

Article

Public Visual Preference for Dead Wood in Different Types of Landscape

Ling Qiu [†] , Na Yu [†], Yanan Gao [†], Tian Zhang and Tian Gao ^{*} 

College of Landscape Architecture and Arts, Northwest A&F University, Xianyang 712100, China; qiu.ling@nwsuaf.edu.cn (L.Q.); yn429602@nwsuaf.edu.cn (N.Y.); 18883372829@163.com (Y.G.); 2010263@tongji.edu.cn (T.Z.)

* Correspondence: tian.gao@nwsuaf.edu.cn; Tel.: +86-029-8708-2997

† These authors contributed equally to this work.

Abstract: Although dead wood is considered to be one of the most reliable indicators for measuring the level of biodiversity, it was still seemingly unpopular with the public. In order to identify the public's preferences for dead wood and explore the driving factors for it, this study investigated academic-related group and layman group preferences for a variety of forms of dead wood in different types of environment through the use of questionnaire surveys. The results showed: (a) The participants preferred the urban natural environments with dead wood, especially the layman group; (b) the existence of dead wood in semi-open/semi-closed green space and blue space was most likely to be appreciated; (c) the participants most liked the dead wood with a peculiar shape in the semi-open/semi-closed and the closed green space, and a regular shape in the open green space; (d) the information of landscape appreciation had the greatest positive influence on public's dead wood preference, followed by the information of recreational facility and ecological education, and the information of "leading the way" was the least; (e) the present findings serve to provide a practical guidance for future optimal planning of urban environments from urban biodiversity and human recreation aspects.

Keywords: dead wood; ecological aesthetics; photo elicitation; acceptability



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1. Introduction

Landscape is an area perceived by people whose character is the results of the action and interaction of natural and/or human factors ([1–3] and the European Landscape Convention (ELC)). Different landscape elements can stimulate spontaneous aesthetic satisfaction in people [4] and then influence public landscape preference.

Forest is an indispensable part of landscape for human life, often containing different forms and decay stages of dead wood [5]. Dead wood refers to dry wood or downed logs formed as a result of competitive exclusion, aging, death, and interference of natural climate factors or the influence of human activities in the course of the growth of trees [6,7]. Early studies on public preference for dead wood mainly focused on an aesthetic assessment of forest. Dead wood was usually considered as a "messy" element [8,9] and even a safety hazard due to the collapsing of wood and potential fires, [10,11] influencing the aesthetic and recreational values of forests and then the landscape quality [12–14]. In the study of Fröhlich [15], it was shown that there were no downed logs, and only 4% of dry woods distributed among the 488 randomly selected urban green spaces of Krakow, Poland. It can be deduced that dead wood resources were limited and people in charge of the parks in Krakow disliked dead wood [16]. Moreover, several studies showed that dead wood was not popular with the public as well [17–21].

However, dead wood is considered to be one of the most reliable indicators for measuring the level of biodiversity and naturalness of habitat [22,23]. Furthermore, dead wood plays an important role in ecosystem function, including maintaining the integrity

of the forest ecosystem structure, ecosystem-related biotic and abiotic processes, affecting ecosystem nutrient cycling, carbon sequestration, and biodiversity conservation through physical and biological actions [24,25].

With the infiltration of ecological aesthetic consciousness, the public has increasingly become concerned with the dynamic changes and ecological functions of dead wood, which could influence its landscape perceptions and preferences [9,26]. Nowadays, increasing the appropriate amount of dead wood has become a clear and unified political requirement for forest planning in Europe [27]. In the study of forest landscape preference in southern Norway, Gundersen [28] found that the public's preferences for dead wood increased when they were given information concerning the ecological function of dead wood, but did not increase when given additional information of the economic or social aspects (e.g., the different means of management) [29]. This could have implications for public education and for landscape design and management, but more empirical research is needed to confirm previous findings.

