

传承或是生活方式引领者： 伦敦当代城市环境中的疗愈空间研究

LEGACY OR LIFESTYLE DRIVER: A LONDON STUDY OF HEALING SPACE IN CONTEMPORARY URBAN ENVIRONMENTS

收稿时间 RECEIVED DATE: 2016-01-23
中图分类号 / TU986 文献标识码 / A

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摘要

以往的研究表明，城市绿地对人类健康具有促进疗愈和恢复的积极作用。传承了有益于人类健康和宜居性的城镇与乡村相结合的后花园城市——伦敦已成为世界上最绿色的城市之一，公园绿地也已深深融入伦敦市民的日常生活之中。本文作者对伦敦中心城区及郊区进行了实证型研究，通过客观评估和主观调查，就建成环境品质、使用者态度和疗愈感知进行了研究。本文尤其关注疗愈感知的感官层面，旨在重新解读当代背景下疗愈空间的转变，并探究疗愈绩效提升的关键标准。最后，本文提出一个概念化的框架，以提升城市绿地设计的疗愈功效。

关键词

健康；宜居性；疗愈空间；感知；伦敦

ABSTRACT

Previous studies have indicated that urban green space has superior benefits for human health on healing and restoration. Inherited with the Post-Garden City legacy that created “the marriage of town and countryside” for health and livability, London has become one of the greenest cities in the world where gardens and parks greatly involved in daily life. The authors conducted an empirical study in central and suburban London to investigate the quality of built environment, user attitude and healing perception by objective assessment and subjective survey. With a special attention to the sensorial dimension of healing perception, this paper aims to reinterpret the transition of healing space in the contemporary context and investigate the key criteria for healing performance promotion. Finally, a framework is conceptualized as an attempt to enhance healing efficacy in urban green space design.

KEY WORDS

Health; Livability; Healing Space; Perception; London

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- ① 在本研究中，“英式花园”主要是指那些英国人在荒野环境中寻求与自然的传统花园，而不是景观设计领域中所讨论的风格和细节。
- ② “花园城市运动”是一种19世纪末起源于英国的城市规划方法，其对现代城市的社会、经济和文化领域产生了深远影响。
- ③ 数据源自GiGL（2013年）。GiGL是首都地区的环境记录中心，其对伦敦地区的野生动物、公园、自然保护区、花园及其他开放空间的详细信息进行比对、管理和可利用率；并与服务水平协议者、客户和公众合作，可提供多种数据服务。请访问：<http://www.gigl.org.uk/about-gigl/>。
- ④ 这里的“后花园城市时代”是由作者定义的，其在花园城市运动为英国留下了丰硕的成果遗产后的新发展阶段。

- ① In this study, the discussion of English garden mainly refers to the traditional sites where English sought for social connection with nature in the wildernesses, rather than the styles and details in the realm of landscape design.
- ② The Garden City Movement is a method of urban planning initiated from the late 19th century in the UK, which deeply impacted the development of the modern city in social, economic and cultural domains.
- ③ Data source comes from Greenspace Information for Greater London (GiGL), 2013. GiGL is the capital's environmental records centre. They collate, manage and make available detailed information on London's wildlife, parks, nature reserves, gardens and other open spaces. They work with service level agreement holders, customers and the public to meet a range of data needs. Source: <http://www.gigl.org.uk/about-gigl/>.
- ④ Here the Post-Garden City era is defined by the authors which represent the newly developed phase after the Garden City Movement gained great achievements in the UK.

1 引言

英式花园^①是社会转型的产物。从封建时代供上流阶级炫耀财富、权利、社会地位的传统皇家狩猎场，到资本主义时代现代城市中的公共财富——这时的精英阶层将教育模式作为统治系统的一部分——花园对城市发展和社会风纪做出了显著贡献^[1]。在伊丽莎白一世和斯图亚特早期时期，英国潮湿阴沉的气候导致很多人患有流行性忧郁症这种被称为“英国病”的疾病。正是花园的野趣之美令患者的精神从现实中抽离出来，并渐渐疗愈^[2]。工业革命后，快速的城镇化使得近3/4的人口生活在城市中，造成了严重的社会和环境问题，包括空气污染、水污染、贫民区涌现、居住环境拥挤、瘟疫传播等^[3]。为了将充满活力的城市生活和环境优美的乡村区域这二者的优势相整合，花园城市运动^②（由埃比尼泽·霍华德爵士于1898年首次提出）应运而生，其目的是创造有别于城市和乡村的第三种城镇规划方式——带有疗愈花园的城市^[4]。

花园城市运动使得伦敦成为了世界上最绿色的城市之一^[5]。2009年，时任伦敦市长鲍里斯·约翰逊曾说：“提高生活品质应成为所有公共主管部门的主要目标之一”^[6]。对于伦敦这座城市来说，更好的生活品质有赖于那些优美的公园、广场和街道——它们既在城市建成环境中创建了安静惬意的空间，也营造了更好的生活体验（图1）。来自大伦敦地区绿地信息中心（GiGL）^③的数据表明，大伦敦地区约47%的地区为未开发绿地，其中约39%具有环境舒适价值或潜在环境舒适价值（表1）。伦敦的绿地网络体系完善：从位于郊区的规模较大的地域性和都市性公园，到内城区中规模中等的地区性和当地性的公园，再到街区中小规模的口袋公园和街头广场^[6]，所有这些绿地使人们的日常生活与自然开放空间联系在一起。在后花园城市时代^④背景下，伦敦的目标是成为世界上拥有最佳城市建成环境和生活品质的城市^{[6][7]}。一系列针对城市开放空间开发的政府主导性策略和指导原则已经制定，以提升城市整体竞争力，进入后花园城市时代，以使伦敦拥有一个更美好的未来^{[6]-[11]}。

1 Introduction

The English garden^① was developed with a social transition. From traditional royal hunting grounds in the Feudal Age where upper class showed off wealth, power and social status, to the public treasure of modern cities in the Capitalist Era where Elitism employed education model as part of the ruling system, the gardens revealed renowned contributions in the urban development and social discipline^[1]. In the Elizabethan and early Stuart Period, the wet and gloomy climate in the UK generated an epidemic melancholia called the “English Malady,” which was recuperated by the gardens via taking spirit away from reality to wildness^[2]. After the Industrial Revolution, rapid urbanization attracted almost three-quarter of the UK population to live in towns which caused serious social and environmental problems, including air and water pollution, slums, overcrowding and pestilence^[3]. With a prospect to integrate the advantages of energetic town life and beautiful countryside, the Garden City Movement^② was launched by Sir Ebenezer Howard in 1898, which aimed to create a third alternative in new town planning — a city with garden therapy^[4].

Inherited with the legacy of the Garden City Movement, London has become one of the greenest metropolis in the world^[5]. The Mayor of London Boris Johnson (2009) once said “one of the principal aims of any public authority is to improve the quality of life”^[6]. For London, a better quality of life counts upon great parks, squares and streets that provide perceivable tranquillity and peace as well as better living experience in the urban built environment (Fig. 1). According to the data of Greenspace Information for Greater London (GiGL)^③, roughly 47% of Greater London is undeveloped green space and 39% of which has amenity values or potential amenity values (Table 1). The green networks are well-developed in London: From a large area of regional and metropolitan parks in the suburban to a middle size of the district and local parks in the inner city, as well as small size pocket parks and street squares in the neighborhood^[6], all of which have connected everyday life with natural open space. In the Post-Garden City era^④, London is targeted as the world leading city with the highest level of built environment and quality of life^{[6][7]}. A series of government-led strategies and guidelines for urban open space development have been formulated to promote the holistic competitiveness and bridge the gap between the Post-Garden City era to a better future London^{[6]-[11]}.

无论是在经济和社会文化的宏观层面，还是在建成环境的具体领域，城市绿地都被视为生活经历中的一种健康场所^{[12][13]}。城市绿地在促进健康方面的裨益包括提供身体活动场地、降低肥胖和心脏疾病风险、改善心理健康和整体福祉等^{[14]-[20]}。事实上，城市绿地网络不不仅可以缓解城市的建筑密度，还能够满足人们追求更好的生活品质、环境保护、社会凝聚力和经济发展的基本需求^[21]。本文对于伦敦后花园城市遗产的研究出于两个目的：（1）在当代语境下，重新解读传统绿地向疗愈空间的转变过渡；（2）制定一个能够提升疗愈空间绩效的概念框架。

From the macroscopic economic and socio-cultural perspective to the specific domain of built environment, urban green space is perceived as a healthy place in life experience^{[12][13]}. The benefits of urban green space for health promotion includes physical activities provision, reducing risk of obesity and heart disease, improving mental health and overall well-being, etc.^{[14]-[20]} Indeed, urban green networks are not merely used to relieve architectural density in the city, but also to establish a connection with people's essential requirement for a better quality of life, environmental conservation, social cohesion and economic development^[21]. This paper investigated the Post-Garden City legacy in London for two purposes: (1) to reinterpret the transition of conventional green space into healing space in a contemporary context; (2) to develop a conceptual framework which promotes the performance of healing space.

1. 对于伦敦这座城市来说，更好的生活品质有赖于那些优美的公园、广场和街道——它们既在城市建成环境中创建了安静惬意的空间，也营造了更好的生活体验。
1. For London, a better quality of life counts upon great parks, squares and streets that provide perceivable tranquility and peace as well as better living experience in the urban built environment.

