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李树华, 姚亚男, 孟令爽, 朱怀真. 从园艺疗法到自然疗愈: 类型、发展、机理与展望[J]. 风景园林, 2024, 31 (5): 12-22.

从园艺疗法到自然疗愈: 类型、发展、机理与展望

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摘要: 【目的】在“健康中国”战略的推动下, 中国自然疗愈相关概念发展迅猛, 亟待梳理中国现有的主要疗愈类型与发展历程, 探究其共性作用机理。【方法】归纳中国现有的主要疗愈类型、共性机理, 对比分析不同疗愈类型在概念、研究热点与前沿方向、学科基础、专业发展程度与研究深度、作用媒介、与人的关联度等方面的差异。【结果】当前中国正在形成一个包括园艺疗法、园林康养、农业康养及森林康养在内的多元化自然疗愈体系, 该体系中以环境载体为基础的园林康养、农业康养、森林康养与依赖具体活动形式的园艺疗法并存。尽管各疗愈类型的研究焦点以及发展情状各异, 但它们在促进人体健康方面具有共性机理, 可分为神经调节与免疫调节两大路径。【结论】未来, 从园艺疗法到自然疗愈全谱系的理论体系构建应更注重不同人群需求与行业发展特征, 促进自然疗愈方法向精准化、个性化方向发展。同时, 需深入探索这 2 种途径在不同自然疗愈类型中应用的效果与机理, 以期自然疗愈领域提供更加坚实的科学基础和理论支撑。

关键词: 园艺疗法; 园林康养; 农业康养; 森林康养; 自然疗愈

基金项目: 国家自然科学基金面上项目“基于高压人群身心健康的工作环境绿地系统研究”(编号 51978364); 清华丰田联合研究院交叉学科项目(编号 20223930040)

中图分类号: TU986

文献标识码: A

文章编号: 1673-1530(2024)05-0012-11

DOI: 10.3724/j.fjyl.202401170043

收稿日期: 2024-01-17

修回日期: 2024-04-10

开放科学(资源服务)
标识码(OSID)



人类健康与自然密不可分。大量研究表明, 接触自然并在自然环境中进行治疗、康复、养生等活动, 可以带来多维度的健康效益, 包括降低血压、促进术后恢复、减轻压力、促进睡眠、促进心理健康、减少抑郁焦虑情绪、增加亲社会行为、增强社会联系、提升幸福感与生活满意度等^[1]。然而, 现代城市生活不可避免地减弱了人与自然的联系, 发达国家人口, 尤其是儿童的户外活动时间普遍减少, “自然缺失”的室内生活方式可能会增加肥胖症、心脏病、糖尿病、癌症等疾病的患病风险, 对身体健康造成威胁^[2], 还可能导致精神疲劳、攻击性和暴力性行为增加、情绪障碍、注意力缺陷、抑郁等心理障碍^[3]。

在“健康中国”国家战略的推动下, 中国自然疗愈相关概念迅猛发展, 逐渐形成包括园艺疗法(horticultural therapy)、园林康养(landscape for well-being)、农业康养(agriculture

for well-being)及森林康养(forest therapy)在内的多元化自然疗愈(natural healing)体系, 成为当下自然环境与公共健康研究与实践的关键领域。通过对比不同自然疗愈类型的发展历程、特点与差异, 本研究旨在为构建自然疗愈体系的综合理论框架奠定基础, 从而推动该领域的科学发展。

1 从园艺疗法到自然疗愈的五大疗愈类型发展历程

1.1 相关概念的出现与发展

在现代城市生活背景下, 园艺疗法、园林康养、农业康养、森林康养、自然疗愈 5 种概念的发展, 展现出自然与人类健康相互作用关系的逐渐深化, 形成了一个层次互补且交织密切的疗愈体系。在自然疗愈体系中, 园林康养、农业康养、森林康养强调以不同自然环境作为疗愈载体, 而园艺法则更多

地强调参与性的活动形式。19 世纪末期, 园艺疗法在欧美经历了系统化的发展, 为自然疗愈领域的理论和实践提供了坚实的基础^[4]。20 世纪末至 21 世纪初, 随着人们对城乡自然环境与公共健康关系认识的提高, 园林康养与农业康养的概念相继出现, 逐步成为城市规划的重要组成部分。园林康养通过精心设计的园林环境及其中的自然元素促进参与者的身心健康^[5]; 农业康养则通过让参与者接触自然、参与农事活动及了解食物来源等活动, 强调绿色健康生活方式的重要性, 为居民健康及农村可持续发展提供了新的思路^[6-7]。20 世纪末, 森林康养的概念在日本兴起, 强调森林环境对身心健康的独特贡献, 并在全球范围内得到推广^[8]。在生态环境挑战与公共健康危机加剧的 21 世纪, 自然疗愈作为一种综合性健康促进方法获得广泛关注。自然疗愈在上述 4 种概念的基础上, 强调广泛接触

自然对健康的全面积极作用，从园艺疗法到自然疗愈标志着对自然与健康关系认识的持续深化和对疗愈方法的综合探索^[9]。

1.2 五大疗愈类型的差异

一方面，各疗愈类型的载体不同，表现在作用媒介、与人的关联度上。另一方面，各疗愈类型的发展程度也有所差异，表现在研究热点与前沿方向、学科基础、专业发展程度与研究深度上。笔者根据上述维度分类比较五大疗愈类型的差异（表1）。

