SCIENTIFIC CULTURE

www.sci-cult.com

SCIENTIFIC CULTURE, Vol. 12, No. 2.1, (2026), pp. 309-322
Open Access. Online & Print

DOI: 10.5281/zenodo.122.12636

NATURE THERAPY IN DAILY LIFE: HOW URBAN JAPANESE INTEGRATE FOREST BATHING FOR HEALTH MAINTENANCE AND HEALING

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Received: 01/12/2025
Accepted: 02/01/2026

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ABSTRACT

Forest bathing (shinrin-yoku) research has emphasized immersion in large forests, limit-ing its relevance for urban populations. This study investigates how Japanese city resi-dents obtain comparable benefits through distinct cultural-spatial-temporal practices. Using qualitative interviews with 21 participants from Greater Tokyo and multi-layered coding of temporal patterns, spatial routines, and meaning structures, we found that ur-ban nature therapy functions as an integrated system rather than a discrete medical in-tervention. The analysis identified four practitioner types and revealed an "invisibility principle": the most enduring practices are those least recognized as therapeutic. Results highlight three mechanisms: brief "micro-doses" of nearby greenery accumulate restora-tive effects; religious sites operate as culturally protected health infrastructure that ampli-fies meaning; and seasonal rituals sustain engagement across decades without explicit health motivation. When personal, social, and cultural meaning align, practices persist for 15–20 years. We propose the concept of "embedded therapeutics"—healing woven into daily routines without conscious effort. This perspective challenges conventional behavior change models and suggests a paradigm shift: cities can be reframed from stressors into environments of flourishing by enhancing existing cultural-spatial-temporal systems ra-ther than creating separate therapeutic facilities.

KEYWORDS: Urban Nature Therapy, Embedded Therapeutics, Cultural-Spatial-Temporal System, Distributed Micro-Dosing, Sacred Spaces, Ikigai, Multi-Layered Analysis, Invisibility Principle.

1. INTRODUCTION

1.1. Background of the Study

As global urbanization accelerates—with over 68% of the world's population expected to live in cities by 2050—the question of how to maintain human health and well-being in urban environments becomes increasingly critical. This challenge is particularly acute in super-aging societies like Japan, where maintaining population health through accessible, sustainable practices is essential for social and economic sustainability [1,2].

Nature-based health interventions have gained recognition as effective approaches to urban health challenges. Among these, forest bathing or shinrinyoku has attracted particular attention in medical, environmental, and public health fields [3–6]. However, the conventional understanding of forest bathing as requiring immersion in large forest areas may limit its applicability in densely populated urban contexts.

The concept of ikigai—often translated as "life purpose" or "reason for being"—provides a valuable framework for understanding how nature therapy can be integrated into daily urban life. As Oe explains, ikigai encompasses the intersection of what you love, what you're good at, what the world needs, and what you can be paid for, creating a sense of life satisfaction and well-being [2]. This holistic approach to well-being aligns naturally with nature therapy practices that are embedded in daily routines rather than pursued as separate health interventions.

1.2. Research Rationale

Japan's unique position as a highly urbanized yet culturally nature-oriented society provides an ideal context for studying urban nature therapy. Despite rapid urbanization, Japanese cities have maintained significant green spaces, particularly within religious sites. This reflects historical patterns of sacred boundary-making that have protected natural areas within settlements for millennia [7].

The Japanese Forestry Agency formally introduced "forest bathing" in 1982 as a pub-lic health initiative [8]. However, the relationship between Japanese people and nature ex-tends far deeper, rooted in ancient cosmological understandings that continue to influence contemporary urban design and daily practices. This cultural foundation suggests that effective nature therapy models may already exist in Japanese urban life, operating through mechanisms that differ from Western therapeutic frameworks.

Furthermore, Japan's experience as a super-aging society offers crucial insights. With over 29% of the population aged 65 or older in 2025, Japan has developed innovative approaches to healthy aging that integrate physical activity, social connection, and nature contact [9]. Understanding these integrated approaches becomes increasingly relevant as other nations face similar demographic transitions.

1.3. Aim and Objectives

This study aims to document how urban Japanese residents integrate nature therapy into their daily lives for health maintenance and healing, to analyze the role of cultural and religious frameworks in facilitating urban nature therapy, to examine how community networks support nature-based health practices, and to provide insights for implementing sustainable nature therapy in urban environments globally.

2. LITERATURE REVIEW

2.1. Nature Therapy and Urban Health

Extensive research documents the physiological and psychological benefits of nature exposure. These include reduced cortisol levels, lower blood pressure, improved immune function, enhanced mood, and increased cognitive performance [3, 4, 10]. Recent neuroimaging studies have also revealed that nature exposure activates brain regions associated with emotional regulation and stress reduction, providing biological evidence for observed health benefits.

However, most research has focused on immersive experiences in large natural areas, potentially limiting applicability in urban contexts where such spaces are scarce or inaccessible. This gap raises important questions about whether brief encounters with small urban green spaces can provide similar benefits.

Urban living presents unique health challenges, including increased stress, reduced physical activity, social isolation, and limited nature contact. These factors contribute to rising rates of mental health disorders, lifestyle diseases, and premature mortality in ur-ban populations. While physical exercise is recognized as essential for health, public health interventions promoting exercise in cities have shown limited long-term success [11], suggesting a need for alternative approaches that integrate health-promoting behav-iors into existing daily routines.