Moreover, the preference studies of dead wood in the natural/rural forests have primarily been conducted in Europe and North America, including areas such as Finland, Norway, Sweden, the United Kingdom, Canada, and the USA in order to explore the impact of forest management on visual experiences of visitors [30,31]. Few dead wood studies are employed in other types of environment outside of those countries, and the relevant knowledge of dead wood's attributes such as form, shape, and quantity influence the public's perceptions and preferences are also seldom [15].

The overall aim of the study was thus to identify the public's perceptions of and preferences for dead wood in the different types of environment of China and compare opinions on which type of dead wood improved. The analyses focused on the following research questions:

1. Do people like the different types of environment with dead wood in China?
2. In which types of environment is dead wood more acceptable to the public?
3. Which form of dead wood is more preferred by the public in the different types of environment?
4. Are people's preferences for dead wood influenced by additional information of function?
5. Are people's preferences for dead wood influenced by academic backgrounds?

2. Materials and Methods







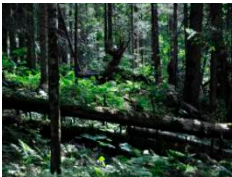
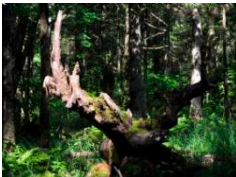


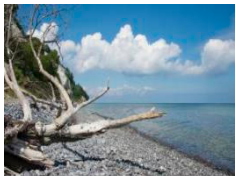
2.1. Select Photos

In this study, dead wood included both fallen dead trees and standing dead trees [32]. In order to ensure the recognizability of dead wood, a total of 107 photos containing dead wood were first collected through on-site shooting and an online survey. The photos were mainly taken from urban forest parks, scenic areas, botanic gardens, arboretums, city zoos, etc. A distribution of these areas used throughout urbanized areas in the Chinese cities ensures representation of the different types and locations of dead wood along the gradient from the inner city to the urban periphery.

Ten expert (mean age = 50.50 ± 5.68 , six males and four females) silviculturists ($n = 3$), ecologists ($n = 3$), and landscape architectures ($n = 4$) were invited to classify and select dead wood photos through a visual and bio-physical characterization of the landscape. First, photos were divided according to the land cover type into green space and blue space. Then the green space was subdivided into open green space (<10% canopy cover of trees/shrubs), semi-open/semi-closed green space (10–70% canopy cover of trees/shrubs), and closed green space (>70% canopy cover of trees/shrubs) based on the assessment the canopy cover ratios of trees and shrubs. Next, the most representative photos of open green space, semi-open/semi-closed green space, closed green space, and blue space were determined by the different forms of dead wood, including regular shape, peculiar shape with strange postures, seat shape, and messy/straggly shape, and large size (Table 1). For

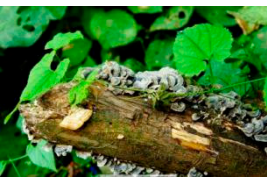



each type of environment, two to three photos in common were included, and a total of 11 photos were finally selected.

Table 1. Eleven photos with the different forms of dead wood in the four types of environment.

| Landscape Type | Pictures and Form of Dead Wood | | | |
|--------------------------------------|---|---|--|--|
| | Regular Shape | Peculiar Shape | Seat Shape | Messy/Straggly Shape |
| Open green space |  |  |  | |
| | A | B | C | |
| |  |  |  | |
| Semi-open or semi-closed green space | D | E | F | |
| |  |  | |  |
| | G | H | | I |
| Blue space |  |  | | |
| | J | K | | |

Lastly, the experts were also asked to select four additional photos of dead wood with different functions including ecological education, “leading the way,” appreciation, and recreational facility from the rest of the selected photo pool. The descriptive texts of the four various functions were attached to each corresponding photo by ten experts as well (Table 2).