1.2.1 专业发展程度与研究深度

总体来看，自然疗愈及其涵盖的其他4种疗愈类型均属于交叉学科研究。而这五者的专业发展程度与研究深度的差异表现在学科基础、研究热点与前沿方向的侧重不同。

园艺疗法是专业发展程度最高的类型，已有部分高校设置相应的专业课程。园艺疗法以园艺学为基础，主要涉及心理学、康复医学、社会学等学科的内容。园艺疗法的独特之处在于对康复治疗的应用^[10]，以及对教育成果和社会参与的促进^[11]。国内外园艺疗法的研究正逐渐从案例研究和描述性研究转变为更系统的实证研究，包括随机对照试验（randomized controlled trial, RCT）、长期追踪研究等，研究结果更具可靠性和普适性。国内园艺疗法研究的发展表现在理论基础建设（如环境心理学和职业疗法理论）^[12]、实践模式研究^[13]、教育培训认证^[14]、定量定性相结合的人体效益评估^[11]，以及专业组织机构（如美国园艺疗法协会、中国风景园林学会园林康养与园艺疗法专业委员会）建设等方面。目前，中国高校和研究机构也正在加强园艺疗法专业建设。进一步推动专业化教育培训与职业认证是中国当前园艺疗法发展的主要目标。

园林康养以风景园林学为基础，外延内容涉及园艺学、医学、心理学和社会学等学科，研究侧重对康养设计原则的探索，对老年人^[15]、儿童、残障人士等特殊人群疗愈效果的评估^[16]，以及对身心健康效益的评价^[17]。此外，园林康养理念和实践内容开始融入如风景园林学、园艺学等学科的教育培训和专业设置中。在实践层面，中国多地开展园林康

表1 5种疗愈类型的差异比较分析
Tab. 1 Comparative analysis of differences across the five healing types

疗愈类型	专业发展程度	学科基础	研究热点与前沿方向	作用媒介	与人的关联度
园艺疗法	较高	园艺学	园艺疗愈功效定性/定量研究；疗愈性园艺环境设计与营建	植物种植及相应的园艺活动	高
园林康养	中高	风景园林学	园林康养功效定性/定量研究；康养园林的景观设计与营建	园林环境体验	高
农业康养	中等	农学	农业与农村环境康养功效定性/定量研究；康养型农业、农村规划设计及营建	农业与农村环境体验	较高
森林康养	较高	林学	森林医学；森林康养基地、浴场、步道等规划设计及营建	森林环境体验	较高
自然疗愈	中等（涵盖多种疗愈类型）	园艺学、风景园林学、农学、林学等	自然疗愈定性/定量研究；自然疗愈环境规划设计及营建	自然环境体验	

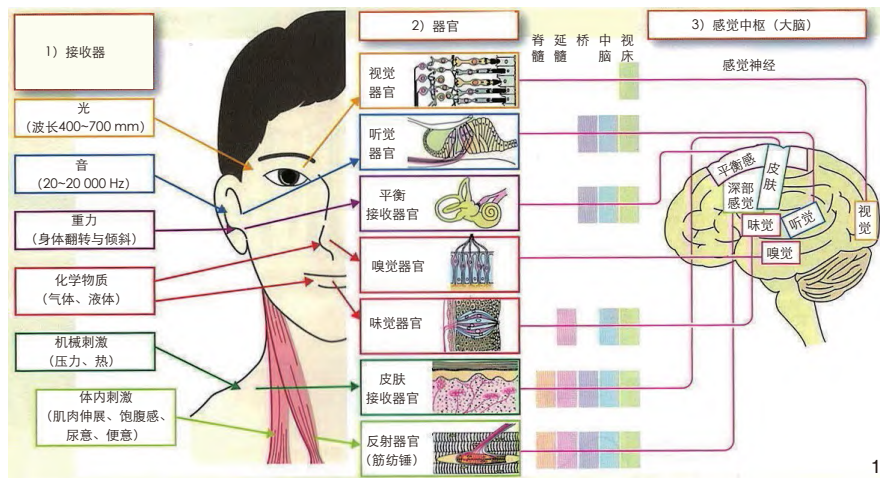
养项目的探索和建设，尝试将园林康养理念融入公园、社区、旅游景点等多种绿地场景的设计中，为园林康养建设提供了实践经验。随着国家对“健康中国”战略的推进和对生态文明建设的重视，园林康养作为提高公众健康水平和生活质量的重要途径，开始得到政府的政策支持和推广，并在此基础上取得了一定成效。目前康养园林与景观设计、园林康养服务质量等尚未形成行业标准，亟待制定基于学术理论研究的标准和规范。

农业康养以农学为基础，外延内容涉及旅游学和社会经济学等领域。除了探索农业与健康的关联^[6]外，农业康养研究通常与社会经济和政策相关。例如，通过优化农业康养服务与管理模式来振兴农村、提供就业机会、增进社会福祉^[18-19]，研究旅游和农产品的市场营销策略与品牌推广以提升农业康养项目的吸引力与知名度^[20]，研究相关政策和法规对于农业康养发展的影响及合理化建议^[21]，以及通过农业康养实现环境保护与农业可持续发展^[22]。国际上，农业康养作为一种综合了农业、健康和旅游的新兴产业，已经在许多国家得到发展。意大利、美国和加拿大等欧美国家的农业康养产业较为发达，农场通常提供农产品采摘、农事体验、农村文化教育以及休闲度假等服务^[19, 22]。在中国，农业康养与乡村振兴战略紧密结合，是推动农业和农村经济发展的新途径。国内一些农业康养项目还强调文化传承和生态保护^[23]，如在康养项目中增加