Physiological activity and healthy lifestyle
身体运动和健康的的生活方式



Psychological restoration and healing from nature
生理恢复和自然疗愈



Urban livability and social well-being
都市宜居性和社会福利



表1：大伦敦地区绿地信息中心提供的伦敦开放空间的主要统计数据
Table 1: Key Statistics of Open Space in London by GiGL

土地利用 Land Use	面积 Area (hm ²)	所占比例 Percentage
公园和花园 Parks and Gardens	9,208	5.77%
自然和半自然的城市绿地 Natural and Semi-natural Urban Greenspace	8,815	5.53%
绿色廊道 Green Corridors	5,678	3.56%
户外运动设施 Outdoor Sports Facilities	10,624	6.66%
便利设施 Amenity	6,598	4.14%
儿童和青少年活动设施 Children and Teenagers	72	0.05%
划拨地块、社区花园和都市农场 Allotments, Community Gardens and City Farms	992	0.62%
墓地和教堂墓地 Cemeteries and Churchyards	1,389	0.87%
其他城市边缘类型 Other Urban Fringe	12,885	8.08%
公共空间 Civic Spaces	74	0.05%
其他类型 Other	3,291	2.06%
未知类型 Unknown	2,650	1.66%
总计 Total	62,276	39.05%

2 理论综述

2.1 绿地和公共健康

以往的研究证明,物理环境与公共健康情况之间极有可能存在显著关联性,而健康的建成环境需要来自公共空间设计的指导^[22]。免费开放的、可达的绿地可通过提供身体活动场地和建筑物与其周边景观环境的融合对人体健康产生影响^[23]。泰瑞·彼卡拉等人^[24]制定了一个概念框架,以比对和身体活动相关联的公共绿地的潜在相关指标。该概念框架将物理环境属性和身体活动行为分为4类:功能性、安全性、美观性,以及目的性^{[25][26]}。基于这一框架,产生了一系列完善的用以评估建成环境对身体活动影响的方法^{[27]-[30]}。阿丽亚娜·本迪莫-瑞恩等人^[31]进行了一项研究,以建立一个用于测量公园在公共健康中所起作用的概念模型。脱胎于模型的直接观察手段旨在从特色、状况、可达性、美观性、安全性和政策等方面对公园的特征进行评价^[32]。这种公园特征模型可对特定的地理区域进行系统性分析,这对关于环境规划和城市政策制定的后续研究有着重要影响^{[33]-[36]}。

2.2 自然恢复和感官感知

爱德华·威尔逊提出了亲自然假说,即认为“人类天生会对其他生命和仿生命过程寄予情感”^[37]。实证型研究表明,对某些自然元素和环境的适应性反应是深入人类的基因基础的^[38]。由于日益严重的全球城镇化,人类已与大自然逐渐分离,这导致了慢性、非传染性疾病的频繁发生^[22],以及抑郁症及其他精神疾病的高发病率^[39]。现代环境心理学发现,自然环境有助于促进精神疲劳恢复,从而提升人类健康^{[40]-[42]}。关于疗愈花园的研究强调了自然环境治疗作用的核心能力,这不仅有益于提升人类的情感福祉,也有利于人们从负面压力和威胁中更快、更全面地恢复^[43]。研究证明,只要我们日常生活中可以接触到自然,即使是那些不起眼、平凡无奇的绿地,也可能为人类健康和福祉带来诸多裨益^[44]。此外,自述性生活满意度与人类的生活环境存在高度相关

2 Theoretical Review

2.1 Green Space and Public Health

Previous studies have demonstrated that the physical environment has high potential to associate with public health while a healthy built environment requests guidelines for public space design^[22]. Free, accessible green space might influence human health via the provision of physical activity and the integration of the building and its surrounding landscape setting^[23]. Terri Pikora et al.^[24] have developed a conceptual framework to collate potentially relevant indicators of public green space associated with physical activities. This conceptual framework has grouped the physical environmental attributes and physical activity behaviours into four categories: functionality, safety, aesthetics, and destinations^{[25][26]}. Based on this framework, there are a series of well-developed approaches to audit the built environment for physical activity^{[27]-[30]}. Ariane Bedimo-Rung et al.^[31] conducted a research to construct a conceptual model for measuring the role of parks in public health. A direct observation instrument was developed from the model that aims to assess park characteristics by the following domains: features, condition, accessibility, aesthetics, safety and policies^[32]. The park characteristics model has systematically analyzed the categories into specific geographic areas, which significantly impacts subsequent studies on environmental planning and urban policy-making^{[33]-[36]}.

2.2 Nature Restoration and Sensation Perception

Edward Wilson proposed the Biophilia hypothesis that identified “the innately emotional affiliation of human beings to other life and lifelike processes”^[37]. The evidence-based research indicated that adaptive biophilia response towards certain natural elements and settings embedded in human genetic basis^[38]. Even since the ever-increasing global urbanization, humans have been separated from mother nature that associated with chronic, non-communicable diseases^[22], as well as a higher incidences of depression and other psychiatric disorders^[39]. Modern environmental psychology has found that the natural environment has a restorative benefit for human health in fostering recovery from mental fatigue^{[40]-[42]}. The research of healing garden stresses the core capacity of therapeutic function in natural context that fosters emotional well-being and enhances faster and more complete recovery from negative stress and threats^[43]. It verified that even the modest unspectacular green space could contribute multiple benefits for human

性，这说明自然环境在人类健康和福祉方面发挥着非常关键的作用^{[44]-[46]}。

环境心理学中的感知被定义为获得对感官信息的认知和理解的过程，其会随着环境特征和人类行为的变化而变化^[47]。从现象学的角度出发，体现这个世界真实形态的是感知体验，而非客观量化^[48]。人通过视觉、听觉、嗅觉、触觉、想象等来认知某个场所，而且场所的品质在一定程度上由使用者的情绪和感受所决定^[49]。对于某个场所的感官层面反映出个体的心理投射，其会调动并组织生活经历中的记忆、意象、感受、情感、意义和想象力^[49]。

经由感官认知，自然的“疗愈功能”可以减轻焦虑和抑郁^[50]。关于视觉与自然联系的研究主要集中于对形态心理学中的感知与行为研究，以及对紧张、痛苦和精神疲劳的视觉偏好和响应^{[51]-[53]}。听觉刺激领域研究了声音与记忆的相关性、听觉偏好、与视觉设计的协同作用等方向^{[54]-[56]}。嗅觉刺激的研究强调人类免疫记忆的效果，以及芳香疗法的功能^{[48][57][58]}。触觉研究包括触摸和治疗性触觉活动等^{[59]-[61]}。味觉研究主要包括与嗅觉设计的协同效应，以及与自然产物相关的品尝活动^{[62][63]}。此外，热舒适度感知研究了微气候环境对人体反应和身体活动的影响^{[34][64]}。

2.3 研究假设

近几十年来，“疗愈花园”语境下的“疗愈”是指压力的缓解以及环境抚慰和恢复一个人的心理和情绪健康的能力，而非强调疗愈花园能够治疗疾病^[65]。因此，本研究中的疗愈空间已经从最初的医疗语境转移到广泛的社会、心理和情感福祉层面^[66]，其在日常生活中提供身体、心理和精神疗愈^[67]。本研究假设提出城市公共绿地如果配置得

health and well-being as long as nature is available surrounded in daily life^[44]。Also, the self-reported life satisfaction is highly correlated with the human living environment, which identifies natural environment contributes a crucial part in health and well-being^{[44]-[46]}。

Perception in environmental psychology is defined as the process of attaining the awareness or understanding of sensory information which intervenes or mediates between the environmental features and human behavior^[47]。From the phenomenological point of view, the real shape of the world is represented by the perceptual experience rather than the objectified quantification^[48]。People cognize a place by seeing, hearing, smelling, touching, imaging, etc., and quality of the place could be partially defined by the moods and feelings of occupants^[49]。The sensorial dimensions in a place represent the feelings from the mental projection of individuals which evokes and organizes memories, images, feelings, sentiments, meanings and imagination in life experience^[49]。

The “healing power” of nature relieves anxiety and depression via sensation perceptions^[50]。The research of visual and nature connection focuses on perception and behavior studies of Gestalt psychology, as well as visual preference and responses towards stress, pain and mental fatigue^{[51]-[53]}。Auditory stimulation investigated the correlation between sound and memory, sound preference, as well as a synergistic effect with visual design^{[54]-[56]}。The study of olfactory stimulation stresses on the effect of human immune memory, and the function of aromatherapy^{[48][57][58]}。Haptic research includes the scope of touching and therapeutic haptic activity^{[59]-[61]}。Gustation study refers to the synergistic effect with olfactory design and the tasting activity relevant to natural products^{[62][63]}。Besides, the perception of thermal comfort investigates the influence of microclimatic environment towards human reaction and physical activities^{[34][64]}。

2.3 Research Hypothesis

In recent decades, the reference of “heal” in the context of “healing garden” refers to the alleviation of stress and the ability of the environment to soothe and restore one’s mental and emotional health, instead of stressing the idea that they can cure a person^[65]。Therefore, healing space in this research has shifted from the original medical setting in healthcare only towards a broad vision of social, psychological and emotional well-being^[66]，which providing physical, mental and spiritual healing in everyday setting^[67]。The research hypothesis prospects that urban public green space, if well configured, could be therapeutic and upgraded to healing space for public

⑤ 调查问卷的题目设置及相关研究计划获得了香港大学非临床性人类研究伦理委员会的研究伦理许可，许可编号：EA250314。

⑤ The questionnaire items and relevant research proposal obtained Research Ethical Approval from the Human Research Ethics Committee for Non-clinical Faculties, the University of Hong Kong with Reference No. EA250314.

当，将可能具有治愈性，并提升为可促进公众健康的疗愈空间^[68]。此外，人类的感觉是疗愈感知中的一个重要因素，其可以促进获得建成环境感官上的体验，并在日常生活中创建一种更人性化的设计^[48]。

虽然城市绿地和多种健康效益之间的相关性已经得到了有力证明，但当代疗愈空间的定义和标准却仍旧模糊。本文记述了作者在伦敦进行的一项旨在探究城市绿地疗愈绩效的实证型研究。

3 研究方法

3.1 案例选择

本实证型研究整合了观察性评估和抽样自述式问卷调查^⑤。作者于2014年5月对伦敦中心城区和郊区的15处城市绿地（图2，表2）进行了调查，以记录相关环境特点，并对设计的环境品质进行评估。场地选择标准包括：向公众开放；免费开放或票价亲民；从社区乘坐公共交通工具或步行可达；有为儿童、老人和其他群体提供的设施和活动项目；具有安全控制和日常管理；拥有治疗性环境。

health promotion^[68]. Also, human sensation performs as an important factor in healing perception, which enhances to appreciate sensuous occupation of the built environment and creates a more humane design in everyday life^[48].

Although the correlation between urban green space and the various healthy benefits has well established, the definition and criteria of healing space in contemporary era are obscure. In this research, the authors conducted an empirical study in London as an attempt to investigate the healing performance in urban green space.

3 Research Method

3.1 Case Selection

The empirical study integrated an observational assessment and a cross-sectional, self-administered questionnaire survey^⑤. The authors investigated fifteen cases in central and suburb London (Fig. 2, Table 2) in May 2014 to record the environmental characteristics and evaluate the physical quality of design. The criteria for the case selection include open to the public; free of charge or with affordable admission; connectivity with public transportation or walkability from the neighborhood; available facilities and programs for children, seniors and other groups; security control and regular management; therapeutic environment.