Table 2. Four photos with the descriptive texts that reflect the different functions of dead wood.

| No. | Function | Photo | Text |
|-----|-----------------------|--|---|
| 1 | Ecological education |  | Dead wood plays an important role in maintaining the biodiversity of forest ecosystems. It is the habitat of many plants and animals, creating habitats for unique and diverse life. |
| 2 | Leading the way |  | In addition to the ecological role, the logs in the forest can also be placed in the direction of the road, guiding people to pass, and play a certain protective role. |
| 3 | Appreciation |  | Dead wood can produce a novelty and visual impact different from that of ordinary trees. It forms a unique dead wood landscape with strange postures and colors, reflecting the breath of nature. |
| 4 | Recreational facility |  | Some well-formed dead wood can be used as various types of garden landscape facility, such as benches, tables, chairs, frames, etc., and can be trimmed to have both viewing and practical functions. |

2.2. Questionnaire

Photo elicitation with a survey in the form of a questionnaire was conducted in this study to explore the public preference for dead wood in the different types of environments. The questionnaire was divided into two versions: questionnaire A and questionnaire B. Each version included three parts. The difference between the two versions existed in the third part, with the other two parts remaining completely consistent.

The first of these three parts contained questions revealing demographic information about the participants including gender and profession.

The second section focused on the participants' perceptions of and preferences for the different selected environments with dead wood and without dead wood. The selected eleven photos with dead wood were considered as original photos. Each original photo was processed to only remove the existing dead wood using Adobe Photoshop CS software to obtain the opposite of the original photo. The new 11 photos without dead wood were obtained correspondingly, and 22 photos were finally used for identifying the perceptions and preferences of the participants (Appendix A).

The third part of the questionnaire was used to explore the preferences for dead wood with the addition of the four different functions. There were only four photos of dead wood displaying different functions in questionnaire A, while the text information of the function was added in questionnaire B.

Respondents were asked to evaluate their preference using a 7-point Likert Scale ranging from 1 = "extremely dislike" to 7 = "extremely like," and were allowed to fill in the reasons for the rating.

2.3. Procedure

A total of 148 college students were recruited as the participants [33]. According to their professions, they were divided into the academic-related group or the layman group, which resulted in a total of 62 participants in the academic-related group and 86 participants

in the layman group. The professions of the academic-related group included landscape architecture, forestry, and ecology. The layman group referred to other professions such as those in the humanities, information and electromechanical fields, etc.

The surveys were conducted in a classroom on 5 November 2018, for the layman group and 23 November 2018, for the academic-related group, respectively. Each group was divided into two similarly sized sub-groups, with the groups sitting on both sides of the classroom, with an equal proportion of males and females in each subgroup. Before the questionnaire was given, the purpose and procedure of the study were introduced to the participants. Questionnaire A and questionnaire B were then distributed to the two sub-groups, respectively. Each participant was required to fill out the questionnaire independently.

2.4. Data Analysis

Microsoft Excel 2016 and SPSS 25.0 software were used in all statistical analyses, and significance was defined at the 0.05 level. To understand whether the participants preferred the environment with dead wood, a paired T-test for the differences in preference for the environments with dead wood and without dead wood was conducted. In order to identify in which type of environment dead wood was more preferred by the participants, one-way ANOVA with Tukey's HSD post-hoc tests were conducted. Tukey's HSD post-hoc tests were also used to compare the differences in preference between the different forms of dead wood in each type of environment. A one-way ANOVA was used to explore the effects of additional information on dead wood preference. To understand the effects of profession on preference for dead wood, the paired T-test was employed to compare the differences in preference between the academic-related and layman groups.

3. Results

3.1. Preference for Dead Wood

The results of the paired T-test showed a significant difference in preference between photos with and without dead wood ($p = 0.04$). The preference scores of 11 photos with dead wood were higher than those without dead wood (Table 3), which indicated that the participants are able to accept the urban natural environments with large dead wood and deem those environments more in line with their visual aesthetics.