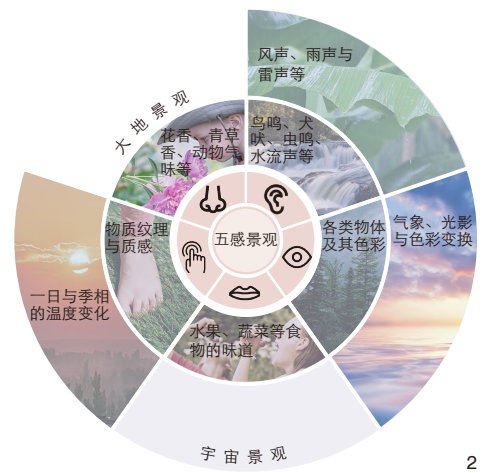
传统农耕文化体验、有机农业推广等活动。

森林康养以林学为基础，外延内容涉及医学、生态学、环境心理学等学科。除对人体身心健康效益^[9, 24]外，森林康养研究还关注对森林疗法实施方案的效果评估，以及对社会经济效益^[25]和生态系统服务^[26]作用的探讨。中国的森林康养凸显了传统文化和现代科学研究的结合，相关理论体系和实践模式正在逐步建立并完善，研究热点通常分为4个方面。1) 森林医学和森林疗法：研究森林环境对人类生理和心理健康的影响，以及如何通过森林环境进行疾病预防和康复治疗。2) 生态学和环科学：探讨森林生态系统的构成、功能及对人类福祉的贡献。3) 环境心理学：研究森林环境对人类心理状态的正面作用，包括减轻压力、改善情绪、提高注意力等。4) 公共卫生和预防医学：探讨森林康养活动在提高人口健康水平和预防生活方式相关疾病方面的潜力。

自然疗愈是一个跨学科领域，不仅涵盖了园艺学、风景园林学、农学、林学学科的内容，外延还包含生态学、心理学、医学、社会学、环境科学等学科的理论与实践。由于自然疗愈类型和涉及的学科领域众多，从理论研究到实践应用均需要保持研究前沿领域的交叉融合。目前，自然疗愈在心理健康、生理健康、环境设计等方面的研究已取得了一定进展，但仍需要进一步深化跨学科研究合作，建立更系统的理论框架和评价体系。



1 刺激的接收与感觉的产生^[28]
Stimulus reception and sensation generation^[28]



2 大地景观与宇宙景观
Earth landscape and universe landscape

在实践层面，自然疗愈的应用项目和案例在全球范围内逐渐增多。然而，为了进一步推动专业发展，需要加大对自然疗愈效果的科学评估力度，并在政策支持、教育培训、标准化和专业化方面做出更多努力。

1.2.2 作用媒介

园艺疗法、园林康养、农业康养、森林康养、自然疗愈都是以自然环境及植物作为主要元素，通过人与自然的互动来促进人体身心健康的方法，每种方法都有主要的作用媒介和应用场景。

园艺疗法的作用媒介为植物种植及相应的园艺活动，参与者通过参加植物的种植、养护和收获等园艺活动来获得治疗效益，包括提高动手能力、促进社交互动、提高认知能力和调节情绪等^[12]。园林康养的作用媒介是园林环境体验。与园艺疗法相比，园林康养更强调精心设计的园林景观环境，专注于环境本身对人的疗愈作用，如通过医院花园、康复中心的疗愈花园来促进身心健康^[27]。农业康养的作用媒介是农业与农村环境体验，强调通过参与真实的农业活动，如耕作、养殖、采摘等，来获得身心健康效益^[19]。森林康养的作用媒介是森林环境体验，森林康养注重在森林环境中的感官体验，通过散步、呼吸和冥想等方式来促进身心健康。自然疗愈则是更广泛的概念，包含了与自然环境的所有互动形式，因此涵盖了所有自然环境对人类健

康的疗愈作用。自然环境不仅包括上述园林环境、农业与农村环境和森林环境，还可能包括海滨、草原等其他自然环境。

1.2.3 与人的关联度

在现代城市生活的大背景下，园艺疗法、园林康养、农业康养、森林康养和自然疗愈通过与自然环境的不同互动方式来促进人体健康，5种疗愈类型在与人的关联度方面存在差异。园艺疗法与园林康养的参与者直接与植物及园林环境互动，如种植、修剪、浇水、游园、漫步等，通过动手的园艺活动与园林环境体验来达到身心的疗愈效果，因此与人的关联度高；而在城市居民日常生活中，农业康养、森林康养受限于康养环境的可达性，故与人的关联度偏低。自然疗愈包含了所有种类的自然环境和与人的互动方式，其与人的关联度取决于具体活动的性质和设计。

2 自然疗愈类型的共性机理

上述5类疗愈类型都是在一定程度上借助自然元素与自然环境，通过开展一系列有益健康的行为活动，从而达到治疗疾病、疗养身心、促进健康的目的。5种疗愈类型对人健康的作用方式具有一定的共性机理，体现为2种典型作用路径：五感景观—感官刺激—中枢神经系统—自主边缘神经系统的神经调节路径、自然有效成分暴露—身心状态与行为改变—免疫功能改善的免疫调节路径。

2.1 五感景观—感官刺激—中枢神经系统—自主边缘神经系统的神经调节路径

2.1.1 感觉器官作为接收器

人体对外界环境的感知依赖各类感觉器官，感觉器官可以称为接收器 (receptor)，用于获取环境中的各类信息。视觉器官可以感受光影变化的刺激，听觉器官可以感受来自不同音波的刺激，平衡接收器官可以感受重力状态的变化，嗅觉与味觉器官可以感受不同物质的味道，皮肤的温/冷觉接收器官可以感受温度的变化，皮肤的压力感受器官可以接收不同压力的刺激，此外人体还有反射器官，可以接收来自体内的刺激 (图1)^[28]。

2.1.2 自然景观之于感官刺激

人们生活空间周围的自然景观可以分为以植物为主体的大地景观 (earth landscape) 与以天象为主体的宇宙景观 (universe landscape)^[29] 两大类 (图2)。这两大类景观可以根据刺激器官的不同进一步分为视觉、肤觉 (含触觉)、听觉、嗅觉、味觉的五感景观 (表2)。

