Supplementary Materials

Text S1. The present situation of the experimental site is the site element

This pilot experiment was located in the She Autonomous County of Jingning, Zhejiang Province, China. We selected three sites with typical forest characteristics, namely Caoyutang, Daji, and Meiqi. Because Caoyutang National Forest Park has a high forest coverage rate and a wide variety of trees, it shows rich ecological diversity. It is suitable for the growth of fir trees, cypress trees and other plants to build a green and healthy forest space, so we use it as the Mean experiment site. The cypress forest, park forest and Chihu forest can be used as the natural background of the site, which can produce benefits for the physiological health of human body. The site also contains water resources, which are rich in blue and green resources. The forest provides an ideal place for experiments to get close to nature and relax（FigureS1）.

In this pilot test, the perception Recovery Scale (PRS), green vision rate (GVI), building proportion, sky proportion, etc. are used as the factors to evaluate the site. The Perceived Recovery Scale (PRS) is based on the four features of attentional recovery theory, namely distance, consistency, infatuation, and compatibility. Hartig et al. (1997) developed a perceptual recovery scale, which is widely used to assess restorative environments [40]. This study used the Chinese version of the Perceptual Restoration Scale (PRS) to assess site resilience (Wang et al., 2019). Greenness (GVI) refers to the proportion of green plants in the objects that people see with their eyes, and it emphasizes three-dimensional visual effects. People feel most comfortable when green reaches 25% of their visual field. According to statistics, the "green vision rate" of longevity areas in the world is more than 15%, it is not difficult to see that the green vision rate is closely related to people's life and health.

The Mean vegetation types of the selected sites were Taxodium ascendens、 cypress, and Celtis sinensis. The GVI values of the three locations were 87%, 58% and 52%, respectively. The proportion of sky was 9.5%, 28% and 30% respectively. Construction accounted for 1%, 0.5% and 8.3%, respectively. It is confirmed that the land is a typical forest green space. This indicates that the site is a typical forest green space. Twenty-eight participants in the open eye group were tested on the perceptual Recovery Scale (Table S2).

Text S2. Participant information collection

Participants' information was collected including gender, age, BMI, major (0 is related to landscape architecture, 1 is unrelated to landscape architecture), frequency of green space exposure in one week, WHO-5 scale (Table S3), whether they smoke, whether they drink, etc. (Table S4). The objective is to investigate the effect of initial mental state and exposure frequency of virgin green space on forest exposure. A total of 52 participants (including 20 women and 32 men) took part in the experiment. They did not report any history of physical or mental disorders and had an average age of 29.9±9.89 years. None of the participants developed obesity or metabolic syndrome. Before the experiment, we introduced the content of the experiment in detail to the participants and obtained their informed consent. During the experiment, we strictly abide by the ethical standards of the China Science Ethics Committee and the relevant provisions of the 1964 Declaration of Helsinki and its subsequent amendments.

Text S3. Environmental meteorological factors information collection

The environmental meteorological factors collected at the pilot site include temperature (Ta), relative humidity (RH), windspeed (Ws), atmospheric pressure (AP), oxygen concentration, and CO_2 concentration. We use instruments such as to collect meteorological data. We achieve data reliability by determining the test height and test interval time. The height is set at 1.2m and the time interval is set at 1 minute. Finally, it can be further studied by Spearman correlation analysis and multiple linear regression analysis（Table S5）.