2.2. Cultural Frameworks for Health and Well-Being

The concept of ikigai provides a culturally specific framework for understanding well-being that

extends beyond physical health. Oe [2] identifies ikigai as a bridge between traditional Japanese wisdom and contemporary society, encompassing purpose, social connection, and daily practices that contribute to life satisfaction. This holistic approach suggests that effective health interventions should address multiple dimensions of well-being simultaneously, rather than focusing solely on physical outcomes.

Research indicates that individuals with a strong sense of ikigai show better health outcomes, including lower mortality rates, better cognitive function in aging, and greater resilience to stress. These findings suggest that health interventions aligned with ikigai principles may be more effective and sustainable than those focused purely on disease prevention.

Research on Japanese "Blue Zones"—areas with exceptional longevity—reveals the importance of community networks in supporting health behaviors. Oe et al. identify key factors including social participation, mutual support systems, and shared activities that promote both physical activity and social connection [1]. These findings highlight how health behaviors are sustained through social infrastructure rather than individual motivation alone.

Interestingly, Oe [12] found that hillside living in Japanese cities, while presenting mobility challenges, actually promotes healthy aging through enforced daily physical activity and stronger community bonds. This "longevity paradox" demonstrates how environmental design can unconsciously promote health behaviors when combined with appropriate social and cultural support systems.

2.3. Sacred Spaces and Urban Nature Preservation

The preservation of nature within urban areas through religious sites reflects deep cultural patterns. Yamaoka and Oe trace this to prehistoric practices of establishing sacred boundaries that protected natural areas within settlements [7].

This historical continuity has resulted in a distributed network of green spaces throughout Japanese cities, providing accessible nature contact points for urban residents. These religious green spaces differ from secular parks in several ways: they are culturally protected from development, maintained through community involvement, imbued with spiritual significance, and integrated into daily movement patterns through their locations near residential areas. This suggests that the cultural framing of urban nature may influence its health effects.

2.4. Research Gap and Conceptual Framework

While extensive research exists on forest bathing's health benefits and separate literature addresses Japanese concepts of well-being, limited work examines how these elements combine in daily urban life. Most studies approach nature therapy as a discrete intervention rather than an embedded practice. This study addresses this gap by examining nature therapy as an integrated component of urban daily life, embedded within cultural, religious, and social frameworks that support health maintenance and healing.

3. METHODOLOGY

3.1. Research Methods

A qualitative approach was employed to capture the nuanced ways urban residents integrate nature therapy into their daily lives [13]. This method allowed exploration of participants' experiences, meanings, and cultural contexts that quantitative methods might overlook. Given the study's focus on embedded practices that participants might not consciously recognize as “therapy,” qualitative methods were essential for uncovering tacit knowledge and cultural assumptions.

3.2. Semi-structured Interviews and Triangulation

Semi-structured interviews provided flexibility to explore emerging themes while maintaining focus on key research questions [14]. Interview questions addressed daily routines, nature contact patterns, health perceptions, community activities, and cultural practices.

To ensure data credibility, we triangulated perspectives from three stakeholder groups: citizens practicing nature engagement, public sector officials involved in urban planning and health promotion, and advisers or consultants working in related fields [15, 16].

3.3. Sampling and Participants

Using convenience and snowball sampling [17], we recruited 21 participants from the Greater Tokyo area. Initial contact was made through a walking club member in Minatoward, who introduced other practitioners, leading to connections with local government officials and health advisers. This sampling approach was appropriate given the study’s exploratory nature and the need to identify participants engaged in regular nature contact within urban settings.

Table 1: Participant Demographics and Nature Therapy Practices.

ID	Category	Gender (age)	Nature therapy practices
Public sector			
P-1	Local council (M-Ward, Tokyo)	F (36)	Urban green space planning, shrine gardens
P-2	Local council (S-City, Chiba)	M (52)	Community health programs, park walks
P-3	Public body (M-Ward, Tokyo)	M (48)	Park management, seasonal events
P-4	Public body (S-City, Chiba)	M (66)	Senior wellness programs, temple visits
Citizens			
C-1	Citizen (M-Ward, Tokyo)	F (40s)	Daily shrine visits, seasonal rituals
C-2	Citizen (M-Ward, Tokyo)	M (50s)	Temple garden meditation
C-3	Citizen, (M-Ward, Tokyo)	M (70s)	Haiku walks, mountain pilgrimages
C-4	Citizen (M-Ward, Tokyo)	F (30s)	Lunchtime park visits
C-5	Citizen (M-Ward, Tokyo)	F (60s)	Shrine cleaning volunteer
C-6	Citizen (S-city, Chiba)	F (20s)	Walking club in local parks
C-7	Citizen (S-city, Chiba)	F (30s)	Marathon training in green spaces
C-8	Citizen (S-city, Chiba)	F (40s)	Pokemon GO nature walks
C-9	Citizen (S-city, Chiba)	F (40s)	Historical walking group leader
C-10	Citizen (S-city, Chiba)	M (60s)	Cycling club, urban-rural routes
C-11	Citizen (S-city, Chiba)	F (50s)	100km charity walks
C-12	Citizen (S-city, Chiba)	F (80s)	Church garden group
Advisers			
A-1	Disability support charity	M (40s)	Accessible nature programs
A-2	Elder care therapist	M (70s)	Urban pilgrimage routes
A-3	Public health professor	M (50s)	Community health research
A-4	Social work professor	F (40s)	Nature-based interventions

3.4. Data Collection and Analysis

Interviews were conducted between January and March 2025 in Japanese, lasting 45–90 minutes each. All interviews were recorded, transcribed, and translated by bilingual researchers. Using NVivo 12, we conducted thematic analysis to identify patterns in how participants integrated nature therapy into daily life [18]. The analysis process involved multiple rounds of coding, with themes emerging through iterative engagement with the data rather than being imposed through predetermined categories.