Table 3. The results of the paired t-test for the differences in preference for the environments with and without dead wood.

| Photo Manipulation | N | Mean | t | df | Sig. |
|--------------------|------|------|------|------|------|
| Dead wood | 1375 | 4.71 | 2.10 | 1274 | 0.04 |
| No dead wood | 1375 | 4.62 | | | |

3.2. Preference for the Dead Wood in the Different Types of Environment

The results showed that the participants had significantly different preferences for dead wood in the different types of environments ($p = 0.00$). In blue space and semi-open/semi-closed green space, the preference score for the images of the environments without dead wood decreased ($L2, L4 > 0$), while in the open green space and closed green space, the preference score for the images of the environments without dead wood increased ($L1, L3 < 0$). This indicated that the participants most preferred semi-open/semi-closed green space and blue space with dead wood and open green space and close green spaces without dead wood (Table 4). The existences of dead wood in semi-open/semi-green space and blue space were most likely to be accepted and appreciated.

Table 4. One-way ANOVA with Tukey's HSD post-hoc tests of preferences for dead wood in the different types of environments.

| Landscape Type | Preference Score | | | F | DF | Sig. |
|-------------------------------|------------------|-------------------|------------|------|----|------|
| | With Dead Wood | Without Dead Wood | Difference | | | |
| Open (L1) | 4.26 | 4.29 | −0.03 | 15.0 | 3 | 0.00 |
| Semi-open or semi-closed (L2) | 5.05 | 4.51 | 0.54 | | | |
| Closed (L3) | 4.48 | 4.73 | −0.25 | | | |
| Blue space (L4) | 5.22 | 5.09 | 0.14 | | | |

(with dead wood: L4 > L2 > L3 > L1)

3.3. Preference for Dead Wood with Different Forms

The results showed that there were significant differences in preference for dead wood with different forms in each type of the selected environments except for blue space ($p = 0.60$) (Table 5). In the semi-open/semi-closed green space and the closed green space, the participants most preferred the dead wood with a peculiar shape, followed by the dead wood with a regular shape, with the seat shape, and messy/straggly shape being the least preferred. In the open green space, the participants most preferred the dead wood with a regular shape, followed by a peculiar shape, and seat shape was the least preferred.

Table 5. The results of Tukey's HSD Test between dead wood forms in each landscape type.

| Landscape Type | Forms of Dead Wood | N | M | Sig. | Rank |
|-----------------------|---------------------|-----|------|------|--------------|
| Open | Regular shape (F1) | 125 | 4.65 | 0.00 | F1 > F2 > F3 |
| | Peculiar shape (F2) | 125 | 4.13 | | |
| | Seat shape (F3) | 125 | 4.02 | | |
| Semi-open/semi-closed | Regular shape (F1) | 125 | 5.19 | 0.01 | F2 > F1 > F3 |
| | Peculiar shape (F2) | 125 | 5.22 | | |
| | Seat shape (F3) | 125 | 4.75 | | |
| Closed | Regular shape (F1) | 125 | 4.72 | 0.00 | F2 > F1 > F4 |
| | Peculiar shape (F2) | 125 | 4.87 | | |
| | Messy straggly (F4) | 125 | 3.84 | | |
| Blue | Regular shape (F1) | 250 | 5.18 | 0.60 | - |
| | Peculiar shape (F2) | 250 | 5.27 | | |

3.4. Effects of Additional Text Information on the Preferences for Dead Wood

The results of a one-way ANOVA test showed that the preference score of dead wood photos with additional information given in the descriptive text was significantly higher than the dead wood photos without additional information ($p = 0.00$) (Table 6), which indicated that the additional information had a positive impact on the public's dead wood preference in general. In addition, the effects of the different types of additional information on dead wood preferences were significantly different ($p = 0.00$). Among them, the information of appreciation most influenced the participants' preferences for dead wood, followed by the information of recreational facility and ecological education, and the information of leading was the least (Table 6).