Text S4. More representative EEG evaluation indexes were selected

In the use of EEG indicators, the single index (θ, α, β) is the most common use, and the mutual ratio of the single index is also commonly used as an evaluation index, such as θ / β, β / α, θ / (α + θ) / β, (α + θ) / β, (α + θ)/(α + θ)/(α + β)) [41]. The existing studies show that using relative power as an EEG index can reduce the numerical error in the monitoring process, and is more suitable for complex EEG evaluation. Relative power refers to the ratio of the power of a certain frequency band to the total EEG power. For example, the theta band (4-8 Hz) is the frequency at which the brain fires during deep sleep, and this waveform helps the body recover and repair, and is associated with emotional stability; The alpha band (8-12 HZ) is the rate at which the brain discharges in a relaxed state. This waveform usually occurs in a state of inattention, such as reading with the eyes scanning the page without really noticing anything; The beta band (12-32HZ) is the rate at which neurons in the brain fire during times of stress, anxiety, or the need to concentrate. This waveform usually occurs when learning new knowledge and processing complex information; In many studies of visual and physiological responses, the beta/alpha index (beta waves are associated with alert states, while alpha waves are associated with relaxed states) is considered the most appropriate index [42,43]. The higher the beta/alpha index, the more stressed the participants were; Conversely, the lower the beta/alpha index, the more relaxed and calm the participants were [25]. Furthermore, relevant studies have shown that when a person engages in meditation-like internal deep thinking, in which slow brain waves (α and θ) dominate, their slow-wave power ratio will be higher and stronger than other brain waves [44]. In this study, five common EEG indicators were selected to analyze the physiological health benefits of forest green space participants and urban green space participants.

Text S5. The preprocessing of original EEG data

In this study, we used electroencephalography (EEG) as a physiological indicator to assess short-term responses. In this experiment, EEG measurements were made using a non-invasive Emotiv EPOC X EEG headset (produced by Emotiv, USA). Using the international 10-20 positioning system, including AF4, AF3, F3, F4, F7, F8, FC5, FC6, T7, T8, P7, P8, O1, O2 and other 14 channels, it can accurately record the brain response data at the sampling frequency of 128 Hz. The Emotiv EPOC X EEG headset combined with Emotiv PRO's supporting software was used to collect and organize raw data. The power spectrum was used to analyze EEG indicators and changes in different brain wave forms. The Emotiv PRO software was used to pre-process the original data, and the spectrum analysis tool was written in combination with the EEGLAB data package in MATLAB. The processing sequence includes electrode positioning, filtering, segmentation, replacement of bad electrode, re-reference and independent component analysis (ICA). We filter out the frequency band beyond 1Hz to 30Hz through filtering, and exclude the movement artifacts such as EMG, heart rate and eye movement through ICA. Our experiment divided the time into a 0–4-minute stress test period and a 4–20-minute forest exposure period. We collected EEG data from each participant. Four more prominent EEG indices were selected, namely relative α index, relative β index, β/α index and relative (α+θ) index. Eeg data for each participant consisted of 14 EEG channels and 0-20 minutes of EEG trends (Figure S2).

Text S6. The process of fitting a curve

After a preliminary observation of the data, it is found that the data tends to appear S-shape, and a Generalized Logistic Function is used to fit the curve：

$$f(x) = \frac{L}{1 + e^{-k(x - x_0)}} + d$$

Using the minimize function in Python's scipy package optimize, curve fitting is carried out through continuous iteration to realize the continuous reduction of the difference

between the fitting function value and the actual value, and the stop of fitting is controlled through tolerance and the number of iterations. Because the discrete points of the fitted curve are affected by noise, the distribution has a certain clutter, so the value range of k is restricted by adding constraints, that is：

$$|k| \geq 0.8$$

Thus, a better curve fitting is achieved. The efficiency threshold is the maximum absolute value of the slope (k1, f (x1)), and when taking the point corresponding to the income threshold, due to the property of the function itself, it is impossible to get the point with a slope of 0, so it is necessary to choose an approximate value. In the fitting of different curves, due to the large change in the range of y values, if a fixed value is selected, the effect is not satisfactory, so the approximate value is taken as (Table S6):

$$k_2 = \left(\max\left(Y_{pred}\right) - \min\left(Y_{pred}\right)\right) \times 0.01$$