2.1.3 自主边缘神经系统连接心脑对人的心率变异性产生影响
心脏属于人体的发动机，它与人们的情绪相关，促进着脑部活动。新生儿的心率变异性 (standard deviation of normal to normal intervals, SDNN) 最协调，随着年龄的增长，人体的SDNN每年下降3%，直至死亡时SDNN降为0。SDNN一般被视为心脑协调的指标，

较低的 SDNN 一般被认为处于心脑血管混乱状态，而决定 SDNN 高低的因素在于副交感神经。人的左脑称为智能脑（皮质层结构），右脑称为情感脑（边缘叶结构），它们持续不断地协作。与心脏、心情密切相关的是情感脑。情感脑中的扣带回、海马体、杏仁核这些部位分泌不同激素，通过不同神经通路传递给心脏从而控制 SDNN 的平衡^[30]。

五感景观对相应的接收器产生刺激，通过感觉神经将兴奋传导至中枢（大脑），在此最初产生感觉。感觉又通过连接心脑的自主边缘神经系统对 SDNN 产生影响，在神经系统的综合调节下导致人的身心状况发生改变。

2.2 自然有效成分暴露—身心状态与行为改变—免疫功能改善的免疫调节路径

心理神经免疫学（psychoneuroimmunology）指出行为、神经内分泌会对免疫过程产生作用^[31]。慢性或急性应激事件都会消极地影响免疫功能，使细胞免疫功能和体液免疫功能下降。慢性应激源引发的慢性炎症是多种疾病的病因之一，例如心脏病和认知执行能力下降。被应激激活的交感神经系统会立即增强免疫细胞活性，尤其是自然杀伤细胞（natural killer cells）。但持续应激会增加消极情绪，例如抑郁和焦虑等，抑郁与细胞免疫的多个指标改变有关，特别是会使淋巴细胞对有丝分裂原的反应降低、自然杀伤细胞活性降低，抑郁还与血液中的白细胞数目变化相关^[32]。自然杀伤细胞对先天性免疫系统至关重要，它能对病毒感染和肿瘤生长做出快速反应^[33]。此外，在社交层面，不良的人际关系也会对免疫系统造成影响。

自然环境中可能存在多种利于免疫功能增强的有效成分，包括自然环境中的天然杀菌剂、更高的空气负离子浓度、可作为免疫增强剂的疫苗分歧杆菌、更高的环境生物多样性、自然的景物与声音、更少的空气污染、更少的暴力性因素，这些有效成分与身心状态及行为情况被证实对免疫功能有直接或间接影响^[33]。人类免疫机制的建立很大程度上依赖其成长过程中多样的微生物暴露，自然环境中的微生物群分布在土壤、空气、动物、

表2 人们从自然景观中接收的五感景观^[29]
Tab. 2 The five sensory landscapes derived from natural landscapes^[29]

景观类型	感官刺激				
	视觉	肤觉（含触觉）	听觉	嗅觉	味觉
大地景观	树木、花草、水、瀑布、溪流、岩石、大地、动物等斑斓的色彩	树木、花草、岩石、绵毛水苏毛茸茸的叶片、昆虫、鸟及其他小动物等	鸟鸣、犬吠、虫鸣、水流声等	花香、木材香、土香、青草香、动物气味、昆虫气味等	草的甜味、海水的咸味、矿泉水的甜味等
宇宙景观	灿烂的太阳、朝霞、晚霞、雨水、露水、云雾、星光、雪等	太阳、阴影、云雾、露水、霜、风、一日和季相的温度变化等	风声、雷声等		
大地景观+宇宙景观	阳光普照的大地、波光粼粼的水面、阳光下的树荫、（随时间发生的）树木生长、四季变化等	潮湿的树木、霜打的花草、露水沾湿的花草、雨后大地、雨后岩石、霜降后的大地、白雪覆盖的大地等	雨打芭蕉、松涛阵阵、潺潺流水、森林中的鸟鸣等	梅花冷香、兰花幽香、随风飘来的香味、雨后空气中的土香、树木淋湿后的香味等	

植物（根际、叶际）等环境，足够多样的微生物输入是维持人体肠道微生物菌群多样性的必要条件，且在炎症调节方面有重要作用^[34]。植物释放的挥发性物质芬多精（phytoncide）可以改善人体健康，提高自然杀伤细胞活性。有实证研究证明，在室内接触从森林中提取的芬多精可以提高自然杀伤细胞活性，改善人体免疫功能^[35]。自然暴露下多样的有效成分可以对人体免疫系统产生积极影响。在自然中的身体活动和社会交往均能使免疫系统功能受益。

3 展望

3.1 从园艺疗法到自然疗愈的跨学科理论框架构建

在“健康中国”战略背景下，自然疗愈领域的未来研究将凸显出跨学科合作的巨大潜力和对系统化理论构建的需求。通过将园艺疗法、园林康养、农业康养、森林康养和自然疗愈五大疗愈类型整合至“同一健康”理论框架内，融合心理学、生态学、医学等学科知识，探索自然疗愈对人类健康影响的具体机制及长期效果。

3.2 五大疗愈类型在各自领域的发展重点与特色实践方向

3.2.1 基于不同人群需求的实践方向

自然疗愈领域的研究未来应更加关注不

同人群需求的发展特征，促进研究向精准化、个性化方向发展，包括对五大疗愈类型对不同年龄段人群及城市中特殊群体的独特疗愈效果的深入研究。例如，园艺疗法在恢复特定病症、农业康养在增强社区归属感、森林康养在促进各年龄段人群身心健康等方面的应用。同时，未来研究还需深入探索神经调节和免疫调节 2 种路径在不同自然疗愈类型中的作用效果与机理，为自然疗愈领域提供更坚实的科学基础和理论支撑。