4. FINDINGS

4.1. Nature Therapy as Unconscious Daily Practice

Participants consistently reported that they do not consciously engage in "nature therapy" or "forest bathing" as deliberate health practices. Instead, nature engagement is seamlessly woven into daily routines: "I don't think 'I'm going to do forest bathing.' I simply stop by the shrine on my way to work. It's been my routine for 20 years. The few minutes among the trees there set my day right" (C-1).

This unconscious integration was particularly evident in activities that combined practical purposes with nature exposure: "My grocery shopping route goes through the temple grounds. It adds five minutes but gives me energy. I didn't realize this was 'forest bathing' until my doctor mentioned it!" (C-4).

Public officials noted this pattern in urban design: "We don't design 'forest bathing facilities.' We preserve shrine forests and temple gardens because they're part of our neighbourhoods. Health benefits come naturally" (P-3).

4.2. Sacred Spaces as Urban Nature Therapy Sites

Religious sites emerged as primary locations for urban nature therapy, serving multiple interconnected functions as follows.

Accessibility: "Every neighborhood has at least one shrine or temple. They're our local forests, always open, always free" (P-1).

Cultural preservation: "These spaces have survived centuries of urban development. Even during the bubble economy, nobody touched shrine trees. They're protected by something deeper than

law" (A-3).

Spiritual enhancement: "There's something different about shrine greenery. Maybe it's the sense of the sacred, but I feel restored in ways parks don't provide. It's not just trees—it's trees with meaning" (C-5).

Community ownership: "The shrine belongs to all of us. We clean it, celebrate there, pray there. It's not just green space—it's our space" (C-12).

4.3. Seasonal Rituals as Nature Therapy Frameworks

Participants described how seasonal religious and cultural events naturally incorporate nature therapy: "Japanese life follows the seasons. Cherry blossoms in spring, summer festivals, autumn leaves, New Year shrine visits—we're always celebrating in nature. It's not therapy, it's life" (C-3).

These seasonal markers create regular nature engagement opportunities that are culturally mandated rather than health-motivated

- Spring: Hanami parties under cherry blossoms combine social gathering with nature immersion
- Summer: Morning radio exercises in parks, evening festivals at shrines
- Autumn: Momijigari excursions to view changing leaves
- Winter: New Year shrine visits, plum blossom viewing

"Even busy salarymen who never exercise somehow find time for hanami. Culture succeeds where health education fails" (A-3).

4.4. Community Networks Enhancing Nature Therapy

Social dimensions emerged as crucial for sustaining nature therapy practices:

"Our walking club isn't about exercise—it's about friendship. We happen to walk in parks and visit shrines, but really we're maintaining our ikigai through connection" (C-9).

These groups create accountability and enjoyment that individual health motivation cannot sustain: "I tried jogging alone for health—lasted two weeks. But I've been with the shrine cleaning group for fifteen years. We chat, we laugh, we're in nature without trying" (C-5).

Groups ranged from formal clubs to spontaneous gatherings

- Morning exercise groups meeting in parks (predominantly elderly)
- Walking clubs exploring historical sites with green spaces
- Cycling groups traversing urban-rural boundaries
- Gaming groups using parks as gathering spots
- Volunteer groups maintaining religious green spaces

4.5. Micro-Dosing Nature: The Cumulative Effect

Rather than intensive forest bathing sessions, participants described cumulative benefits from brief, frequent nature contact: "It's not one big forest bath—it's many tiny ones. Morning shrine visit, lunchtime in the office garden, evening walk through the park. Together they keep me balanced" (C-2).

This "micro-dosing" approach aligns with urban rhythms: "City life doesn't allow forest retreats, but it offers constant small nature touches. The key is recognizing and using them" (A-4).

Participants identified numerous micro-dose opportunities

- Station platform gardens during commutes
- Roadside trees during walks
- Office building green walls
- Pocket parks during lunch breaks
- Home shrine visits morning and evening
- Seasonal decorations bringing nature indoors

4.6. Integration with Modern Life

Interestingly, participants successfully integrated traditional nature practices with modern technology: "Pokemon GO brought me back to parks I'd forgotten. Now I know every green space within 2km. The game was the excuse, but nature became the habit" (C-8).

"Our LINE group shares photos of seasonal changes—'Cherry blossoms at X shrine!' 'Autumn colors at Y temple!' Technology connects us to nature and each other" (C-6).

4.7. Deep Structure of Urban Nature Therapy: Findings from Multi-layered Coding Analysis

The multi-layered coding analysis of interview transcripts revealed distinct patterns in how participants engage with urban nature. This section presents the key findings organized by the three analytical dimensions.

4.7.1. Temporal Patterns of Nature Engagement

Analysis of temporal coding revealed three nested cycles of nature contact

- Daily rhythms: Participants demonstrated consistent micro-encounters throughout their day. C-1 described: "Every morning for 20 years, I stop at the shrine. Just 5 minutes, but it sets my day right." C-2 reported a tripartite

pattern: "Morning shrine visit, lunchtime in the office garden, evening walk through the park. Together they keep me balanced."