2. 本研究中的15处城市绿地

2. 15 sites investigated in the research

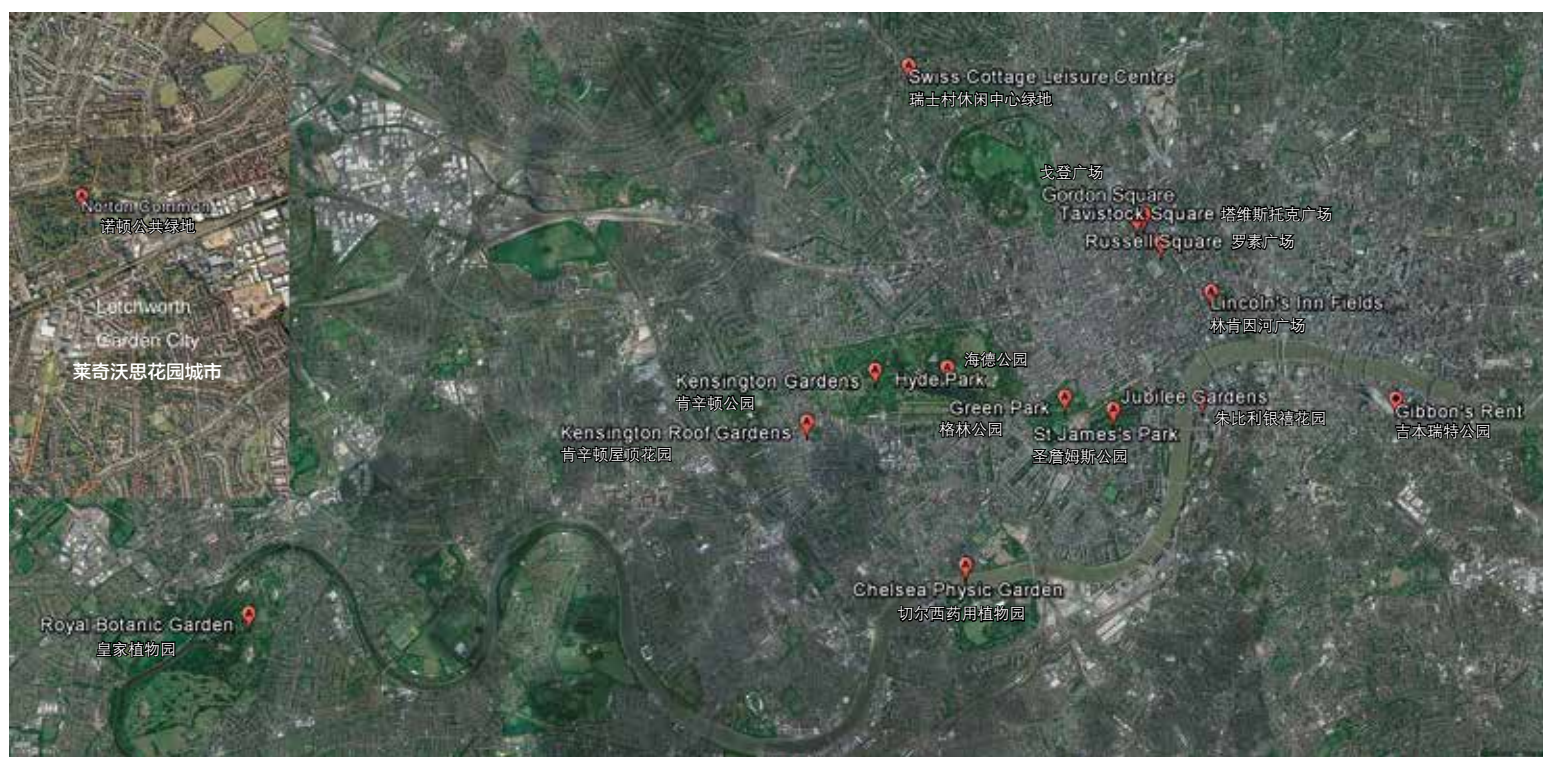


表2: 本研究15处所选场地概况
Table 2: Inventory of 15 Selected Cases

类型 Typology	场地名称与缩写 Name and Abbreviation	收费情况 Admission	主要特色 Main Feature
传统皇家公园 Heritage Royal Park	海德公园 (HP) Hyde Park (HP)	免费 (国家政府出资管理) Free admission (national government)	自17世纪以来伦敦中心城区最著名的传统皇家公园, 也是广受游客和当地居民喜爱的热门景点。 The most famous heritage royal parks in central London since 17th century, as well as the most popular scenic areas beloved by the visitors and local inhabitants.
	肯辛顿公园 (KG) Kensington Gardens (KG)		
	圣詹姆斯公园 (SJP) St. James's Park (SJP)		
	格林公园 (GP) Green Park (GP)		
传统街边公园/广场 Heritage Street Garden / Square	罗素广场 (RS) Russell Square (RS)	免费 (地方政府和慈善机构出资管理) Free admission (local government and charities)	为纪念自19世纪初期以来伦敦大学校园周围的、有关名人和历史事件的文化古迹而建。 Historical cultural monuments for celebrities and events dispersed around the campus of University of London since early 19th century.
	塔维斯托克广场 (TS) Tavistock Square (TS)		
	戈登广场 (GS) Gordon Square (GS)		
	林肯因河广场 (LIF) Lincoln's Inn Fields (LIF)		
	肯辛顿屋顶花园 (KRG) Kensington Roof Gardens (KRG)	收费较低 (私人慈善机构出资管理) Cheap admission (private charities)	该具有历史意义的屋顶花园——其曾经是欧洲最大的屋顶花园——目前维护良好, 并与一家精致的餐厅融合, 以迎合各种商业活动的开展。 The historical roof garden (used to be the largest in Europe) which is well maintained and integrated developed with an exquisite restaurant for diverse commercial events.
现代城市/社区公园 Modern Urban / Community Garden / Recreation	瑞士村休闲中心绿地 (SCLC) Swiss Cottage Leisure Centre (SCLC)	免费 (地方政府和慈善机构出资管理) Free admission (local government and charities)	城市复兴项目, 将绿地与翻新的图书馆、体育中心、社区中心和剧院等场馆设施相整合。 Urban redevelopment project which integrated green space with refurbished library, sports centre, community centre and theatre.
	朱比利银禧花园 (JG) Jubilee Gardens (JG)		为纪念女王的钻禧庆典而建, 其亦是2012年伦敦奥运会的一个重要公共场所, 园区内的茵茵草坪和微地形相结合, 构成了令人惊叹的城市绿地。 In memory of Queen's Diamond Jubilee celebration and a key public venue for London 2012 Olympics, the park performed as a spectacular urban green land with lush lawn and micro-topography.
	吉本瑞特公园 (GR) Gibbon's Rent (GR)	免费 (私人慈善机构出资管理) Free admission (private charities)	一个将位于伦敦市中心社区的狭窄小巷转变为城市中的最新公园的创新项目。 An innovative project which converted a set of narrow laneways of community in central London into the city's newest park.
传统英式植物园 Traditional British Botanic Garden	切尔西药用植物园 (CPG) Chelsea Physic Garden (CPG)	收费较低 (私人慈善机构出资管理) Cheap admission (private charities)	该传统英式植物园是拥有来自全球各地的植物物种的研究型机构, 其将一个国家级花园转变为一座服务于市民的广受喜爱的现代休闲场所。 Traditional British botanic garden with lush global plant species and research-based institution which transferred a national garden into a popular, modern recreation place for citizen.
	皇家植物园 (RBG) Royal Botanic Garden (RBG)	票价亲民 (国家级慈善机构出资管理) Affordable admission (national charities)	
经典花园城市的城市 绿地 Classic Garden City Urban Green	莱奇沃思花园城市诺顿公共绿地 (LGCNC) Letchworth Garden City Norton Common (LGCNC)	免费 (地方政府和慈善机构出资管理) Free admission (local government and charities)	世界上第一座由埃比尼泽·霍华德爵士设计的花园城市, 其将城镇和自然合二为一, 共同发展。 The world's first Garden City launched by Sir Ebenezer Howard which integrated development of town and nature.

- ⑥ 天空视域因子 (SVF) 是指未被植被或建筑物遮挡的开放天空占视线上空半球的分比率。
- ⑦ 总立地因子 (TSF) 是指在一定周期内, 穿透林冠下层的入射辐射的量化比率。
- ⑥ Sky view factor (SVF) is the fraction of the open sky which unobstructed by vegetation or buildings in the region of the overlying hemisphere.
- ⑦ Total site factor (TSF) means ratios that quantify the amount of incident radiation that penetrates below canopy for a given period.

3.2 现场测量和观察

作者对与热舒适度相关的可观察到的微气候参数进行了研究, 包括空气温度 (Ta)、相对湿度 (RH)、风速 (WV)、天空视域因子 (SVF)^⑥以及总立地因子 (TSF)^⑦。实时测量在白天上午10:00时至下午19:00时间随机进行 (因为这个时段适合进行户外活动)。

现场观察包括交通环境、目的地所含内容、管理和安全、美观性和设计特色等类别。交通环境关注公共交通的可达性, 以及步行和自行车设施的配置情况。目的地所含内容指的是公共绿地中的用于放松和恢复的项目和设施。管理和安全对项目的整洁程度、安全程度和定期维护程度等环境品质进行检查。美观性和设计特色关注基于感官的疗愈绩效, 包括各种组成部分及其设计风格、感官功能和模式。

4 结果

4.1 环境评估

4.1.1 微气候环境评估

于2014年5月在伦敦进行的实时微气候指标调查的平均值如表3所示。作者还研究了太阳辐射强度的SVF和TSF。通常情况下, SVF值越高, 意味着日间气温越高, 这是由于更多的太阳辐射可直接到达建成环境的地表^[69]。因此, 在春季, 大约一半的太阳辐射可以到达地面空间, 这使得户外绿地具有温暖的热舒适性。

4.1.2 建成环境评估

详细的建成环境评估如表4所示。前两类 (交通环境和目的地所含内容) 以“是”或“无”标记; 后两个类别 (管理与安全, 以及美观性和设计特色) 分为三个评价层次, 分别是优秀、良好和一般。在

表3: 记录到的户外热力参数
Table 3: Recorded Outdoor Thermal Parameters

测量工具 Measuring tool	气候指标 Climate indicator	平均值 Mean	最高值 Maximum	最低值 Minimum	标准偏差 SD
Kestrel 4000型袖珍天气追踪仪 Kestrel 4000 Pocket Weather Tracker	气温 (°C) Air Temperature (°C)	17.99	27.00	12.40	3.50
	湿度 (%) Humidity (%)	44.07	62.50	26.40	10.52
	风速 (m/s) Wind Speed (m/s)	0.80	2.00	0.30	0.39
相机: 尼康E4500型, 配置FC-E8 鱼眼转换镜头 软件: WinSCANOPY2014植物冠 层分析软件 Camera: NIKON E4500 with FC-E8 Fish-Eye Converter Lens; Software: WinSCANOPY2014	天空开敞度 (%) Sky Openness (%)	41.83	72.56	17.62	18.99
	总立地因子 (%) TSF (%)	52.19	93.51	11.45	32.03
	檐下辐射参数 (mol/m ² 每天) PPFD Under (mol/m ² day)	24.69	45.77	5.36	15.38

3.2 Site Measurement and Observation

The authors investigated the observational microclimate parameters relevant to the perceived thermal comfort, namely air temperature (Ta), relative humidity (RH), wind velocity (WV), sky view factor (SVF)^⑥ and total site factor (TSF)^⑦. The real-time measurements randomly conducted during daytime 10:00 am to 19:00 pm that is suitable for the outside activities.