3.2.2 基于媒介特征、行业和产业特征的实践方向

未来各类自然疗愈实践在“健康中国”的背景下也将明确自身特色发展方向：完善园艺疗法标准体系，建立人才培养体系，深入研究园艺疗法对不同人群的治疗效果；探索园林康养的长期健康效益，规范康养景观的设计方式，并将园林康养融入城市规划；发展综合农业康养模式，结合现代技术拓展实践方式；完善森林康养标准体系与人才培养体系，探索如何让森林康养服务于更多人群，在森林生态系统服务的基础上探索并扩大森林康养对社会经济与人群健康的影响；将自然疗愈发展成为重要的心理健康干预方法，应用于绿色健康文旅、绿康城市规划等领域，展现自然疗愈的多样性及应用潜力，并结合科技手段优化临床应用与效果评估。

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图表来源:

图 1 由作者根据参考文献 [28] 翻译改绘; 图 2、表 1 由作者绘制; 表 2 由作者根据参考文献 [29] 翻译改绘。

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LI S H, YAO Y N, MENG L S, ZHU H Z. From Horticultural Therapy to Natural Healing: Types, Development, Mechanisms, and Prospects[J]. *Landscape Architecture*, 2024, 31(5): 12-22. DOI: 10.3724/j.fjyl.202401170043.

From Horticultural Therapy to Natural Healing: Types, Development, Mechanisms, and Prospects

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Abstract: [Objective] Under the impetus of the "Healthy China" strategy, the concepts related to natural healing in China have developed rapidly, making it urgent to sort out the types and development history of the main healing methods in China and explore their common mechanisms. [Method] This research inductively summarizes the main types and common mechanisms of existing natural healing methods in China, and conducts a comparative analysis of the differences and similarities between different types of natural healing in such aspects as concept, foundational discipline, research hotspots, mediator, and degree of correlation with human. [Results] Currently, China has formed a diversified natural healing system that includes horticultural therapy, landscape for well-being, agriculture for well-being, and forest therapy. This system is featured by the coexistence between the landscape for well-being, agriculture for well-being and forest therapy based on environmental carriers, and the horticultural therapy relying on specific activities. Although different healing

methods differ in research focus and development situation, they share common mechanisms in promoting human health, which can be divided into the two pathways of "neural regulation" and "immune regulation". [Conclusion] In the future, the construction of a theoretical system ranging from horticultural therapy to the entire spectrum of natural healing should place greater emphasis on the needs of diverse populations and the characteristics of industry development, thereby advancing the development of natural healing methods towards precision and personalization. Simultaneously, it is necessary to delve into the effects and mechanisms of the aforesaid two pathways in different types of natural healing, with the aim of providing a more solid scientific foundation and theoretical support for the field of natural healing.

Keywords: horticultural therapy; landscape for well-being; agriculture for well-being; forest therapy; natural healing

Human health is inextricably linked with nature. Extensive research indicates that engaging in therapeutic, rehabilitative, and wellness activities in natural settings can confer multifaceted health benefits. These include lowering blood pressure, promoting post-surgical recovery, alleviating stress, improving sleep quality, boosting mental health, reducing symptoms of depression and anxiety, increasing prosocial behaviors, strengthening social connections, and enhancing overall well-being and life satisfaction^[1]. However, modern urban living inevitably reduces human contact with nature. In developed nations, there is a notable decline in outdoor activity, especially among children, leading to a lifestyle deficient in natural exposure termed "nature deficit". This can increase the risk of obesity, heart disease, diabetes, cancer, and other physical health issues^[2]. Moreover, it may also contribute to mental fatigue, aggressive and violent behaviors, emotional disorders, attention deficits, and depression^[3].

Driven by the "Healthy China" national

strategy, the concept of natural healing in China has rapidly evolved and expanded into a diverse system encompassing horticultural therapy, landscape for well-being, agriculture for well-being, and forest therapy. This burgeoning field has become a pivotal area of research and practice in the nexus of natural environments and public health. By comparing the development, characteristics, and differences of various types of natural healing, this research aims to lay the groundwork for constructing a comprehensive theoretical framework for the natural healing system, thereby fostering scientific advancement in this field.

1 From Horticultural Therapy to the Development of Five Major Types of Natural Healing

1.1 Emergence and Evolution of Related Concepts

In the context of modern urban life, the development of concepts such as horticultural therapy, landscape for well-being, agriculture for

well-being, forest therapy, and natural healing illustrates the deepening interaction between nature and human health, forming a multilayered and interwoven healing system featuring the complementation of different healing methods. In this system of natural healing, landscape for well-being, agriculture for well-being, and forest therapy emphasize reliance on various natural environments as healing carriers, whereas horticultural therapy places more emphasis on participatory activities. Horticultural therapy underwent systematic development in Europe and America at the end of the 19th century, laying a solid foundation for both the theory and practice in the field of natural healing^[4]. As the 20th century drew to a close and the 21st century began, with increasing awareness of the relationship between urban and rural natural environments and public health, the concepts of landscape for well-being and agriculture for well-being emerged and gradually became integral to urban planning. Landscape for well-being promotes physical and mental health through

