment

According to the analytical results, the old-growth forests had a much better viewing environment, and more soothing light conditions, than did the control (Table 3), and gave better feelings of spirituality, naturalness, and calmness (Table 4). Differences in impressions were especially reflected in the increase in vitality (Table 2).

According to the analytical results (Tables 5, 6), the distinctive spatial structure of the old-growth forests gave subjects greater impressions of comfort, beauty, gentleness, and coolness than did the control (50-year-old) forest, and may have helped to relieve the emotional tensions, anxieties, feelings of suppression, melancholy, and fatigue of forest walkers and increase their vitality.

Conclusion

In conclusion, the psychological investigation in the present study has proved the therapeutic effect of taking in the atmosphere of a forest (especially old-growth forest) environment (shinrin-yoku). As the psychological effect suggested, on-demand-shinrin-yoku will likely help to decrease the incidence of stress-related illness. Hence, much more research will be required about how shinrin-yoku and forest environments help to promote human health and well-being.

References


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