Table 6. One-way ANOVA test of the effects of the additional information on dead wood preferences and Tukey's HSD test among the different types of additional information given.

| Questionnaire Type | Mean | F | DF | P | Rank |
|---|------|-------|----|------|-------------------|
| No additional information (Questionnaire A) | 4.59 | 11.73 | 1 | 0.00 | L3 > L4 > L1 > L2 |
| Additional information (Questionnaire B) | 5.01 | | | | |
| Information of ecological education | 4.84 | | | | |
| Information of leading the way | 5.28 | | | | |
| Information of appreciation | 5.41 | | | | |
| Information of recreational facility | 4.50 | | | | |

3.5. Effects of Professional Background on the Preferences for Dead Wood

The results of two-sample T-tests showed that the preference score of the layman group for dead wood was significantly higher than that of the academic-related group ($P = 0.00$) (Table 7). In addition, the preferences of the layman group for the different types of environments with dead wood were all higher than those of the academic-related group. Compared with the academic-related group, the layman group more preferred the dead wood with a peculiar shape, a regular shape, and a messy/straggly shape. These results indicated that the layman group had a higher level of acceptance for dead wood with different forms in the different types of the environments (Table 7).

There was a significant difference in preference for dead wood with additional information between the two groups, while no significant differences were found in preference for dead wood without additional information. The relevant preference scores of the laymen group were higher than those of the academic-related group. Information given with ecological education and "leading the way" had more significant influences on laymen groups' preferences for dead wood than the academic-related group.

Table 7. Results of the two sample T-tests of the effects of professional background on the preferences for dead wood.

| Group | | Preference Score | | T | DF | Sig. |
|------------------------|------------------------------------|------------------|--------|-------|-----|------|
| | | Expert | Layman | | | |
| Processed | With dead wood | 4.49 | 4.81 | −3.92 | 604 | 0.00 |
| | Without dead wood | 4.59 | 4.54 | 0.78 | 604 | 0.43 |
| | Open | 4.15 | 4.51 | −2.50 | 164 | 0.01 |
| Landscape type | Semi-open/semi-closed | 4.88 | 5.24 | −2.24 | 164 | 0.03 |
| | Closed | 4.10 | 4.98 | −5.75 | 164 | 0.00 |
| | Blue | 4.97 | 5.43 | −2.39 | 109 | 0.02 |
| Forms of dead wood | Regular shape | 4.68 | 5.03 | −2.56 | 219 | 0.01 |
| | Peculiar shape | 4.63 | 4.95 | −2.42 | 219 | 0.02 |
| | Messy/straggly shape | 3.34 | 4.38 | −4.04 | 54 | 0.00 |
| | Seat shape | 4.36 | 4.22 | 0.79 | 109 | 0.43 |
| Questionnaire type | Without additional information (A) | 4.41 | 4.70 | −1.51 | 115 | 0.13 |
| | With additional information (B) | 4.73 | 5.21 | −2.45 | 103 | 0.02 |
| | Ecological education | 4.22 | 5.05 | −2.97 | 54 | 0.00 |
| Additional information | Leading the way | 3.98 | 4.56 | −2.14 | 54 | 0.04 |
| | Appreciation | 5.02 | 4.89 | 0.44 | 54 | 0.66 |
| | Recreational facility | 5.02 | 4.3 | 0.37 | 54 | 0.71 |

4. Discussion

4.1. Public Preferences for Dead Wood

It was found that the participants' preference scores for the photos with dead wood were significantly higher than those without dead wood. This is inconsistent with the results of previous studies, which showed that the public disliked the environments with dead wood [34–36]. This is perhaps due to the selection of the dead wood photos in this study that mainly focused on the different forms of dead wood in the conditions of natural

metabolism or species competition in the forests and other types of green spaces [29]. The poor growing conditions of dead wood were avoided such as fire, artificial logging, etc., which could enhance the participants' preferences [37]. Based on the analyses of the reason for preference, we also found that most of the participants deemed dead wood as a positive element to enrich the settings' configuration and helped them to understand the site with a unique experience by using descriptors such as "varied and rich in forms", "cognitions", "leading", "mystery and exploratory". Karjalainen [21] showed that dead wood can be used as a signpost or a landmark to increase the public's understanding and cognitions of the surrounding environment. Hallikainen [38] found that dead wood was often associated with the unpredictable and mysterious areas, where visitors could immerse themselves in the feeling of being away from the tension of daily life. The participants thus had more positive and optimistic emotions towards dead wood in the selected photos.