Tab. 1 Comparative analysis of differences across the five healing types

healing type	level of professional development	foundational discipline	research hotspot and cutting-edge direction	mediator	degree of correlation with human
horticultural therapy	high	horticulture	qualitative/quantitative research on therapeutic effects of horticulture; design and construction of therapeutic horticultural environments	gardening activities	high
landscape for well-being	medium-high	landscape architecture	qualitative/quantitative research on the efficacy of landscape for well-being; landscape design and construction for therapeutic gardens	landscape environment experience	high
agriculture for well-being	medium	agronomy	qualitative/quantitative research on health benefits in agricultural and rural environments; planning, design and construction of therapeutic agriculture and rural area	agricultural and rural environment experience	medium-high
forest therapy	high	forestry	forest medicine; design and construction of forest therapy bases, bathhouses, trails, etc.	forest environment experience	medium-high
natural healing	medium (covering multiple types)	horticulture, landscape architecture, agronomy, forestry, etc.	qualitative/quantitative research on natural healing; planning, design and construction of natural healing environments	natural environment experience	

carefully designed landscape environments and their natural elements^[5]; agriculture for well-being engages participants with nature, involves them in agricultural activities, educates them about the origins of food, and underscores the importance of a green and healthy lifestyle, providing new ideas for resident health and sustainable rural development^[6-7]. At the end of the 20th century, the concept of forest therapy originated in Japan, highlighting the unique contributions of forest environments to physical and mental health and gaining promotion worldwide^[8]. Facing the challenges of ecological crises and public health emergencies in the 21st century, natural healing, as a comprehensive health promotion method, has received widespread attention. Building on the aforementioned four concepts, natural healing emphasizes the extensive and holistic beneficial impacts of interacting with nature on health,

marking a continuously deepened understanding of the relationship between nature and health and an integrated exploration of natural healing methods^[9].

1.2 Differences Between the Five Healing Types

The healing types vary in carrier, including mediator and level of correlation with human. Additionally, there are differences in their current status of development, which include research hotspot, foundational discipline, and level of professional development. Below is a comparative analysis of these differences across the five healing types (Tab. 1).

1.2.1 Level of Professional Development and Depth of Research

Overall, natural healing and the four other types of healing it encompasses are interdisciplinary research areas. The level of professional development and depth of research vary among

these five types, demonstrated by different focuses in foundational discipline, research hotspot, and cutting-edge direction.

Horticultural therapy has the highest level of professional development. Some universities offer specialized courses based on horticulture, mainly involving disciplines such as psychology, rehabilitation medicine, and sociology. Unique aspects of horticultural therapy include its application in rehabilitation treatments^[10] and its role in enhancing educational outcomes and social participation^[11]. Research on horticultural therapy is gradually shifting from case study and descriptive research to more systematic empirical study, including randomized controlled trials (RCT) and long-term follow-up studies, making the findings more reliable and universally applicable. The development of horticultural therapy research in China is evident in the establishment of theoretical foundations (such as environmental psychology and occupational therapy theory)^[12], the research on practical models^[13], the certification of education and training^[14], the assessment of human benefits^[11] based on the combination of quantitative and qualitative methods, and the formation of professional organizations like the American Horticultural Therapy Association and the Committee of Horticultural Therapy & Landscape for Well-Being, Chinese Society of Landscape Architecture. Currently, Chinese universities and research institutions are also strengthening the professional infrastructure for horticultural therapy. Advancing professional education and certification remains a primary goal for the development of horticultural therapy in China.

Landscape for well-being is based on landscape architecture, and extends into other disciplines such as horticulture, medicine, psychology, and sociology. Research focuses include the exploration of design principles for therapeutic landscape, the assessment of therapeutic effects of landscape for well-being for special groups such as the elderly^[15], children, and

people with disabilities^[6], as well as the evaluation of the physical and mental health benefits provided by landscape for well-being^[17]. Moreover, concepts and practices of landscape for well-being are beginning to be integrated into the educational and professional setups in disciplines such as landscape architecture and horticulture. Practically, various regions in China have started to experiment with and construct landscape for well-being projects, incorporating these concepts into the design of parks, communities, and tourist spots, thus gaining practical experience. With the national push towards a “Healthy China” and emphasis on ecological civilization, landscape for well-being has started receiving governmental policy support and promotion, and has already obtained tangible results. However, standards for therapeutic landscape design and service quality are still in development and require establishment based on scholarly research.

Agriculture for well-being is grounded in agronomy and extends into such disciplines as tourism and socioeconomics. Research often connects agricultural activities with health benefits^[6] and is linked with socio-economic and policy dimensions, such as optimizing service and management models to rejuvenate rural areas, create jobs, and enhance social welfare^[18-19]; exploring marketing strategies for agritourism to improve its attractiveness and recognition^[20]; investigating policy impacts on agritourism development and making rational recommendations^[21]; and using agritourism to achieve environmental conservation and sustainable agricultural practices^[22]. Internationally, agriculture for well-being as a hybrid of agriculture, health, and tourism, has developed in countries like Italy, the USA, and Canada, where farms often offer such services as produce picking, agricultural experience, rural culture education, and leisure and holiday-making^[19, 22]. In China, agriculture for well-being is closely linked with the rural revitalization strategy and is considered a new avenue for promoting agricultural and rural economic development. Some

domestic projects also emphasize cultural heritage and ecological conservation^[23], such as incorporating traditional farming culture experience and promoting organic agriculture.

Forest therapy is based on forestry and incorporates elements from disciplines such as medicine, ecology, and environmental psychology. Research often focuses on evaluating the effectiveness of forest therapy programs^[9, 24] and exploring the socio-economic^[25] and ecosystem service benefits of forest therapy^[26]. In China, forest therapy is increasingly recognized for blending traditional culture with modern scientific research, with its theoretical and practical frameworks being gradually established and refined. Research hotspots typically include four themes. 1) Forest medicine and therapy: Studying the impacts of forest environments on human physiological and mental health and how these environments can be used for disease prevention and rehabilitation. 2) Ecology and environmental science: examining the components and functions of forest ecosystems and their contributions to human well-being. 3) Environmental psychology: investigating the positive mental effects of forest environments, such as stress reduction, mood improvement, and attention enhancement. And 4) public health and preventive medicine: exploring the potential of forest therapy activities to improve public health levels and prevent lifestyle-related diseases.