- Weekly/monthly patterns: Two distinct types emerged. Regular commitment was exemplified by C-5: "I've been with the shrine cleaning group for fifteen years. Every week, same time." In contrast, C-8 described episodic engagement: "Pokemon GO brought me back to parks I'd forgotten. Some weeks I go daily, others not at all."
- Seasonal cycles: All participants mentioned culturally-driven annual patterns. C-3 stated: "Cherry blossoms in spring, summer festivals, autumn leaves, New Year shrine visits—we're always celebrating in nature. It's not therapy, it's life."

4.7.2. Spatial Distribution and Accessibility

Spatial coding revealed a clear proximity gradient in sustainable practices:

Ultra-proximate spaces (within 5-minute deviation) showed highest usage. C-4 explained: "My grocery route goes through the temple grounds. It adds five minutes but gives me energy." C-1 noted: "The shrine is right on my commute path. No extra effort needed."

Proximate spaces (walking distance) were regularly accessed. C-8 reported: "Now I know every green space within 2km. The game mapped them all for me."

Sacred vs. secular spaces: Participants distinguished between space types. C-5 ob-served: "There's something different about shrine greenery. Maybe it's the sense of the sa-cred, but I feel restored in ways parks don't provide."

4.7.3. Layers of Meaning in Nature Engagement

The meaning analysis revealed three interacting layers

Personal meanings centered on bodily and emotional experiences. C-4 shared: "I didn't realize this was 'forest bathing' until my doctor mentioned it! I just knew it gives me energy." C-2 described: "Those tiny nature moments keep me balanced throughout the day."

Social meanings emphasized group connection. C-9 stated: "Our walking club isn't about exercise—it's about friendship. We happen to walk in parks, but really we're maintaining our ikigai through connection." C-5 contrasted experiences: "I tried jogging alone for health—lasted two weeks. But the shrine cleaning group? Fifteen years and counting."

Cultural meanings reflected deeper significance. A-3 observed: "These spaces have survived centuries. Even during the bubble economy, nobody touched shrine trees. They're protected by something deeper than law." C-12 expressed collective ownership: "The shrine belongs to all of us. We clean it, celebrate there, pray there."

4.7.4. Four Practitioner Profiles

Cross-analysis of the three dimensions revealed four distinct engagement patterns

- Profile 1 - Routine Integrators: Participants like C-1 and C-4 showed daily contact, ultra-proximate access, but limited conscious awareness. C-4's comment exemplified this: "I didn't know it was therapy until my doctor said so!"
- Profile 2 - Cultural Practitioners: C-3 and C-12 demonstrated variable frequency but deep cultural meaning. C-3 summarized: "It's not therapy, it's life."
- Profile 3 - Social Connectors: C-9 and C-5 prioritized group activities. C-9 explained: "We're a walking club that happens to walk in nature. The friendship comes first."
- Profile 4 - Digital Discoverers: C-8 and C-6 used technology to reconnect with nature. C-6 described: "Our LINE group shares seasonal photos—'Cherry blossoms at X shrine!' Technology connects us to nature and each other."

4.7.5. The "Invisibility" Pattern

A consistent finding across all dimensions was that the most sustained practices were those least recognized as health interventions. P-3, a public official, captured this: "We don't design 'forest bathing facilities.' We preserve shrine forests and temple gardens because they're part of our neighborhoods. Health benefits come naturally."

This pattern appeared strongest when all three dimensions aligned—daily frequency, ultra-proximate access, and multiple meaning layers—as illustrated by participants who maintained practices for 15-20 years without conscious health motivation.

5. DISCUSSION

5.1. Reframing Nature Therapy for Urban Contexts

This study reveals that effective nature therapy in urban settings operates through fundamentally different mechanisms than conventional forest bathing models. Rather than requiring intensive immersion in pristine natural environments, urban

nature therapy in Japan functions through what might be termed "distributed microdosing"—frequent, brief encounters with culturally significant green spaces integrated into daily routines.

This finding aligns with emerging research on "nature pills" suggesting that even 20-30 minutes of nature contact can significantly reduce cortisol levels. However, our results extend this by showing that multiple brief encounters (5-10 minutes) throughout the day may provide cumulative benefits comparable to longer sessions. This has profound implications for urban health policy, suggesting that distributed small green spaces may be more valuable than centralized large parks for population health (Figure 1).

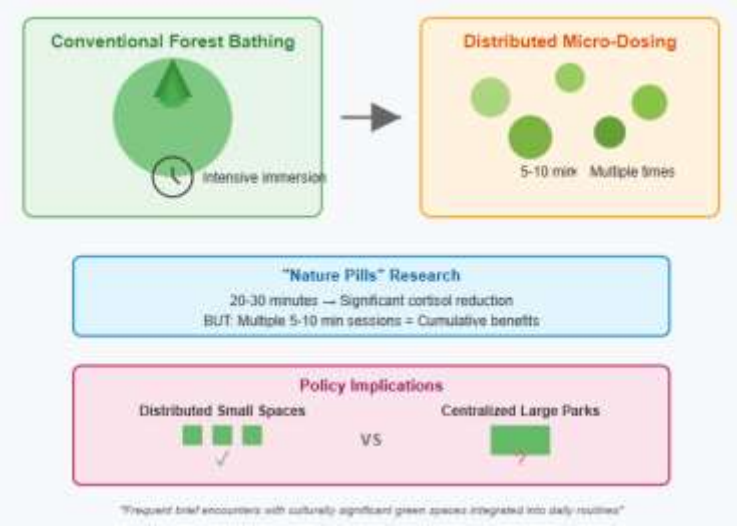

Figure 1: Urban Nature Therapy: New Model—Nature Pills (Authors' Creation Based on SVG).