In addition, the volumes of dead wood in the selected photos were not abundant. This is consistent with relevant studies, which showed that an environment with a large amount of dead wood often arouses people's dislike due to the impressions of the low level of management and inaccessibility [11,16]. Therefore, the low volume of dead wood in each environment may also be one of the reasons for the participants' high preferences [39].

4.2. Preference for the Dead Wood in the Different Types of Environment

The results indicated that the participants most preferred the semi-open/semi-closed green space and blue space with dead wood and open green space and closed green spaces without dead wood. It can be deduced that dead wood as a certain landscape element can influence public preference due to changes of the spatial structures of the environment. Participants disliked the levels of space of the overly high or low green coverage compared to the moderate green coverage. Visual accessibility of green environments is a major determining factor for public use and preference, because too many objects in a space can make it overloaded structurally [40]. The semi-open/semi-closed green space can provide people with more visual accessibility and aesthetic experiences due to complex vegetation structures with a moderate canopy cover of trees and shrubs. As a participant mentioned, "the presence of dead wood (the environment) more luxuriant, hierarchical and dynamic". The blue space is consistently associated with higher preferences and more positive subjective reactions [41]. The dead wood in different colors and textures from the water and beach can increase the effects of visual cohesion [42]. One of the comments from the participants highlights this effect, as they stated: "I like water and the existence of the dead wood makes the water special." However, the open green space would be less preferred due to a lack of obstacles and refuges. The prospect refuge theory claims that people normally prefer environments with obstructive elements, which can allow them to see others without being seen [43]. The closed green space also received the lowest preferences. This might be due to the fact that it had a high level of canopy cover with trees/shrubs and dead wood, which may have resulted in untidy, ugly, and even unsafe feelings of such environments [44].

4.3. Preference for the Dead Wood with the Different Forms

Although the participants' preferences for dead wood varied according to the different types of environment, they generally most preferred dead wood with a natural form (peculiar shape/regular shape) rather than an artificial form (seat shape). This is in line with one of the European forest studies [14], which showed that the deforested residues had a more negative impact on the aesthetic and recreational values of forests than dead wood with natural forms. The natural forms of dead wood are more likely to draw the participants' attention due to the representation of the natural alternation of life.

Moreover, the results showed that the participants preferred to see clean and tidy dead wood, which indicated that the participants more focused on coherence, particularly in areas of remnant vegetation and other messy habitats with natural character [45]. Although some participants acknowledged the practical values of the dead wood in seat form, they

were still not willing to use it due to it being damp and dirty. One of their comments mentioned that “it’s damp and rotten. The crevices of dead wood may hide some uncertain and awful things.” Therefore, it is necessary to have appropriate dead wood management and maintenance in order to increase public appeal and experience.

4.4. Preference for the Dead Wood with Additional Text Information Given

The results showed that the additional text information had a significantly positive impact on the participants’ preferences for the dead wood, which indicated that the people’s attitudes towards dead wood can be affected by the knowledge and information the participants previously had or had been given during the survey [18,26]. However, different additional information had varying impacts on the participants’ perceptions of dead wood. The information of appreciation had the most influence on the participants’ preferences for the dead wood. This is perhaps because the additional information given can directly arouse people’s stronger psychological reflections and then highlight the visual stimulus [46].

Moreover, most of the participants were concerned about the recreational function of dead wood. This is consistent with previous studies, which showed that recreation is the primary motivation of users for visiting nature [47], and the relevant facilities for recreation had a significant impact on the quality of nature experience [48]. The participants’ preferences for dead wood also increased significantly after reading the information of ecological education, which indicated that the potential of environmental education can be used as a tool for merging ecological and recreational benefits through dead wood management [9]. Surprisingly, the preference was not varied by the additional information given of “leading the way.” This is perhaps because the participants disliked the dead wood in the dense forest, which is often considered messy [49].