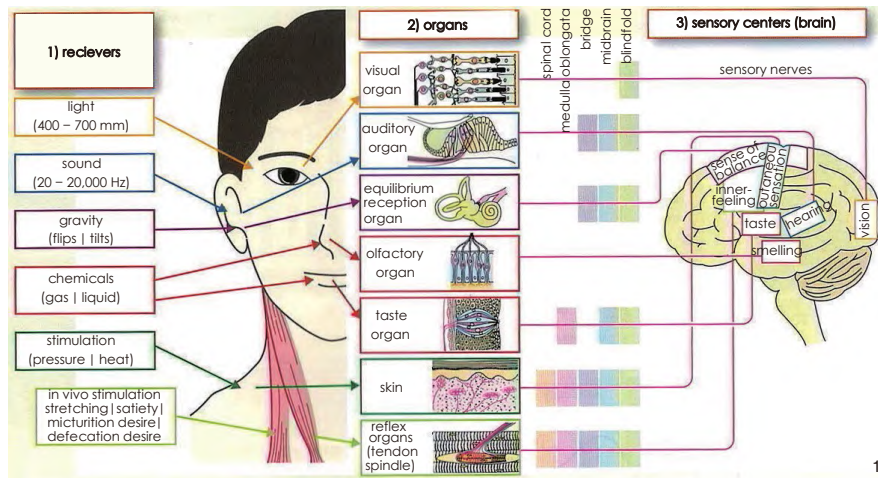
Natural healing represents a cross-disciplinary field that includes theories and practices from such disciplines as horticulture, landscape architecture, agronomy, forestry, ecology, psychology, medicine, sociology, and environmental science. Due to the wide array of types and disciplines involved, both theoretical research and practical applications require continuous integration of cutting-edge interdisciplinary insights. Currently, research in natural healing related to such areas as mental and physical health and environmental design has made significant progress, but there is still a need for

deeper interdisciplinary collaboration to establish a more systematic theoretical framework and evaluation system. On a practical level, the number of natural healing projects and cases worldwide is gradually increasing. To further promote the professional development of natural healing, it is crucial to enhance scientific evaluations of natural healing outcomes and to make greater efforts in policy support, education and training, standardization, and professionalization.

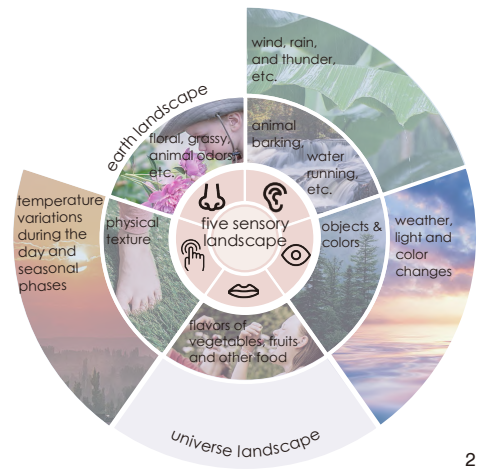
1.2.2 Mediators

Horticultural therapy, landscape for well-being, agriculture for well-being, forest therapy, and natural healing all utilize the natural environment and its vegetation as primary elements. They enhance physical and mental health through human interaction with nature, with each method featuring a principal medium and application context.

The mediator for horticultural therapy involves plant cultivation and related gardening activities. Participants engage in gardening activities such as plant planting, maintaining and harvesting plants, which brings therapeutic benefits such as improving manual skills, fostering social interaction, enhancing cognitive functions, and regulating emotions^[12]. The mediator for landscape for well-being is the experience of landscape environments. Compared to horticultural therapy, landscape for well-being places a greater emphasis on well-designed landscapes and focuses on the inherent healing effects of the environment itself, such as promoting health through healing gardens in hospitals and rehabilitation centers^[27]. The mediator for agriculture for well-being is the experience of agricultural and rural environments. It emphasizes the health benefits derived from engaging in real agricultural activities, such as farming, animal husbandry, and harvesting^[19]. Forest therapy uses the forest environment as its mediator, prioritizing sensory experience within the forest environment, aiming to promote health through activities such as walking, breathing, and meditation in the forest environment. natural



1 Stimulus reception and sensation generation^[28]



2 Earth landscape and universe landscape

healing represents a broader concept that includes all forms of interaction with the natural environment, thus encompassing the therapeutic effects of all natural environments on human health. In addition to the landscape, agricultural, and forest environments mentioned above, it may also include other natural environments such as beaches and grasslands.

1.2.3 Degree of Correlation with Human

In the broader context of modern urban life, horticultural therapy, landscape for well-being, agriculture for well-being, forest therapy, and natural healing promote human health through various forms of interaction with the natural environment, and the degree of correlation with human varies among them. Horticultural therapy and landscape for well-being involve direct interactions with plants and landscape environments, such as planting, pruning, watering, garden touring, and walking. These hands-on gardening activities and experience in garden environments are designed to achieve both physical and mental healing effects, hence they have a high degree of correlation with human. In contrast, agriculture for well-being and forest therapy often have a lower degree of correlation with human in the daily life of urban residents due to the poor accessibility of their environments. natural healing

encompasses all types of interactions between the natural environment and human, and its degree of correlation with human depends specifically on the nature and design of activities.

2 Mechanisms of Natural Healing System

The five healing types discussed above utilize natural elements and environments to facilitate a series of health-beneficial activities, thereby achieving therapeutic, recuperative, and health-promoting objectives. The mechanisms by which they impact human health share certain commonalities, exemplified by the following two typical pathways: The “five sensory landscapes – sensory stimulation – central nervous system – autonomic limbic nervous system” neural modulation pathway, and the “natural component exposure – mental and physical state and behavioral changes – immune function enhancement” immunomodulation pathway.