Table S1 Main tree species at the study site

Area	Major species	Height/m	DBH/cm	Age/a	Elevation/m
Caoyutang	*Chamaecyparis pisifera*	11	26	31	919
	Abies firma	17	36	56	
	Liriodendron chinense	18	27	25	
Daji	*Quercus glauca*	14	15	29	563
	Schima superba	17	13	30	
	Pinus massoniana	16	14	31	
Meiqi	*Abies firma*	15	34	52	1176
	Cryptomeria japonica var. *sinensis*	11	19	29	
	Pinus massoniana	13	9	24	

Table S2. Descriptive statistics of Perceptual Recovery Scale (PRS) scores

number	Being Away Mean±SD	Fascination Mean±SD	Coherence Mean±SD	Compatibility Mean±SD	Total score Mean±SD
52	5.9±1.34	5.79±1.45	5.3±1.74	4.325±1.98	5.37±1.58

Note: In this experiment, the perceptual Recovery Scale (PRS) was used to test participants. The PRS consists of five parts, namely, overall evaluation, departure, charm, compatibility and consistency, with a total of 23 questions. The score of each question is 0-7 points, the first is the overall evaluation; Distance from the second to the sixth; Questions 7 to 14 are entitled Charm; Questions 15 to 18 are entitled compatibility; Questions 19 to 23 are entitled Consistency.

Table S3. World Health Organization Five Physical and Mental Health Indicators (WHO-5)

In the last two weeks	All the time	Most of the time	More than half the time	Less than half the time	A fraction of time	none
1. I feel happy and happy	5	4	3	2	1	0
2. I feel peaceful and relaxed	5	4	3	2	1	0
3. I feel alive and energetic	5	4	3	2	1	0
4. I wake up feeling fresh and well-rested	5	4	3	2	1	0
5. My everyday life is full of interesting things	5	4	3	2	1	0

Table S4. Participant information collection

Number	Age mean±SD	Weight mean±SD	Height mean±SD	BMI mean±SD	Work (Landscape architecture related 0, not related 1) mean±SD	Frequency of green space exposure (several times per week) mean±SD	WHO-5 exponent mean±SD	Smoke 0, don't smoke 1 mean±SD	Drink 0, don't drink 1 mean±SD
Male（32） Female（20）	29.9±9.89	60.25±7.93	1.71±0.07	20.74±2.80	0.45±0.51	3.95±1.67	3.45±1.10	0.75±0.44	0.35±0.49

Table S5. Environmental meteorological factors information collection

Meteorological factor	Mean±SD
Ta Mean±SD	16.75±4.29
RH Mean±SD	59.7±10.79
Ws m/s Mean±SD	0.5±0.69

BP Mean±SD	903.78±25.64
L Mean±SD	3713.75±6955.73
Oxygen concentration Mean±SD	19.85±0.13
Carbon dioxide index Mean±SD	469.33±123.93

Table S6. Parameters and residual standard error of the fitted fourth-order logistic function

Group	EEG index	Parameters			
		a	b	c	d
OE	Relative α index	0.2019	0.2	17.6465	0.0572
	Relative β index	-1.2019	0.7778	7.9734	0.8898
	β/α index	-0.9232	0.7924	7.4211	-0.2204
	Relative (α+θ) index	0.3864	0.2	22.7165	0.0705
BF	Relative α index	-0.0982	0.7397	4.4327	0.1783
	Relative β index	-0.0118	0.7799	7.2653	0.0709
	β/α index	-2.9233	0.7744	4.7997	5.0605
	Relative (α+θ) index	-0.0717	0.8022	7.0391	0.0832

Notes: For a fourth-order logistic function, the equation takes the following form: $f(x) = a/(1+\exp(-b\times(x - c)))+d$,where a, b, c, and d are the parameters to be fitted, and x is the independent variable.