5.2. Cultural Embedding as Sustainability Mechanism

The unconscious nature of participants' nature therapy practices reveals how cultural embedding enhances sustainability. When health behaviors are framed as cultural traditions rather than medical interventions, they face fewer psychological barriers to adoption and maintenance. This reflects patterns identified in Japanese Blue Zones, where longevity-promoting behaviors are embedded in social and cultural practices rather than pursued as explicit health goals [1].

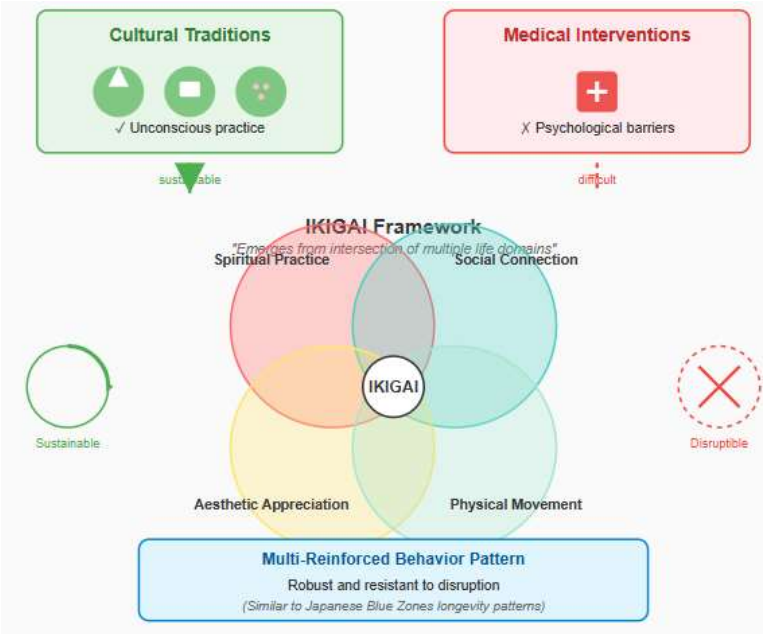

Figure 2: Cultural Embedding Enhances Sustainability (Authors' Creation Based on SVG).

The concept of ikigai provides a theoretical framework for understanding this integration. As Oe notes, ikigai emerges from the intersection of multiple life domains rather than singular pursuits [2]. Similarly, urban nature therapy in Japan operates at the inter-section of spiritual practice, social connection, aesthetic appreciation, and physical movement—creating a robust, multi-reinforced behavior pattern resistant to disruption (Figure 2).

5.3. Sacred Spaces as Health Infrastructure

The prominent role of religious sites in providing urban nature access demonstrates how cultural values can preserve and maintain health resources. As Yamaoka and Oe document, the designation of sacred boundaries has historically protected natural areas within human settlements across cultures [7]. In contemporary Japanese cities, this translates to a distributed network of green infrastructure that is culturally protected, community maintained, equitably distributed, and meaningfully enhanced. This suggests that ef-fective urban health infrastructure might leverage existing cultural institutions rather than creating new facilities.

5.4. Social Architecture Supporting Nature Therapy

The prominence of group activities in nature therapy practices supports Oe's findings on the importance of community networks for healthy aging [9]. These social structures provide reinforcement mechanisms such as social accountability, meaning multi-plication, knowledge transfer, and collective efficacy. This social architecture transforms nature therapy from an individual health behavior into a community practice, dramatically increasing sustainability and reach.

5.5. Theoretical and Practical Implications of the Multi-layered Analysis

The multi-layered coding analysis presented in section 4.7 reveals urban nature therapy as a complex adaptive system operating through mechanisms fundamentally different from conventional therapeutic models. This section examines the theoretical implications of these findings and their broader significance for urban health planning.

5.5.1. Reconceptualising Therapeutic Temporality

The temporal patterns identified in section 4.7.1 challenge linear dose–response models prevalent in environmental psychology. While Kaplan and Kaplan's Attention Restoration Theory assumes longer exposure yields greater benefits [19], our findings suggest urban contexts require a different temporal framework. The "rhythmic entrain-ment" demonstrated by participants aligns more closely with chronobiology research showing that regular, brief exposures can entrain circadian rhythms [20].

The distinction between sustained commitments and episodic engagement suggests two parallel pathways to nature therapy benefits. This duality extends Hartig et al.'s restoration theory by proposing that cultural embedding can substitute for conscious intention in maintaining therapeutic practices [21]. The seasonal cycles particularly demonstrate what we term "anticipatory restoration"—the psychological benefits of expected future nature contact, a mechanism absent from current theoretical models.

5.5.2. Spatial Justice and the Proximity Principle

The spatial findings (section 4.7.2) have profound implications for environmental justice theory. The "ultra-proximate" spaces that showed highest sustained use challenge the recreational planning paradigm that prioritizes destination parks. This aligns with Wolch et al.'s critique of park inequality [22] but suggests a different solution: rather than creating new large parks in underserved areas, cities might achieve greater health equity by enhancing micro-spaces within existing movement patterns.

The distinction participants drew between sacred and secular spaces introduces a dimension absent from current urban planning theory. While Attention Restoration The-ory treats all natural environments as functionally equivalent, our findings suggest cultural significance amplifies restorative effects—what we term "semantic enhancement." This finding resonates with work on therapeutic landscapes [23] but extends it by showing how cultural meaning can compensate for limited physical nature.