4.5. Professional and Non-Professional Participants’ Evaluation of Dead Wood

It was found that the layman group had a higher level of preference for dead wood with the different forms in the different types of environment, which is inconsistent with previous studies [50,51]. This inconsistency may be due to the different cultural contexts. Compared with the developed countries, China has been through a dramatic urbanization leading to the conversion of farmlands, grasslands, and forests, etc., into new urbanized areas [52]. A large Chinese population has a limited number of natural and semi-natural green spaces in the urban environmental settings, and such urban landscape patterns can often result in landscape homogenization [53]. Therefore, Chinese inhabitants are more likely to have insufficient experiences with dead wood in the city and become increasingly curious about it once the relevant knowledge is captured, which appears to be especially true for the layman group [54]. Their perceptions of and preferences for dead wood are easily influenced by the additional information given, such as ecological and practical aspects, which is closely related to their motivation of nature use.

Aesthetic cognition is not only perceptual and intuitive in nature but also rational, which comes from the knowledge base and background history of the observer [55]. The academic-related group could have relatively strict and relatively uniform evaluation criteria for dead wood [50]. Most of the participants in the academic-related group associated dead wood with richness of species. As their comments mentioned, “I don’t like it here because it supplies rare species”, and “this is not biodiversity harbor”. The inherent expertise could be the main reason for the low preference of the academic-related group. However, when the information of appreciation and recreational facility were added, the academic-related group preferred the dead wood more than the layman group did, which showed that the academic-related group considered the dead wood in all aspects of its functions.

4.6. Limitations and Future Research

Although college students are acceptable substitutes for actual population according to Stamps [33], participants from different demographic backgrounds should be considered

in the future in order to get more extensive conclusions, especially for, e.g., families with children. Moreover, this pilot study was confined to roughly academic backgrounds of participant and the detailed academic backgrounds on preference for dead wood should be distinguished in future study. Furthermore, the differences of preference between standing dead trees and fallen dead trees should be examined to explore the potential values of dead wood for application. Last, in order to get more accurate perception on dead wood in urban context, photos or modified photos of built up area with dead wood should thus be used in the future study. The size of dead wood and the scale of mess should be also taken into account.

5. Conclusions

The study shows that people do accept the urban natural environments with dead wood, and the presence of dead wood in semi-open/semi-green space and blue space was most likely to be appreciated. The character of dead wood and additional descriptive information had a positive impact on the public's dead wood preference in general. While expert and lay people expressed such qualities in somewhat different ways, it was clear that experts were more sensitive to the presence of dead wood and pursued higher ecological and aesthetical qualities of the natural environment. These findings call for a more conscious and site-specific approach to landscape design and management, particularly in areas of remnant dead wood. For instance, in high-density urban areas, the semi-open/semi-closed green space or blue space with dead wood in natural forms should be retained as much as possible in order to increase more opportunities for the inhabitants to be close to nature in cities. Dead wood under appropriate management can be used as a recreational facility for enhancing the qualities of nature experiences in urban environmental settings. The potential of environmental education is quite necessary as a tool for merging ecological and recreational benefits of dead wood through green space management. Information of dead wood provided on site might be one way to achieve this. In general, dead wood can be utilized to enrich urban landscapes in the future.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to policy of the institute.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Eleven groups of contrasting pictures after image processing.

| Landscape Type | Compare Photos | Regular Shape | Peculiar Shape | Seat Shape | Messy/Straggly Shape |
|--------------------------------------|-----------------|---|--|--|---|
| Open green space | Original photo |  |  |  | |
| | Processed photo |  |  |  | |
| Semi-open or semi-closed green space | Original photo |  |  |  | |
| | Processed photo |  |  |  | |
| Closed green space | Original photo |  |  | |  |
| | Processed photo |  |  | |  |
| Blue space | Original photo |  |  | | |
| | Processed photo |  |  | | |

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