Table S7. Spearman's correlation analysis of the effect of covariates on changes in health indicators

		M1	M2	M3	M4	M5	M6	M7	P1	P2	P3	P4	P5	P6	P7
A1	Correlation coefficient	-0.308	0.389*	-0.600**	0.277	-0.481**	0.550**	-0.092	-0.038	-0.147	-0.322	-0.429	0.279	0.230	-0.191
	Sig0.(2-tailed)	0.072	0.021	0.000	0.108	0.003	0.001	0.599	0.875	0.547	0.166	0.059	0.234	0.329	0.420
	N	35	35	35	35	35	35	35	35	35	35	35	35	35	35
A2	Correlation coefficient	-0.241	0.359*	-0.601**	0.365*	-0.458**	0.498**	-0.057	0.005	-0.142	-0.305	-0.412	0.299	0.230	-0.155

	Sig0.(2-tailed)	0.162	0.034	0.000	0.031	0.006	0.002	0.744	0.982	0.562	0.191	0.071	0.200	0.329	0.515
	N	35	35	35	35	35	35	35	35	35	35	35	35	35	35
A3	Correlation coefficient	0.199	-0.219	0.045	0.430**	0.234	-0.018	0.407*	-0.055	0.019	0.218	0.112	0.192	-0.070	0.118
	Sig0.(2-tailed)	0.251	0.206	0.798	0.010	0.176	0.920	0.015	0.818	0.937	0.356	0.639	0.417	0.769	0.620
	N	35	35	35	35	35	35	35	35	35	35	35	35	35	35
A4	Correlation coefficient	0.014	0.113	-0.563**	0.441**	-0.152	0.483**	0.031	0.193	0.176	0.044	-0.352	0.158	0.150	0.118
	Sig0.(2-tailed)	0.935	0.518	0.000	0.008	0.385	0.003	0.859	0.415	0.470	0.855	0.128	0.506	0.527	0.620
	N	35	35	35	35	35	35	35	35	35	35	35	35	35	35
A5	Correlation coefficient	-0.029	0.042	-0.063	0.209	-0.122	0.188	0.127	-0.350	-0.187	0.009	-0.171	0.179	-0.070	-0.064
	Sig0.(2-tailed)	0.867	0.809	0.717	0.228	0.485	0.279	0.467	0.130	0.444	0.971	0.471	0.449	0.769	0.790
	N	35	35	35	35	35	35	35	35	35	35	35	35	35	35
A6	Correlation coefficient	0.127	-0.255	0.568**	-0.445**	0.327	-0.515**	-0.005	-0.364	-0.095	-0.044	0.074	0.037	-0.170	0.027
	Sig0.(2-tailed)	0.468	0.139	0.000	0.007	0.055	0.002	0.976	0.115	0.700	0.855	0.756	0.876	0.473	0.909
	N	35	35	35	35	35	35	35	35	35	35	35	35	35	35
B1	Correlation coefficient	0.309*	-0.433**	0.200	-0.546**	0.530**	-0.205	-0.305*	-0.111	-0.306	0.218	-0.037	0.183	-0.010	-0.282
	Sig0.(2-tailed)	0.041	0.003	0.193	0.000	0.000	0.182	0.044	0.642	0.202	0.356	0.878	0.440	0.967	0.229