The site observation comprised of categories in transportation environment, destination content, management and security, aesthetics and design features. Transportation environment concerns the availability of public transportation and the configuration for walk and cycling. Destination content refers to the programs and facilities in public green space for relaxing and restoration. Management and security inspect the environmental quality in cleanliness, safety, and the regular maintenance. Aesthetics and design features concentrate on the sensorial based healing performance, including components and design styles, as well as the sensorial feature and patterns.

4 Results

4.1 Environment Assessment

4.1.1 Microclimate Environment Assessment

The mean value of real-time microclimate indicators of May 2014 in London was presented in Table 3. The authors also investigated SVF and TSF of solar radiation admittance intensity. Usually, higher SVF contributes to higher air temperature in the daytime due to more direct solar radiation access into the ground level of built environment^[69]. Thus, around half of solar radiation could access the ground space in the spring season, which regulated the thermal comfort at a warm level in the outdoor green space.

4.1.2 Physical Environment Assessment

The details of the physical environment assessment were presented in Table 4. The first two categories — transportation environment and destination content — were marked by “yes” or “nil” and the last two categories — management and security, and aesthetics and design features — were estimated by three levels: excellent, good and fair. From the perspective

表4: 建成环境评价
Table 4: Physical Environment Assessment

类别 Category	描述 Description	HP	KG		GP		TS	GS	LIF	KRG	SCLC		GR	CPG	RBG	LGCNC
1 交通环境 Transportation environment																
公交站/地铁站 Bus stops / Metro stations	在目的地附近100m范围内是否设有公交站或地铁站 If the destination has bus stops or metro stations within 100 m.	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes
人行道/自行车道 Sidewalks / Bike lanes	是否有可达目的地的人行道 If there is a sidewalk reach to the destination.	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes
2 目的地所含内容 Destination content																
基本设施 Basic facility	是否有可用的卫生间、信息亭、座椅、遮蔽设施等 Available restroom, kiosks, benches, shelter, etc.	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes
基本锻炼器材 Basic exercise	是否有可用的步道、小径和健身器械 Available trail, footpath and fitness equipment.	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes
运动场地 Sports ground	是否有网球场、篮球场、儿童活动场等 Tennis court, basketball court, children playground, etc.	是 yes	是 yes	是 yes	是 yes	无 nil	无 nil	无 nil	是 yes	无 nil	是 yes	是 yes	无 nil	无 nil	是 yes	是 yes
水上运动 Aquatic sports	是否可以设有船坞、亲水平台等 Shipyard, waterfront terrace, etc.	是 yes	是 yes	是 yes	无 nil	无 nil	无 nil	无 nil	无 nil	无 nil	无 nil	无 nil	无 nil	无 nil	是 yes	是 yes
餐饮 Food and beverage	是否有餐厅、咖啡厅、餐饮区等 Restaurants, café, food court, etc.	是 yes	是 yes	是 yes	是 yes	是 yes	无 nil	是 yes	是 yes	是 yes	是 yes	是 yes	是 yes	无 nil	是 yes	是 yes
娱乐项目 Recreation programme	是否拥有博物馆、遗迹、电影院、马戏团、艺术表演等 Museum, heritage, cinema, circus, art show, etc.	是 yes	是 yes	是 yes	是 yes	无 nil	无 nil	无 nil	是 yes	是 yes	是 yes	是 yes	无 nil	是 yes	是 yes	是 yes
3 管理与安全 Management and security																
整洁程度 Cleanliness	场地整洁, 无垃圾 The place is tidy and free of garbage.	良好 good	良好 good	良好 good	良好 good	一般 fair	一般 fair	良好 good	一般 fair	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good
安全程度 Safety	警察巡逻, 拥有照明和监控设施等 Police patrol, lighting, CCTV, etc.	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good
场地维护程度 Site maintenance	花园和设施维护良好 The garden and facility maintenance in good condition.	良好 good	良好 good	良好 good	良好 good	一般 fair	一般 fair	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good
4 美观性与设计特色 Aesthetics and design features																
自然元素 Natural component	空间拥有不同组成元素, 包括树荫、花境、滨水空间、草坪等 Space with different components including tree canopy, flower border, waterfront, lawn, etc.	非常好 excellent	非常好 excellent	非常好 excellent	非常好 excellent	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	非常好 excellent
设计元素 Design component	拥有植物、水体、地形、艺术设施、休憩设施等景观元素 Landscape elements of plants, water body, landform, art features, rest facilities, etc.	非常好 excellent	良好 good	非常好 excellent	良好 good	良好 good	良好 good	良好 good	良好 good	非常好 excellent	良好 good	良好 good	良好 good	良好 good	非常好 excellent	一般 fair
感官设计 Sensory design	结合自然进行的视线/视觉、听觉、嗅觉、触觉和味觉设计 Sight / vision, auditory, olfactory, haptic and gustatory design with nature.	非常好 excellent	良好 good	非常好 excellent	良好 good	良好 good	一般 fair	一般 fair	一般 fair	良好 good	良好 good	良好 good	良好 good	良好 good	良好 good	非常好 excellent
生物多样性 Biodiversity	拥有多样化的动植物物种 Diverse species of flora and fauna.	非常好 excellent	非常好 excellent	非常好 excellent	良好 good	良好 good	良好 good	良好 good	良好 good	非常好 excellent	良好 good	良好 good	良好 good	非常好 excellent	非常好 excellent	良好 good

⑧ 根据《开放空间策略：最佳实践导则》（由2009年伦敦市长办公室颁布）中的规定，居民距自然绿地的可达性标准为300m步行距离。

⑧ According to Open Space Strategies: Best Practice Guidance published by Mayor of London in 2009, the accessibility standards of natural green space is within 300 metres' walking distance of their home.

交通环境方面，所有选定场所附近的居民都可以在步行300m^⑧的距离内到达，或乘坐公共交通工具（公共汽车或地铁）到达。在目的地所含内容评价方面，每个场地都配置了标准的设施和服务，以满足使用者的基本需求，包括卫生间、咖啡厅、信息亭、座椅、遮蔽设施和步行道。一些重要的场地还设有餐厅、运动场所、水景设施、儿童活动场、博物馆等，以供家人和朋友聚会。此外，场地管理的品质与管理水平密切相关。举例来说，传统皇家公园和国家公园通常干净整洁、运营良好，但一些地方性的街头广场或花园则缺乏维护、日渐衰败。在美观性和设计特色方面，无一例外，每个场地都拥有浓密树荫和茵茵草坪，供人们享受自然之美。部分场地设有喷泉、湖泊或其他水景设施以吸引人们前来。生物多样性和亲自然的氛围对于放松和恢复来说非常重要。

4.2 调查分析

4.2.1 人口统计背景

调查受访者的口统计概况如表5所示。60名志愿者完成了自述式调查问卷，其中60%为当地居民，40%为外来游客。男性受访者的数量少于女性受访者，分别为40%和60%；大多数受访者年龄为26~40岁（55%），而61岁以上的受访者所占比例最少（3.4%）。大多数受访者自称拥有研究生教育水平（81.7%）。

of transportation environment, all the selected cases are walkable from neighborhoods within 300 m^⑧ or accessible by public transportations, i.e., buses or undergrounds. In the destination content assessment, every single case configured with standard facilities and services to fulfill users' primary requirement, i.e. restrooms, café, kiosks, benches, shelter and footpath. Some momentous places allocate with restaurants, sports ground, water features, children playground, museum, etc. that customized for family and friends get together. Moreover, the quality of site management is strongly associated with the level of administration. The heritage royal parks and national gardens, for instance, are dustless and well operated, while some local street squares or gardens are less maintained and run-down. From the perspective of aesthetics and design features, it was conventional that every place provided lush tree canopy and lawn for people to enjoy the beauty of nature. Some cases have fountains, lakes or other water motifs to attract users. Biodiversity and biophilic atmosphere are very impressive for relaxation and restoration.

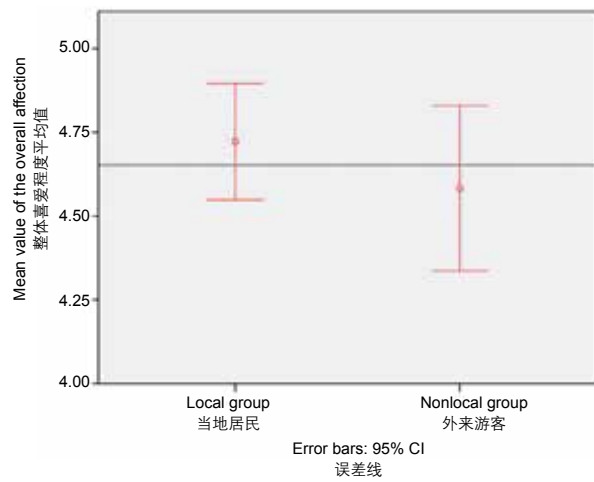
4.2 Survey Analysis

4.2.1 Demographic Background

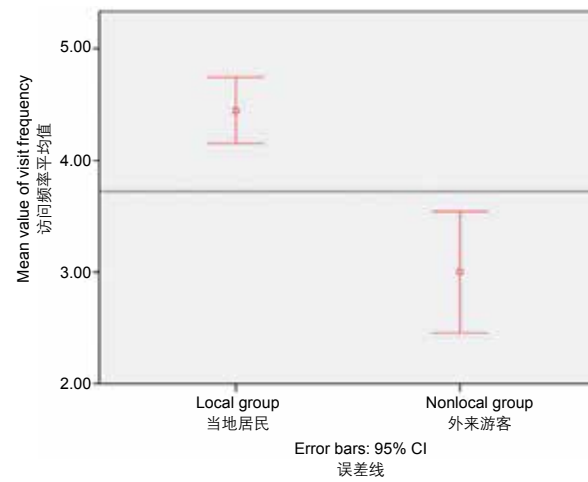
The demographic profiles of the participants are shown in Table 5. Sixty volunteers completed the self-reported questionnaire, among which 60% are local residents and 40% are visitors. The quantity of male (40%) is less than the female (60%); the majority of participants are between 26 to 40 years (55%) while the minority is above 61 (3.4%). The majority participants reported postgraduate education level (81.7%).