5.5.3. Meaning-Making as Active Ingredient

The three-layer meaning structure provides empirical support for meaning-focused health interventions while revealing their limitations. When C-5 contrasted failed individual jogging with successful group participation, this illustrated Antonovsky's sense of coherence concept [24]—but with a crucial modification. Rather than individual meaning-making, our findings show collective meaning construction as the sustaining force.

The interaction between personal, social, and cultural meaning layers suggests a multiplicative rather than additive effect. This challenges individualistic behavior change models [25] and aligns with social ecological approaches [26], but

goes further by show-ing how cultural frameworks can maintain behaviors without conscious health motiva-tion.

5.5.4. Practitioner Typologies and Differentiated Interventions

The four profiles identified suggest moving beyond one-size-fits-all approaches to nature-based interventions. For Routine Integrators, light-touch interventions may enhance implicit benefits without medicalizing the behavior. Cultural Practitioners reflect what Bourdieu termed habitus [27], suggesting that interventions should work through cultural channels rather than health messaging. Social Connectors demonstrate that na-ture can function as a "third place" [28], facilitating social capital formation. Digital Dis-coverers represent a novel pathway absent from pre-digital theorizing, showing that technology can serve as a bridge to nature if designed thoughtfully.

5.5.5. The Invisibility Principle and Public Health Paradigms

The "invisibility" pattern represents perhaps the most radical challenge to current public health thinking. The finding that the most effective urban nature therapy occurs below conscious awareness contradicts the planned behavior models [29] underlying most health interventions. Instead, it suggests what we term "embedded therapeutics "—healing processes woven so seamlessly into daily life that they require no conscious effort or motivation.

This principle has profound implications for global urban health. Rather than creating specialized therapeutic gardens or designated mindfulness walks—interventions requiring sustained individual motivation—cities might achieve greater population health impact by threading nature through routine pathways. This approach addresses the "implementation gap" plaguing behavioral interventions by removing the need for behavior change entirely.

5.5.6. Toward a Cultural-Ecological Model of Urban Health

Synthesizing these implications, our findings point toward a new theoretical frame-work: a cultural-ecological model of urban health that recognizes healing as an emergent property of culturally meaningful human–environment interactions rather than a discrete intervention outcome. This framework integrates insights from ecological psychology's affordances [30], social capital theory [31], chronobiology's temporal rhythms [20], and environmental justice's spatial equity [22].

This model suggests that effective urban health infrastructure emerges not from medical facilities or even parks per se, but from the intersection of accessible spaces, cultural practices, and social networks that together create conditions for human flourishing.

Implications for nature therapy design is as follows: This deep structural analysis fundamentally reframes urban nature therapy from a medical intervention to a cultural-spatial-temporal system. Rather than creating designated therapeutic gardens or forest bathing facilities, cities should

1. Enhance the invisible infrastructure: Strengthen the existing network of micro-nature sites along routine pathways
2. Leverage cultural rhythms: Align health interventions with existing seasonal practices rather than creating new programs
3. Support multi-layered engagement: Design interventions that simultaneously ad-dress personal, social, and cultural meanings
4. Embrace unconscious benefits: Recognize that explicit health framing may actually reduce effectiveness

This analytical framework reveals urban nature therapy not as a simplified version of forest bathing, but as a distinct phenomenon with its own logic, mechanisms, and optimization strategies—one that may be more sustainable and accessible than conventional nature-based interventions (Figure 3).

This visualization presents the multi-layered coding analysis as a graphic recording, illustrating the deep structure of urban nature therapy practices. The key visual elements unfold in four interconnected layers.

One is the set of three analytical axes shown in the upper section: the Temporal Axis (blue), which depicts the three-tiered temporal structure of daily cycles, weekly or monthly patterns, and seasonal rhythms; the Spatial Axis (green), which employs concentric circles to represent proximity zones ranging from ultra-proximate (within a five-minute radius) to distant locations; and the Meaning Axis (pink), which illustrates three nested layers of meaning—personal, social, and cultural—through overlapping ellipses.

Two is the integrated analysis at the center, represented by a yellow circle where all three axes converge, signifying the synthesis of temporal, spatial, and meaning dimensions.

Three is the set of four practitioner archetypes in the lower section: Unconscious Integrators (blue),

Cultural Practitioners (purple), Social Navigators (orange), and Technology-Mediated Reconnectors (brown).