	N	44	44	44	44	44	44	44	44	44	44	44	44	44	44
B2	Correlation coefficient	0.425**	-0.587**	0.308*	-0.481**	0.634**	-0.333*	-0.122	0.209	0.206	-0.113	0.322	-0.048	-0.070	0.373
	Sig0.(2-tailed)	0.004	0.000	0.042	0.001	0.000	0.027	0.430	0.375	0.397	0.634	0.167	0.840	0.769	0.106
	N	44	44	44	44	44	44	44	44	44	44	44	44	44	44
B3	Correlation coefficient	0.173	-0.249	0.123	-0.409**	0.265	-0.328*	-0.321*	0.200	-0.210	-0.200	-0.269	0.235	0.571**	-0.264
	Sig0.(2-tailed)	0.263	0.103	0.425	0.006	0.082	0.030	0.033	0.399	0.389	0.397	0.252	0.318	0.009	0.261
	N	44	44	44	44	44	44	44	44	44	44	44	44	44	44
B4	Correlation coefficient	0.331*	-0.443**	0.262	-0.403**	0.538**	-0.134	-0.027	-0.165	0.155	0.270	0.367	-0.176	-0.571**	0.300
	Sig0.(2-tailed)	0.028	0.003	0.086	0.007	0.000	0.386	0.860	0.487	0.525	0.249	0.111	0.457	0.009	0.199
	N	44	44	44	44	44	44	44	44	44	44	44	44	44	44
B5	Correlation coefficient	0.005	-0.150	0.019	-0.054	0.102	-0.087	-0.075	0.228	0.144	-0.340	0.236	-0.017	0.070	0.227
	Sig0.(2-tailed)	0.972	0.330	0.904	0.729	0.510	0.573	0.628	0.335	0.557	0.143	0.317	0.944	0.769	0.335
	N	44	44	44	44	44	44	44	44	44	44	44	44	44	44
B6	Correlation coefficient	-0.341*	0.536**	-0.271	0.567**	-0.623**	0.283	0.194	-0.254	-0.085	0.218	-0.363	-0.049	-0.010	-0.282
	Sig0.(2-tailed)	0.023	0.000	0.075	0.000	0.000	0.062	0.206	0.280	0.729	0.356	0.116	0.838	0.967	0.229
	N	44	44	44	44	44	44	44	44	44	44	44	44	44	44

BA1	Correlation coefficient	-0.225	0.311	-0.534**	0.561**	-0.459**	0.429**	0.183	-0.167	-0.168	-0.026	-0.318	0.098	0.050	-0.373
	Sig0.(2-tailed)	0.163	0.050	0.000	0.000	0.003	0.006	0.258	0.483	0.490	0.913	0.172	0.682	0.834	0.106
	N	44	44	44	44	44	44	44	44	44	44	44	44	44	44
BA2	Correlation coefficient	-0.223	0.268	-0.404**	0.627**	-0.443**	0.463**	0.261	0.023	0.390	0.026	-0.009	-0.330	-0.050	0.373
	Sig0.(2-tailed)	0.168	0.094	0.010	0.000	0.004	0.003	0.103	0.922	0.099	0.913	0.971	0.156	0.834	0.106
	N	40	40	40	40	40	40	40	40	40	40	40	40	40	40
BA3	Correlation coefficient	0.247	-0.263	0.027	-0.348*	0.276	0.055	0.002	0.039	-0.111	0.410	0.403	0.295	-0.210	-0.009
	Sig0.(2-tailed)	0.124	0.102	0.870	0.028	0.085	0.734	0.992	0.870	0.650	0.073	0.078	0.207	0.374	0.970
	N	40	40	40	40	40	40	40	40	40	40	40	40	40	40
BA4	Correlation coefficient	-0.364*	0.435**	-0.453**	0.640**	-0.553**	0.329*	0.140	-0.054	0.118	-0.410	-0.420	-0.294	0.210	-0.027
	Sig0.(2-tailed)	0.021	0.005	0.003	0.000	0.000	0.038	0.389	0.820	0.629	0.073	0.065	0.209	0.374	0.909
	N	40	40	40	40	40	40	40	40	40	40	40	40	40	40
BA5	Correlation coefficient	0.064	-0.127	0.304	-0.134	0.152	-0.052	0.092	0.167	0.258	0.078	0.301	-0.147	-0.090	0.445*
	Sig0.(2-tailed)	0.693	0.434	0.056	0.409	0.350	0.751	0.573	0.481	0.286	0.742	0.198	0.535	0.706	0.049
	N	40	40	40	40	40	40	40	40	40	40	40	40	40	40