表5：调查参与者的人口统计信息
Table 5: Demographic Information of the Participants

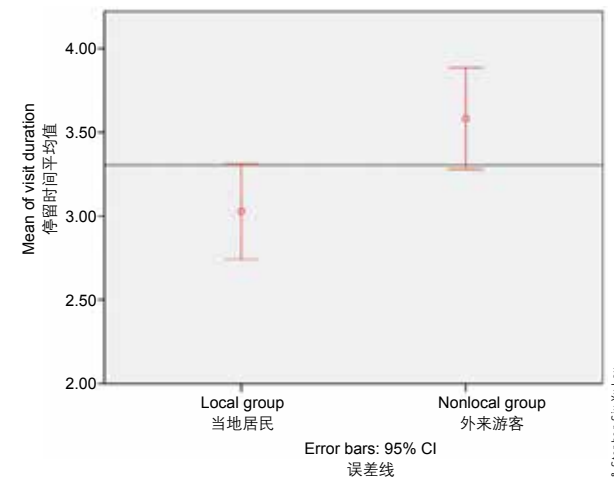
类别 Category	性别 Gender		年龄 Age				教育程度 Education Level			身份 Identity	
	男性 Male	女性 Female	25岁及以下 25 and below	26~40岁 26 ~ 40	41~60岁 41 ~ 60	61岁及以上 61 and above	中学 Secondary school	大学/专科学院校 College / Academy	研究生 Postgraduate	当地居民 Local inhabitant	外来游客 Nonlocal visitor
人数 Quantity	24	36	14	33	11	2	4	7	49	36	24
比例 Percentage	40.0%	60.0%	23.3%	55.0%	18.3%	3.4%	6.6%	11.7%	81.7%	60.0%	40.0%



Scale: 5 = Strongly like; 4 = Like; 3 = Neutral; 2 = Dislike; 1 = Strongly dislike
 分值范围: 5=非常喜欢; 4=喜欢; 3=无喜好倾向; 2=不喜欢; 1=非常不喜欢

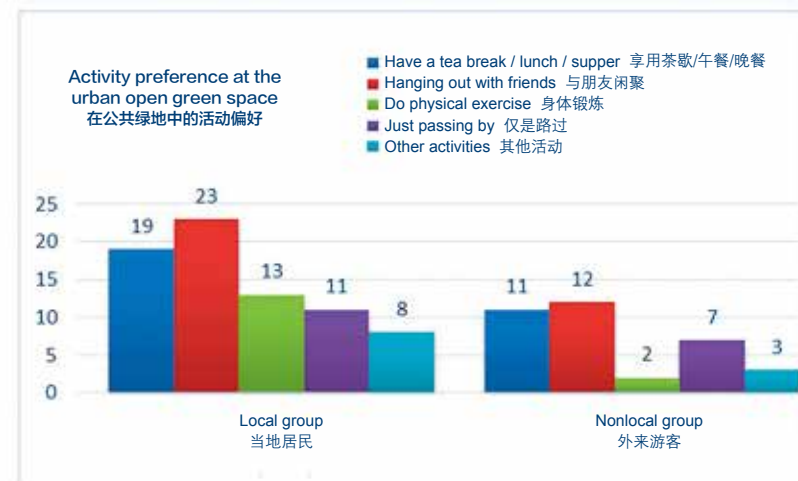
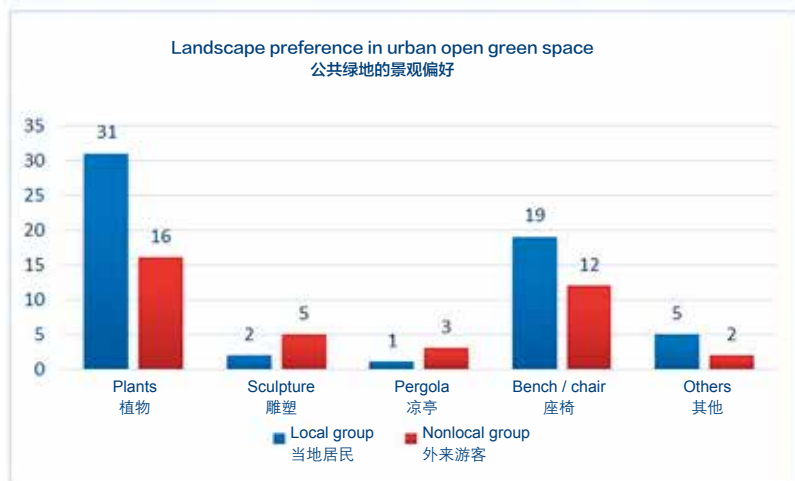
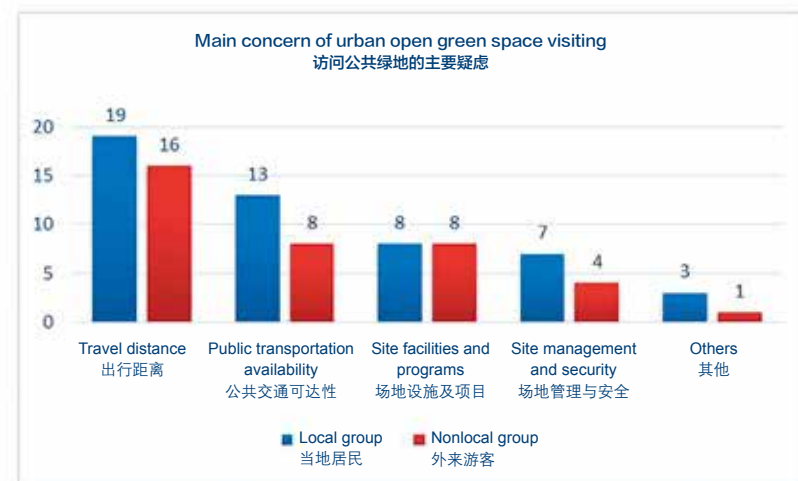
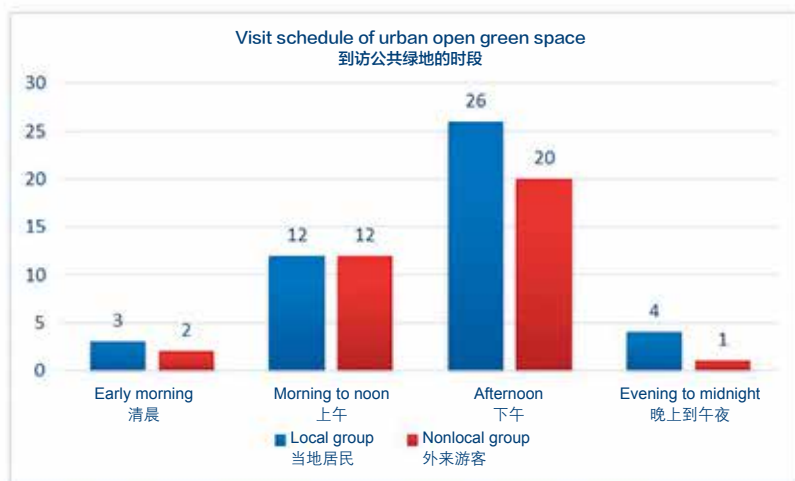


Scale: 5 = More than once a week; 4 = Once a week; 3 = once a month; 2 = Several times a year; 1 = Once a year or fewer
 分值范围: 5=一周几次; 4=一周一次; 3=一个月一次; 2=一年几次; 1=一年一次或更少



Scale: 4 = More than two hours; 3 = One to two hours; 2 = Half to one hour; 1 = Less than 30 minutes
 分值范围: 4=长于2小时; 3=1~2小时; 2=0.5~1小时; 1=短于30分钟

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3. 使用者到访绿地的方式和偏好的组间对比
3. Group-wise comparison of the user pattern and preference between residences and visitors.

4.2.2 使用方式与偏好

对使用者到访绿地的方式和偏好的统计结果如图3所示。绝大多数的受访者表示对城市绿地普遍喜爱；约一半的受访者每周会多次到访城市公园和花园；大于40%的使用者倾向于每次停留一个小时以上。此外，大多数人习惯于在下午到访城市公园，影响他们到访的主要问题是出行距离和公共交通可达性。使用者更喜欢绿地中拥有自然植物和坐椅的地方，在那里他们可以喝杯茶或享受午休时光、和朋友一起闲聚、进行身体锻炼，或者仅是路过。

居民和游客在使用方式和偏好方面的多种差异的组间比较如图3所示。作者通过采用T值来检验当地居民组和外来游客组之间的假设差异（表6）。该结果表明，相较于外来游客组，当地居民组会更频繁地到访场地，停留的时间更长，进行的活动更加多样。

4.2.3 感官假设和疗愈感知

感官假设和疗愈感知如表7所示。结果表明，超过90%的受访者认为，与自然的视觉接触、景观美观性和来自自然环境的听觉刺激对人体健康有益，而其中有75%和81%的受访者认为，自然环境中嗅觉、触觉、味觉和热环境层面的刺激也有益于人类健康。共有90%的受访者对城市绿地的疗愈功效和日常生活中的疗愈需求表示认可。多种差异

4.2.2 Use Pattern and Preference

The statistics summary of the user pattern and preference towards green space visit is presented as Figure 3. It shows that great majority of respondents expressed the general affection to the urban green space; around half of them usually visit urban parks and gardens several times a week; above 40% of users prefer to stay longer than one hour each time. Also, most people used to visit the urban parks in the afternoon, and their main concerns of visit were travel distance and public transportation availability. The users preferred natural plants and benches collocated in the green space where they could take a tea or lunch break, hanging out with friends, take some physical exercise or just passing by.

According to the group-wise comparison presented in Figure 3, there are diverse discrepancies of the user pattern and preference between residences and visitors. The authors employed a T-test to examine the hypothetical difference between the local group and the nonlocal group (Table 6). The result verified that the local group was significantly different from the nonlocal group in higher frequency of site visit, higher duration of the stay length and more diversity of activities.