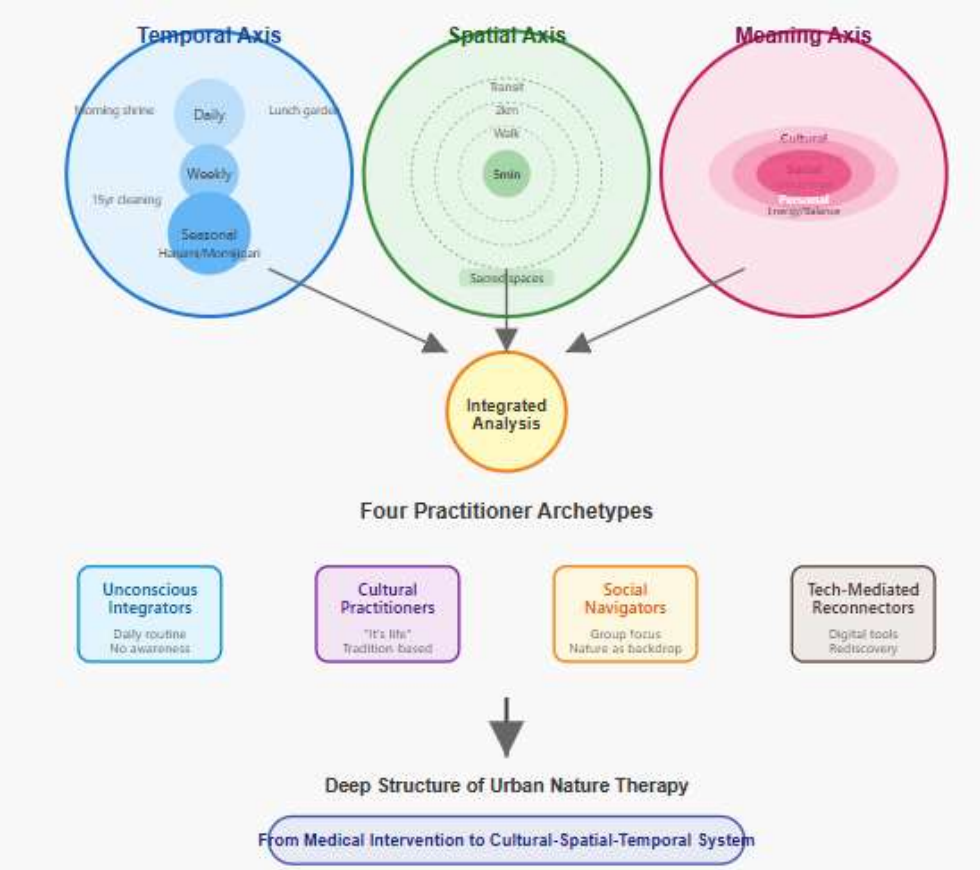

Figure 3: Multi-Layered Coding Analysis of Nature Therapy (Authors' Creation Based on SVG).

Four is the deep structure transformation at the bottom, which emphasizes the conceptual shift "From Medical Intervention to Cultural-Spatial-Temporal System." Together, these elements demonstrate that urban nature therapy operates not as a simple health behavior but as a complex cultural-spatial-temporal system, revealing its multi-dimensional operational logic at a glance.

6. CONCLUSION

This study fundamentally reframes urban nature therapy from a discrete medical intervention to what can be better understood as a cultural-spatial-temporal system—a paradigm shift with profound implications for global urban health. Through multi-layered analysis of how Tokyo residents integrate nature into daily life, we discovered that the most effective nature therapy operates not through conscious health-seeking behaviors but as an emergent property of culturally embedded practices, spatially distributed micro-encounters, and temporally rhythmic patterns.

6.1. The Paradigm Shift: Understanding Urban Nature Therapy as System

The conventional medical model approaches nature therapy as an intervention—something prescribed, measured, and administered for specific health outcomes. Our findings reveal this framework as fundamentally misaligned with how urban nature therapy actually functions. Instead, we propose understanding urban nature therapy as a complex adaptive system characterized by:

Cultural Embeddedness: The "invisibility principle" (Section 4.7.5) demonstrates that the most sustainable nature therapy practices are those least recognized as therapeutic. When nature contact is framed as cultural tradition (hanami), religious practice (shrine visits), or social activity (walking clubs) rather than health intervention, it bypasses psychological barriers and becomes self-sustaining for decades.

Spatial Distribution: Rather than concentrated doses in designated therapeutic spaces, effective urban nature therapy operates through what we term

"distributed micro-dosing"—brief encounters (5-20 minutes) with ultra-proximate green spaces (<5-minute deviation from routine paths). This challenges the recreational planning paradigm that prioritizes large destination parks.

Temporal Rhythmicity: Urban nature therapy functions through nested temporal cycles—daily anchor points (morning shrine visits), weekly social patterns (cleaning groups), and seasonal cultural rhythms (cherry blossoms to New Year rituals). These create what we term "chronotherapeutic scaffolding" that maintains engagement without conscious effort.

This systemic view reveals urban nature therapy not as a simplified version of forest bathing but as a distinct phenomenon with its own operational logic—one potentially more sustainable and accessible than conventional nature-based interventions.

6.2. Theoretical Contributions: Toward a Cultural-Ecological Model

Our findings necessitate fundamental revisions to existing theoretical frameworks.

First, the discovery that the most effective practices operate below conscious aware-ness directly contradicts planned behavior theories proposed by Ajzen (1991), which underlie most health interventions. Rather than emphasizing deliberate behavior change, the cultural-spatial-temporal system demonstrates that therapeutic encounters can be em-bedded within existing routines, thereby eliminating the need for intentional change.

Second, we introduce the concept of "embedded therapeutics," which describes healing processes woven so seamlessly into daily life that they require no conscious effort or motivation. This represents a fundamental departure from intervention-based models and reframes health as an emergent property arising from interactions among humans, their environments, and cultural practices.

Third, our findings extend restoration theory. While Attention Restoration Theory assumes that nature exposure is universally restorative, we observed that cultural and spiritual significance can amplify these restorative effects. Sacred spaces therefore provide greater restoration than secular parks not because of superior natural qualities but because of additional layers of meaning.

Finally, environmental justice can be reframed through the proximity principle. Health equity may be more effectively achieved by enhancing micro-spaces within existing movement patterns rather than by creating new large parks in underserved areas. This "capillary" approach to green infrastructure has the potential to democratize access to nature more effectively than conventional park development.