BA6	Correlation coefficient	-0.225	0.334*	-0.560**	0.526**	-0.434**	0.371*	0.115	-0.167	-0.258	-0.078	-0.301	0.147	0.090	-0.445*
	Sig0.(2-tailed)	0.163	0.035	0.000	0.000	0.005	0.018	0.479	0.481	0.286	0.742	0.198	0.535	0.706	0.049
	N	40	40	40	40	40	40	40	40	40	40	40	40	40	40
AT1	Correlation coefficient	-0.299	0.310	0.021	-0.399	-0.202	-0.237	-0.130	-0.219	-0.512*	-0.218	-0.199	-0.102	0.330	-0.227
	Sig0.(2-tailed)	0.166	0.150	0.925	0.059	0.356	0.275	0.554	0.353	0.025	0.356	0.400	0.668	0.155	0.335
	N	23	23	23	23	23	23	23	23	23	23	23	23	23	23
AT2	Correlation coefficient	0.038	-0.229	0.012	0.228	0.244	0.232	0.231	0.554*	0.094	-0.009	0.098	0.061	-0.070	0.427
	Sig0.(2-tailed)	0.863	0.293	0.958	0.295	0.262	0.288	0.289	0.011	0.702	0.971	0.682	0.798	0.769	0.060
	N	23	23	23	23	23	23	23	23	23	23	23	23	23	23
AT3	Correlation coefficient	-0.154	-0.245	0.209	0.269	0.028	0.338	0.378	-0.072	0.081	0.314	0.150	0.144	-0.591**	0.236
	Sig0.(2-tailed)	0.482	0.261	0.339	0.215	0.898	0.115	0.076	0.763	0.741	0.178	0.529	0.544	0.006	0.316
	N	23	23	23	23	23	23	23	23	23	23	23	23	23	23
AT4	Correlation coefficient	0.002	0.265	-0.049	-0.229	-0.194	-0.380	-0.201	-0.312	-0.178	0.105	-0.077	-0.272	0.431	-0.182
	Sig0.(2-tailed)	0.991	0.221	0.823	0.294	0.375	0.074	0.358	0.181	0.467	0.661	0.747	0.246	0.058	0.443
	N	23	23	23	23	23	23	23	23	23	23	23	23	23	23

AT5	Correlation coefficient	-0.063	-0.097	0.253	0.093	0.130	-0.151	0.249	-0.006	-0.401	0.061	-0.342	-0.350	0.130	0.245
	Sig0.(2-tailed)	0.774	0.660	0.245	0.672	0.553	0.490	0.253	0.980	0.089	0.798	0.140	0.131	0.584	0.297
	N	23	23	23	23	23	23	23	23	23	23	23	23	23	23
AT6	Correlation coefficient	0.132	0.026	0.118	-0.050	-0.082	-0.308	-0.128	-0.372	-0.301	0.288	0.027	-0.127	-0.010	-0.227
	Sig0.(2-tailed)	0.548	0.907	0.590	0.821	0.710	0.153	0.560	0.107	0.210	0.219	0.912	0.592	0.967	0.335
	N	23	23	23	23	23	23	23	23	23	23	23	23	23	23

* Significance at the 0.05 level (two-tailed test).

** Significance at the 0.01 level (two-tailed test).

Notes:

Physiological indicators: A: Relative α index; B: Relative β index; BA: β/α index; AT: Relative $(\alpha+\theta)$ index; 1: AUCg; 2:AUCi; 3: Efficiency threshold (x); 4:Efficiency threshold (y); 5: Benefit threshold (x); 6: Benefit threshold (y)

Participants' basic information: Pl: age; P2:BMI ; P3: major; P4: Green space exposure frequency；P5：WHO-5 scores；P6：Whether you smoke or not；P7：Whether to drink.

Meteorological data: M1:Ta; M2: RH; M3:Ws; M4 : BP;M5:L;M6:Oxygen concentration;M7:Carbon dioxide index.