4.2.3 Sensory Assumption and Healing Perception

The summary of sensory assumption and healing perception presented in Table 7. The result indicates that more than 90% of the participants regard visual connection with nature, landscape aesthetics, and auditory stimulation

表6: 当地居民和外来游客使用方式比较分析
Table 6: Different User Pattern between the Local and Nonlocal Group

使用方式 User Pattern		平均值 Mean	标准偏差 SD	效应量 Effect Size (r)	t值 t	自由度 df	P值 (双尾) Sig. (2-tailed)
到访频率 Visit frequency	当地居民 Local	4.44	.88	0.56	5.182	58	.000
	外来游客 Nonlocal	3.00	1.29				
停留时间 Stay length	当地居民 Local	3.03	.84	-0.33	-2.646	58	.010
	外来游客 Nonlocal	3.58	.72				
活动选择 Activity choice	当地居民 Local	2.06	.95	0.34	2.734	58	.008
	外来游客 Nonlocal	1.46	.59				

表7: 感官假设和整体健康感知
Table 7: Sensory Assumption and Overall Health Perception

	非常同意 Strongly agree	同意 Agree	无倾向 Neutral	不同意 Disagree	非常不同意 Strongly disagree
视觉接触 Visual connection	65.0%	30.0%	5.0%	0	0
视觉设计 Visual design	61.7%	33.3%	5.0%	0	0
听觉设计 Auditory design	43.3%	46.7%	10.0%	0	0
嗅觉设计 Olfactory design	40.0%	36.7%	23.3%	0	0
触觉设计 Haptic design	28.3%	46.7%	20.0%	5.0%	0
味觉设计 Gustatory design	43.3%	38.3%	15.0%	3.3%	0
热环境设计 Thermal design	30.0%	45.0%	21.7%	1.7%	1.7%
由绿地获得的疗愈感知 Healing perception from green space	55.0%	35.0%	10.0%	0	0
疗愈需求 Healing requirement	46.7%	43.3%	10.0%	0	0

的组间比较如图4所示。虽然居民组和游客组每个变量的平均值存在差异，T值检验中未见统计学差异。

研究采用了皮尔森相关系数来调查健康导向型变量之间是否存在关联性，以及相关性的强弱程度（表8）。本研究中的疗愈功效是指对城市绿地可以作为日常生活中促进健康的疗愈空间的认可程度。因此，视觉接触和听觉刺激指标显示，它们与疗愈功效指标的相关性（ $r > 0.5$ ）均比其他变量要强，可能符合回归分析中的可预测线性关系。

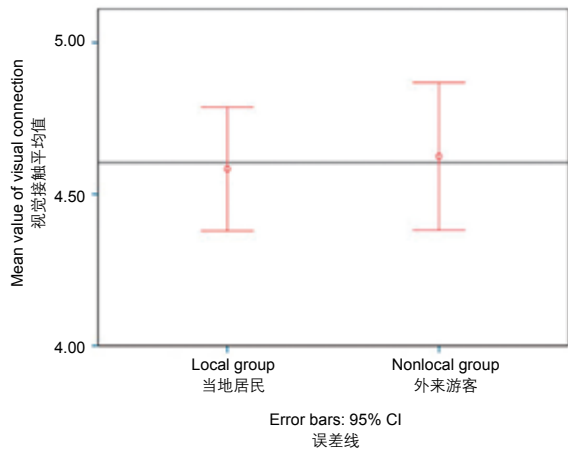
研究还采用了同时多重回归分析法，以验证基于感官的指标可以预测使用者感知中的疗愈功效的假设（表9）。结果表明，本调查中，只有与自然的视觉接触和听觉设计对预测疗愈感知具有统计学意义上

from natural environment are beneficial to human health while 75% to 81% of them believe the olfactory, haptic, gustatory and thermal stimulation from the natural environment could contribute to human health as well. Up to 90% of participants endorse healing efficacy in urban green space and healing requirement in daily life. The group-wise comparison presented in Figure 4. Although the mean value of each variable is discrepant between the local and non-local groups, there is no statistical difference between each other based on the T-test.

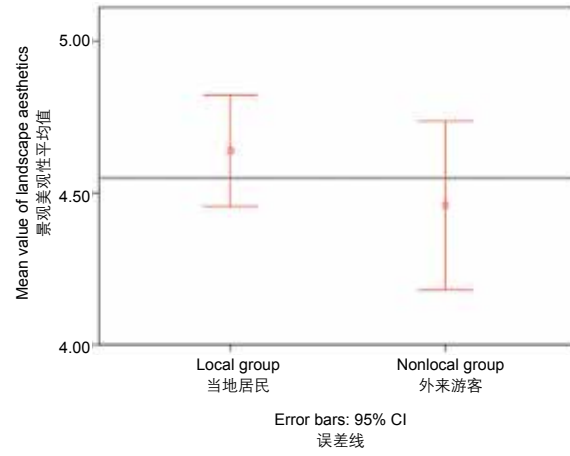
Pearson Correlation is employed to investigate whether and how strongly the health-oriented variables are correlated with each other (Table 8). Healing efficacy in this study refers to the degree of recognition that urban green space could perform as healing space in daily life for health promotion. Thus, indicators of visual connection and auditory stimulation reveal a stronger correlation with healing efficacy ($r > 0.5$) than other variables, which possibly fit the predictable linear relationship for regression analysis.

A simultaneous multiple regression was conducted to investigate the hypothesis that the sensory-based indicators could predict the healing efficacy in the user perception (Table 9). The result indicated that only visual connection with

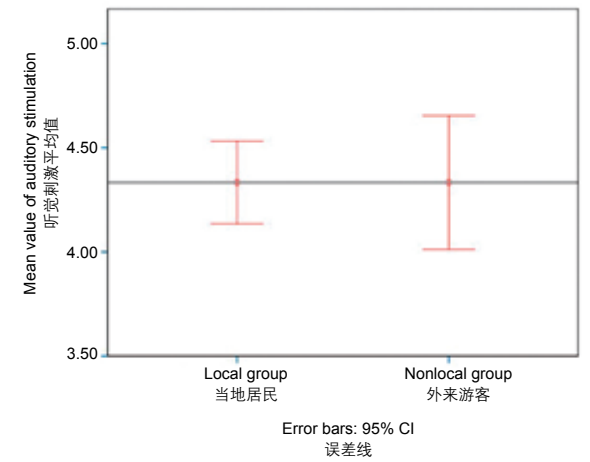
4. 感官假设和疗愈感知的多种差异的组间比较
4. Group-wise comparison of sensory assumption and healing perception.



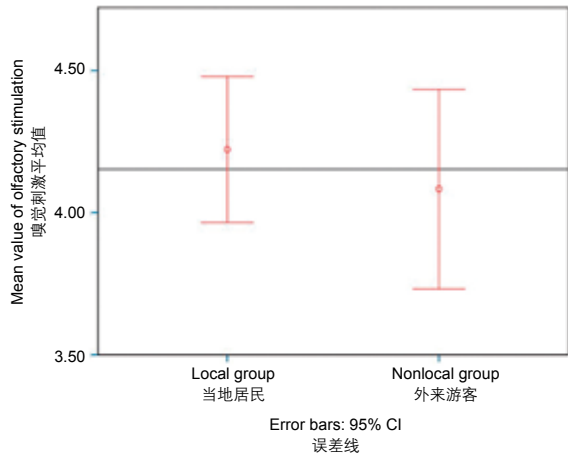
Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意



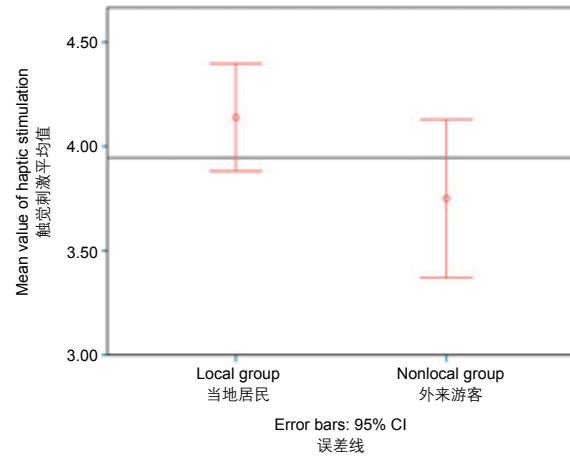
Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意



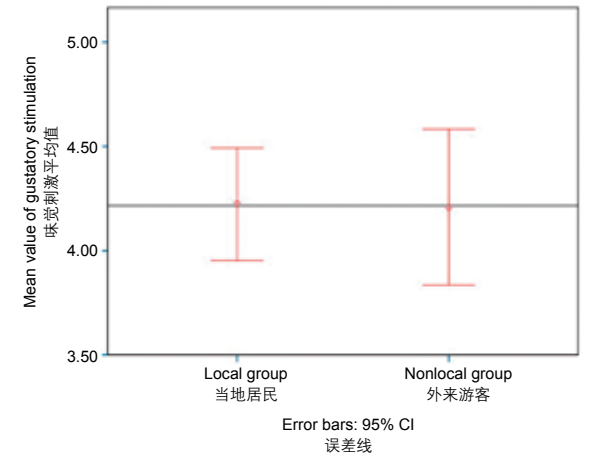
Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意



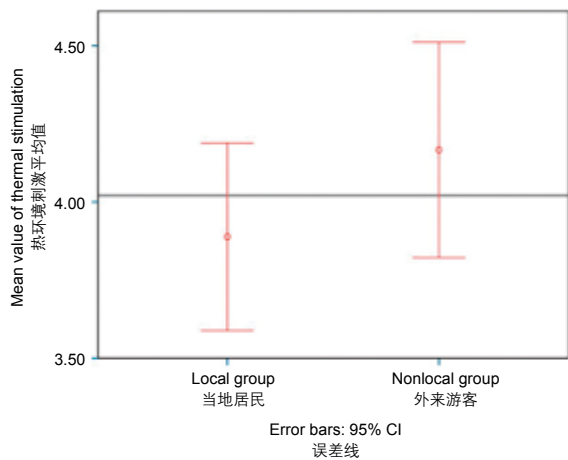
Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意



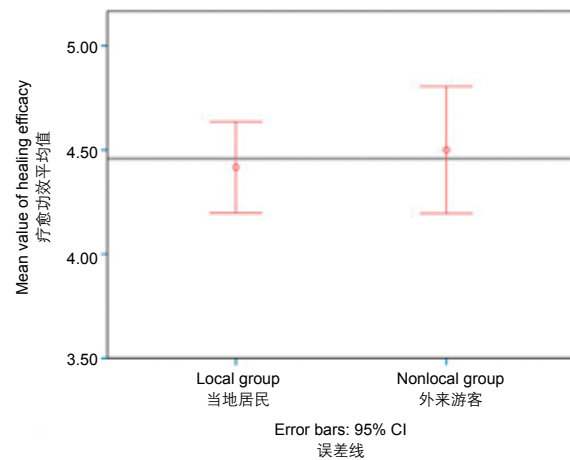
Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意



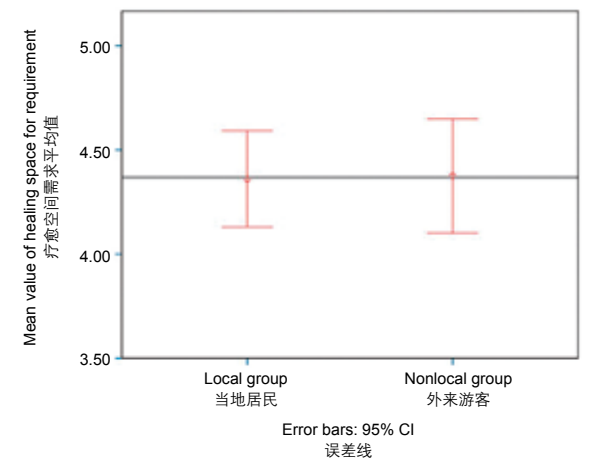
Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意



Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意



Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意



Scale: 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree
分值: 5=非常同意; 4=同意; 3=无倾向; 2=不同意; 1=非常不同意

表8: 疗愈感知和预测变量的平均值、标准偏差, 以及彼此相关性
Table 8: Mean, Standard Deviations, and Inter-correlations for Healing Perception and the Predictor Variables

变量 Variable	平均值 Mean	标准偏差 SD	HP	VC	VD	AD	OD	HD	GD	TD
疗愈感知 Healing Perception (HP)	4.45	0.67	—	.547**	.284*	.537**	.336**	.255*	.126	.320**
视觉接触 Visual Connection (VC)	4.60	0.59		—	.613**	.484**	.404**	.297*	.251*	.334**
视觉设计 Visual Design (VD)	4.57	0.59			—	.509**	.376**	.328**	.368**	.430**
听觉设计 Auditory Design (AD)	4.33	0.66				—	.516**	.476**	.522**	.419**
嗅觉设计 Olfactory Design (OD)	4.17	0.78					—	.626**	.362**	.325**
触觉设计 Haptic Design (HD)	3.98	0.83						—	.400**	.306**
味觉设计 Gustatory Design (GD)	4.22	0.83							—	.357**
热环境设计 Thermal Design (TD)	4.00	0.86								—

注: **表示显著性水平 $p < 0.01$ (双尾); *表示显著性水平 $p < 0.05$ (双尾)。

NOTE: ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

表9: 同时多重回归分析结果
Table 9: Simultaneous Multiple Regression Analysis

变量 Variable	B	SE B	β	t	p
常量 Constant	1.330	.628	—	2.116	.039
视觉接触 Visual Connection	.520	.155	.454	3.352	.002
视觉设计 Visual Design	-.255	.159	-.224	-1.600	.116
听觉设计 Auditory Design	.486	.148	.472	3.285	.002
嗅觉设计 Olfactory Design	.026	.121	.030	.216	.830
触觉设计 Haptic Design	-.007	.110	-.008	-.062	.951
味觉设计 Gustatory Design	-.169	.102	-.207	-1.666	.102
热环境设计 Thermal Design	.105	.093	.134	1.129	.264

注: 调整后 $R^2 = 0.396$; F 值 (7, 52) = 6.34, $p < 0.001$; 疗愈功效 = $0.886 + 0.43^* (\text{视觉接触}) + 0.366^* (\text{听觉设计})$ 。

Note: Adjusted $R^2 = .396$; $F(7, 52) = 6.34$, $p < 0.001$; Healing efficacy = $0.886 + 0.43^* (\text{visual connection}) + 0.366^* (\text{auditory design})$.

⑨ 伦敦的年平均气温为10.4℃，最高与最低月平均气温之间仅相差13.5℃。年平均降水量为594mm，每个月的降水量大致相同，不存在旱季或炎热夏季。数据来源：<http://www.london.climatemps.com/>。

⑨ The average annual temperature in London is 10.4 degrees Celsius, and the average monthly temperatures vary only by 13.5 °C. The total annual precipitation averages 594 mm which distribute to each month equally without dry season or hot summer. Data from the website: <http://www.london.climatemps.com/>.

的显著影响。R²值为0.396，表示疗愈功效中39.6%的方差可以由此模型进行预测。

5 讨论

5.1 城市形象和宜居性

埃比尼泽·霍华德在《明日的田园城市》（1898年出版）中为伦敦的未来描绘了一番愿景：由新镇构成的城市被用以应对因人口过度集中于城市中心而造成的人口衰减；为人们提供拥有和风碧空、公园和花园的美好家园^[4]。一个世纪之后，伦敦已实现了这一伟大梦想，并跻身以花园城市为发展模式的世界级宜居城市行列。在新的时代，气候变化、人口增长和城市变革加剧了城市生活的压力。地方政府通过改善伦敦的居住、工作和娱乐体验来提升城市生活品质，并带来一系列社会、环境和健康等方面的裨益^[6]。

在本研究中，城市绿地拥有成为疗愈空间——其所提供的综合感知具有令人精神焕发、恢复，并感到舒适、鼓舞等功效，以减轻日常生活中的精神压力和疲劳——的巨大潜力和能力。在此背景下，疗愈空间也从最初的旨在服务于医疗卫生领域的病患人群的治疗性或恢复性花园，转变为更广泛的城市生活公共领域中的广义绿地^[70]。那些传统上旨在促进患者康复的医疗卫生领域中的疗愈性景观已开始被视为一种能够缓解压力、造福于普罗大众的普遍性社会资源^{[67][71]}。因此，疗愈空间并不神秘，也并非具有专门性，而是将人与自然之间建立起的心理投射移植到现代社会中。

伦敦是一座注重疗愈空间优势，并将之潜力最大化的都市。受益于花园城市运动和政府主导性绿地政策，一个由无数花园、公园、街头广场，以及散落在城市中的自然和半自然栖息地组成的、经由精心设计的城市绿地系统得以建成。海洋性西海岸气候为伦敦带来了和煦气温与丰沛降水^⑨，这为生活在城市自然环境中的多样化的动植物提供

nature and auditory design were statistically significant to predict healing perception in this survey. The $R^2 = 0.396$ represented 39.6% of the variance in healing efficacy could be predicted by this model.

5 Discussion

5.1 Urban Image and Livability

Ebenzer Howard in *Garden Cities of Tomorrow* (1898) proposed a vision for the future of London, which was a city with new towns for depopulation of overcrowding in urban centre, new homes for residents with canopy of beautiful sky, fresh air and sunshine, and parks and gardens to enjoy the happy life^[4]. A century later, London has fulfilled the great dream and regenerated itself into a worldclass livable city with a pattern of garden-city integration. In the new era, the climate change, population growth and urban regeneration have aggravated the pressures for urban living. The local governments have taken responsibility to promote the quality of life and a range of social, environmental and health benefits by improving the experience of living, working and playing in London^[6].

In this research, urban green space had tremendous potential and capability to be therapeutic and upgraded to be healing space, which provides a comprehensive sensation of refreshment, restoration, comfort and inspiration to mitigate the mental stress and fatigue in daily life. Under this context, healing space transforms from the original healing or restorative gardens aimed at the sick people in healthcare towards a generalized green space in the wider public realm of urban life^[70]. The therapeutic landscape in healthcare that traditionally created for patient recovering began to be viewed as a universal resource in society to relieve pressure and promote well-being for ordinary people^{[67][71]}. Thus, healing space is nothing mysterious or inapplicable but a transplanted approach to establishing a spiritual reflection between human and nature in the domain of modern society.

London is a metropolis that strengthens the virtue of healing space to a maximum potential. Benefit from the legacy of the Garden City Movement and the government-led green space policy-making, an elaborate urban green system is built up with countless gardens, parks, street squares, as well as natural and semi-natural habitat scattered in the territory. The marine west coast climate with mild temperature and abundant precipitation^⑨ in

了理想的栖息条件。毫无疑问，伦敦的城市宜居性在很大程度上得益于伦敦的城市绿地品质。在这项调查中，相对于外来游客，当地居民显示出的与城市绿地的社会联系和对自然的归属感均更加强烈。共有96.67%的受访者表达了他们对于城市绿地的喜爱。90%的受访者认为城市公园和花园是日常生活中不可或缺的疗愈空间。这一发现可以支持当前城市决策的优先次序，从而对城市绿色空间的疗愈资源的利用进行提升。

在本调查中，花草树木等自然元素要比雕塑、凉亭等人工元素更受人喜爱，而这也验证了人类亲自然的天性^[72]。繁茂的树木、整齐的草坪、美丽的喷泉、惬意的咖啡馆、精致的座椅……这些存在于每个街心花园的设施吸引着居民前来，使人们在紧张的都市生活中忙里偷闲，享受自然之美。伦敦的绿色资源赋予了这座充满压力的大都市无数的公园和花园，唤醒了当地居民充满活力的生活方式，在树立城市身份认同中重塑了精神认知。

5.2 拟定义和标准

在紧凑的都市环境中，人们在疗愈空间中寻求喘息。根据注意力恢复理论，人们主动地需要自然环境的疗愈，“烦恼不再”是人们从恢复性环境中获得的典型功效之一^[41]。早在18世纪末期，到访公园及花园就成为了伦敦人的一项传统，而且自然的野趣可以治愈“英国病”也街知巷闻^[2]。20世纪，罗杰·乌尔里希的实验证实，那些拥有能够观望自然的窗户的患者从手术中恢复的速度更快，且需要的止痛药更少^[73]。在本项伦敦研究的启示之下，疗愈空间应该是由自然植被和休憩设施等要素组成的多样化的治疗性环境，其强调治愈因消极情绪和压力导致的注意力涣散、促进精神恢复和情感福祉的核心能力。

以往的研究表明，精神意象是一个活跃而重要的感官体验信息收集资源库；在感官体验中，视觉和听觉更有利于人类感知的心理过程^[48]。本次调查证实了与自然的视觉接触以及自然的听觉刺激是预测城

London provides the ideal condition for diverse flora and fauna living in the urban nature. It is undisputed that the urban livability to a great extent builds upon the quality of urban green space in London. In this survey, local inhabitants reveal stronger social bond with urban green space and a sense of belonging to nature than the visitors. Up to 96.67% of the respondents expressed their affection to urban green space. 90% of participants regard urban parks and gardens act as healing space that is indispensable in daily life. This finding could support the current prioritization in urban policy-making, thereby optimizing the utilization of healing resource extracted from urban green space.

In this survey, the natural elements, i.e., flowers and trees are much beloved than the artificial items, such as sculpture and pergola, which validates the Biophilia instinct embedded in the human mind^[72]. There are flourishing trees, neat lawns, lovely fountains, warm cafés, delicate bench, etc. located in every single street garden which invited the inhabitants to take a moment to enjoy the beauty of nature during the abustle and stressful urban life. The green legacy in London endowed the stressful metropolis with countless parks and gardens, which reshapes the vibrant lifestyle of local inhabitants and reconstructs the spiritual cognition in urban identification.

5.2 Quasi-definition and Criteria

In a compact urban context, people seek a respite through healing spaces. According to the Attention Restoration Theory, people voluntarily require healing from the natural settings, and “being away” is one of the representative efficacy which gains from a restorative environment^[41]. Park and garden visit became a tradition in London since the late 18th century that the “English Malady” acknowledged being cured by the wildness of nature^[2]. In the 20th century, Roger Ulrich’s experiment testified that patients recovered from surgery faster and require fewer painkillers if they have a window of nature view^[73]. Inspired by the London study, healing space should be a therapeutic environment essentially comprised of natural plants and rest facilities in diverse patterns, which stresses the core capacity of attention distraction from negative sentiments and pressures, and fostering mind restoration and emotional well-being.