6.3. Practical Implications: Designing for Different Pathways

The four practitioner typologies identified through multi-layered analysis require differentiated strategies in policy and design. For Routine Integrators, who engage unconsciously with nature in daily life, it is important to preserve ultra-proximate green spaces situated along commute routes, to introduce light-touch awareness campaigns that high-light benefits without medicalizing the practice, and to protect informal nature encounters from the risks of over-designation. For Cultural Practitioners, whose engagement is embedded in tradition, effective measures include strengthening links between health services and cultural institutions, supporting seasonal festivals and the maintenance of religious sites, and framing public health messages through culturally resonant narratives. For Social Connectors, who are oriented toward group interaction, practical implications involve funding community groups that make use of green spaces, designing environments that encourage social interaction, and positioning nature therapy within community development frameworks. Finally, for Digital Discoverers, whose practices are mediated through technology, valuable interventions include developing applications that help reveal hidden green spaces, creating hybrid digital–physical experiences, and employing gamification to link contemporary lifestyles with traditional practices.

6.4. Global Applications: Principles and Translations

Although these findings emerge from the Japanese context, the core principles of proximity, meaning, rhythm, and social embedding are universally applicable. Effective implementation requires cultural translation rather than wholesale importation. The universal principles can be summarized as follows. The first is the idea of a "zero-friction zone," in which therapeutic encounters with nature must occur without special effort. The second is the importance of multi-layered meaning, where personal, social, and cultural dimensions combine to generate sustainable engagement. The third is the role of temporal rhythms that sustain practice without requiring conscious motivation. The fourth is the necessity of social scaffolding, which

compensates for the limitations of individual motivation.

The process of cultural translation builds on these principles. It begins with mapping existing cultural practices that already bring people into contact with nature. It then re-quires identifying ultra-proximate green spaces embedded within routine movement pat-terns, followed by discovering local systems of meaning that enhance the significance of natural encounters. Support for existing social groups takes precedence over the creation of entirely new programs, and interventions are most effective when aligned with cultural rhythms rather than imposed through external schedules.

Concrete examples illustrate how cultural translation operates in different regions. In Mediterranean cities, the evening passeggiata along tree-lined streets provides a natural framework for proximate therapeutic encounters. In Latin American contexts, plaza-centered social life integrates greenery into everyday interaction. In Northern European cities, seasonal light festivals in parks reinforce temporal and cultural rhythms, while in South Asian contexts temple gardens and community festival grounds combine spiritual meaning with communal engagement.

6.5. Future Research Directions

This paradigm shift opens several new research avenues. One direction involves mechanism studies that examine how cultural meaning amplifies physiological restoration and what neural pathways mediate the semantic enhancement of nature's benefits.

Another direction concerns comparative urban studies, asking how different urban cultures construct their own versions of the cultural-spatial-temporal system and identifying which elements are universal and which are culture-specific. A third direction relates to economic valuation, assessing the health economic benefits of distributed micro-green spaces in comparison with centralized parks and developing methods to quantify the prevention of disease achieved through embedded therapeutics. A fourth avenue is digital integration, exploring how technology can provide support without disrupting the invisibility principle and whether artificial intelligence can help identify and protect ultra-proximate green spaces. Finally, implementation science offers a crucial research trajectory, seeking ways to translate these principles into policy while preserving the unconscious and embedded qualities that make them effective in practice.

6.6. Final Reflections

This study suggests that the path to urban health lies not in medicalizing nature contact but in recognizing and nurturing the therapeutic systems already embedded in city life. In this sense, cities themselves can be understood as healing systems. The Japanese case demonstrates that urban environments need not be antithetical to human well-being; when cultural practices, spatial configurations, and temporal rhythms align, cities can actively support human flourishing.

The shift from medical intervention to a cultural-spatial-temporal system represents more than a theoretical reframing. It offers a fundamentally different approach to one of the twenty-first century's greatest challenges: maintaining human health in an urbanizing world. Rather than introducing yet another intervention into already overwhelmed healthcare systems, this perspective leverages existing cultural resources, spatial patterns, and social networks to create self-sustaining therapeutic ecosystems.

As societies confront converging crises of aging populations, mental health epidemics, and climate change, the embedded therapeutics model offers a measure of hope. It demonstrates that healing need not depend on escaping from cities or relying exclusively on scarce medical resources. Instead, by understanding and nurturing the cultural-spatial-temporal systems inherent in urban environments, we can reimagine cities as active sources of restoration. This transformation does not arise through grand interventions, but rather through the cumulative effect of countless small and meaningful encounters with nature, woven invisibly into the fabric of daily life.

Importantly, our findings resonate with recent global reviews of nature-based interventions [32,33] and align with the broader agenda of the United Nations Sustainable Development Goals, particularly SDG 3 on good health and well-being [34]. Taken together, this study contributes to both theoretical innovation and global policy discussions, demonstrating how cities can evolve into cultural-ecological healing systems for the twenty-first century.

Author Contributions: Methodology, Y.Y. and H.O.; Software, Y.Y.; Validation, H.O.; Formal analysis, H.O. and Y.Y.; Investigation, H.O.; Resources, Y.Y. and S.S.; Writing—original draft, H.O. and Y.Y.; Writing—review and editing, H.O. Y.Y. and S.S.; Project administration, Y.Y.. All authors have read and agreed to the published version of the manuscript.

Funding: No funding is obtained for this work.

Institutional Review Board Statement: Ethic Committee of Human Value Creation Lab; Approval Code: 2024 6A; Approval Date: 27 November 2024.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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

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