Previous research indicated that mental images are an active, vital repository of information gathered through sensorial experiences, from which sight and hearing

市绿地的疗愈功效的主导性感官特性。首先,这一发现支持以往的理论,即与自然的视觉接触有利于精神恢复^{[40][41][74][75]}。其次,人们对听觉环境较为敏感,自然界中鸟类、昆虫、河流、风、雨等声音能够舒缓压力,促进安宁^{[50][76]}。在本次调查中,感官假设的排序表明,嗅觉、触觉和热环境感知对于健康的提升作用较不明显。因此,视觉和听觉体验成为了最大限度地发挥城市绿地设计的疗愈功效的最主要的感官反应途径。

5.3 概念框架

基于以上讨论,本文提出了一个概念性架构,以提升绿地设计的疗愈绩效(图5)。图中呈现了一个融入了人性化设计策略的整合性模型。

首先,在当代语境下,城市绿地的优先等级是有差异的。基于本次在伦敦进行的研究,城市绿地的主要评价标准为交通环境和目的地所含内容。在规划阶段,应建立一个复杂的绿地网络,以消除使用者对于出行状况和耗时的疑虑。包括步行和公共交通在内的可达性是影响城市绿地公众参与的关键因素。在设计阶段,所选项目和设施设置应强调活动偏好和疗愈体验。在运营阶段,管理、安全和维护非常重要,但是,这些仅是次级评价标准,我们应将更多的资源集中在主要评价标准上。由于样本数量的限制,美观性和设计特色的影响在本研究中体现较少。

第二个问题在于疗愈和感知的感官层面。本研究对一般感官假设在疗愈感知中的权重进行了调查和检验。根据此研究模型,与自然的视觉接触和自然环境中的听觉刺激被证实是预测疗愈感知方差的主要标准(39%),它们可以作为环境设置中最具成本-效益的设计策略。

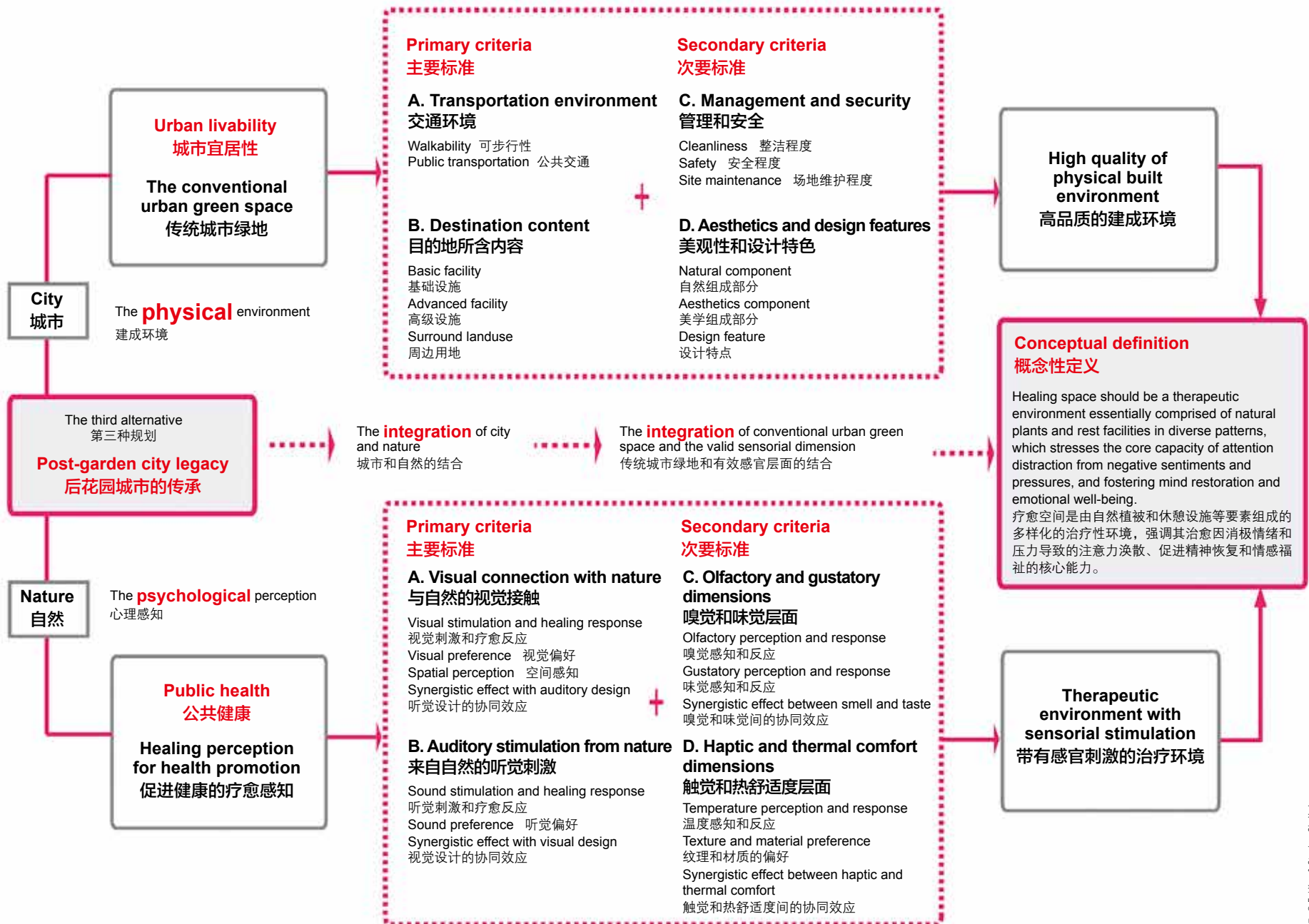
are more conducive to mental processes in human perception^[48]. From this survey, it is verified that visual connection with nature and natural auditory stimulation are the dominated sensorial characteristics to predict the healing efficacy in urban green space. Firstly, this finding supported previous theories that visual contact with nature could benefit to mind restoration^{[40][41][74][75]}. Secondly, people behaved sensitively to the auditory environment from nature that the sound of birds, insects, river, rain and wind, etc. could relieve pressure and promote tranquility^{[50][76]}. In this survey, the ranking of sensory assumption indicates that olfactory, haptic and thermal perceptions revealed less identification with health promotion. Thus, the visual and auditory experiences could perform as the most sensorial response approaches to maximize the healing efficacy of urban green space design.

5.3 Conceptual Framework

Based on the above discussion, a proposed framework is conceptualized as an attempt to enhance the healing performance in green space design (Fig. 5). The diagram of the framework has schematically summarized into an integrated model with human-oriented design strategies.

First of all, the priority of urban green space in the contemporary context is discrepant. Based on the London study, the primary assessment criteria in urban green space are transportation environment and destination content. On the planning stage, a sophisticated green space network should be established to eliminate the users concerns on travel condition and time-consuming. The accessibility to urban green space by walk or public transportation identified as the threshold for the public engagement. On the design stage, the selected programs and facility settings should be emphasized to the preference of activities and the healing experience. On the operation stage, the management, safety and maintenance are important, however, considered as the secondary criteria that more resources should concentrate on the primary criteria. The aesthetic and design features are less identified in this research due to the sample limitation.

The second issue lies in the sensorial dimensions in healing perception. The research investigated and examined the weighting of the general sensorial assumptions towards healing perception. According to this research model, the visual contact with nature and the auditory stimulation from the natural environment were verified as the primary criteria to predict 39% of



因此，树冠之美、山峦的起伏、鸟儿的鸣唱、风的吹拂、花之香气等都可以将无形的疗愈体验转化为可验证的指标。它们不仅提升了城市绿地的疗愈功效，同时也在日常生活中创造了更为人性化的设计。

6 结论

正如尤金·沃尔特^[49]曾说道，拥有好的景观是成为一个好的场所的开始。花园城市运动和政府主导性政策的制定使得伦敦因其完善的城市绿地网络和社会支持系统，成为了宜居城市的典范。受到花园城市运动和环境健康相关理论之精髓的启发，本研究对一项假设进行了调查，即配置良好的传统城市绿地是否可以具有治疗性，并有可能经由提升成为可供人们治愈和恢复的疗愈空间。这一观点已被广泛认可，并在伦敦城市生活中得以践行，而且有望在未来实现全球推广。

今天，城市公园和花园不再是对城市的“化妆”，而被赋予了更重要的意义——充满压力的都市环境中的疗愈之所。传承亦或引领新的生活方式？伦敦城市绿地的丰富资源并不是自然发展而来，而是经由一个复杂的社交网络，被精心整合到规划、设计和管理的过程中。本研究中提出的概念模型强调支持性环境和感官感知对疗愈和恢复的重要性，试图证明通过人性化的设计策略，疗愈空间的绩效可以得到感知和提升。LAF

致谢

本研究由伦敦大学学院荣誉奖学金（亚洲城市知识网络）资助。2014年5月期间，伦敦大学学院巴特利特发展规划学院亦对本研究予以了协助。作者同时向香港大学对研究生的URC/CRCG旅行经费（编号201401171006）的资助表示感谢。

the variance in healing perception, which could perform as the most cost-efficient design strategies in environmental settings. Hence, the beauty of canopy, shape of a mountain, sound of birds, blow of wind, fragrance of a flower, etc. can transfer the healing experience from intangible items into verifiable indicators, which promotes healing efficacy in urban green space and creates a more humane design in everyday life.

6 Conclusion

As Eugene Walter^[49] once declared that a good place to begin is the landscape. The legacy of the Garden City Movement and the government-led policy-making have empowered London to become a livable paradigm by its well-established urban green network and the social support system. Inspired by the quintessence of Garden City Movement and the environment-health associated theories, this research has investigated the hypothesis that if well configured, the conventional urban green space could be therapeutic and upgraded to healing space for healing and restoration. This standpoint has been well recognized and implemented in urban lifestyle in London, and hopefully, will be generalized to the worldwide in the future.

Today, urban parks and gardens are no longer built for civic decoration, but far more important to perform as healing space in the stressed urbanized world. Legacy or lifestyle driver? The richness of urban green space in London does not develop by natural growth, but a sophisticated social network elaborately integrates into the process of planning, design and management. The proposed conceptual model in this research stresses the significance of supportive environment and sensory perception for healing and restoration, which as an attempt to demonstrate the performance of healing space could be perceived and enhanced by the human-oriented design strategies. LAF

ACKNOWLEDGEMENTS

This research was supported by the Honorary Scholarship of University College London (Urban Knowledge Network Asia) and facilitated by the Bartlett Development Planning Unit at University College London in May 2014. The authors also express gratitude to The University of Hong Kong for the funding of URC / CRCG Travel Grant for Research Postgraduate Students (No. 201401171006).

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