2.1 “Five Sensory Landscapes – Sensory Stimulation – Central Nervous System – Autonomic Limbic Nervous System” Neural Modulation Pathway

2.1.1 Sensory Organs as Receptors

Human perception of the external environment relies on various sensory organs, which act as receptors, capturing different types of

environmental information. The visual organs respond to changes in light and shadow, auditory organs to different sound waves, and balance organs to changes in gravitational states. Olfactory and gustatory organs detect the tastes of different substances, while skin temperature/cold receptors perceive changes in temperature. Pressure receptors in the skin respond to varying pressures, and there are also internal sensory organs that receive stimuli from within the body (Fig. 1)^[28].

2.1.2 Sensory Stimulation from Natural Landscapes

The natural landscapes surrounding human living spaces can be artificially categorized into two main types: Earth landscapes, which are primarily based on vegetation, and universe landscapes, which are centered around celestial phenomena^[29] (Fig. 2). These two landscape categories can further be divided according to the sensory organs they stimulate, into visual, tactile (including touch), auditory, olfactory, and gustatory landscapes, collectively known as the “five sensory landscapes” (Tab. 2).

2.1.3 Influence of the Connection Between the Autonomic Limbic Nervous System and Heart and Brain on Heart Rate Variability

The heart, often considered the engine of the human body, is closely linked to emotions and

Tab. 2 The five sensory landscapes derived from natural landscapes^[29]

landscape types	sensory stimuli				
	visual (sight)	tactile (touch)	auditory (hearing)	olfactory (smell)	gustatory (taste)
earth landscape	colorful scenery of trees, flowers, water, waterfalls, streams, rocks, ground, animals, etc.	trees, plants, ground (barefoot touch), rocks, fluffy leaves, insects, birds, other small animals, etc.	birdsong, dog barking, insect sound, water flowing sound, etc.	scents of flowers, woods, earth, fresh grass, animals, insects, etc.	sweet grass, salty seawater, sweet mineral water, etc.
universe landscape	brilliant sun, morning glow, sunset glow, rain, dew, fog, starlight, snow, etc.	sun, shadows, fog, dew, frost, wind, daily and seasonal changes of solar radiation, temperature changes, etc.	sound of wind, thunder, etc.		
earth + universe landscape	sunlit earth, glittering water, shade under trees, tree growth over time, seasonal changes	wet trees, frosted plants, dew-soaked plants, post-rain ground/rocks, frost-covered ground, snow-covered landscape, etc.	rain on banana leaves, rustling of pine trees, babbling brooks, birds chirping in the forest	fragrance of plum and orchid flowers, scents carried by the wind, post-rain earthy smell, wet tree aromas, etc.	

stimulates brain activity. Neonates have the most coordinated heart rate variability (HRV), measured as the standard deviation of normal to normal intervals (SDNN). With aging, a person's SDNN decreases by about 3% annually until it reaches zero at death. The SDNN value is generally seen as an indicator of heart – brain coordination, with lower SDNN values indicating a state of disarray between the heart and brain. The parasympathetic nervous system plays a crucial role in determining the SDNN. The human left hemisphere, known as the “intellectual brain” (cortical structures), and the right hemisphere, known as the “emotional brain” (limbic structures), are constantly in conflict. The emotional brain, which is closely connected to the heart and emotions, includes areas like the cingulate gyrus, hippocampus, and amygdala. These areas secrete various hormones that, through different neural pathways, influence the heart and thereby regulate the balance of SDNN^[30].

The five sensory landscapes stimulate corresponding receptors, conveying excitement to the central nervous system (the brain) where initial sensations are generated. These sensations are then influenced by the autonomic limbic nervous system, which connects the heart and brain, affecting the SDNN. This comprehensive neural regulation results in changes in an individual's mental and physical state.

2.2 “Natural Component Exposure – Mental and Physical State and Behavioral Changes – Immune Function Enhancement” Immunomodulation Pathway

Psychoneuroimmunology highlights that behavior and neuroendocrine functions can influence immunological processes^[31]. Both chronic and acute stress events negatively affect immune functions, leading to a reduction in both cellular and humoral immunity. Chronic inflammation induced by persistent stressors is a causative factor in various diseases, such as heart disease and declines in cognitive executive functions. The activation of the sympathetic nervous system by stress can immediately enhance immune activity, particularly the activity of natural killer (NK) cells. However, prolonged stress increases the production of negative emotions, such as depression and anxiety. Depression is associated with several alterations in cellular immune markers, notably a decrease in lymphocyte proliferation and mitogen-induced proliferative responses, reduced activity of NK cells, and changes in the number of white blood cells in the blood^[32]. NK cells are critical to the innate immune system and provide a rapid response to viral infections and tumors^[8]. Additionally, social interactions, including relationships and loneliness, also impact the immune system.

The natural environment harbors numerous components potentially beneficial to the enhancement of immune function. These elements include natural antiseptics, higher concentrations of negative ions in the air, *Mycobacterium vaccae* which can act as an immunostimulant, greater biodiversity, natural vistas and sounds, less air pollution, and fewer violent factors. Studies have confirmed that these components are directly or indirectly linked to immune function through their influence on both physical and mental states as well as behaviors^[33]. Human immune systems greatly rely on exposure to a diverse range of microbes during the developmental phases. In the natural environment, microbial populations are found in soil and air, and on animals and plants (including roots and leaves). A diverse array of microbial exposures are essential for maintaining the diversity of human gut microbiota, which is crucial for regulating inflammation^[34]. Phytoncide, volatile compounds released by plants, are known to improve human health by enhancing the activity of NK cells. Empirical research has demonstrated that exposure to phytoncide extracted from forests indoors can boost NK cells activity and overall immune functions. The variety of beneficial components found in the natural environment can positively impact the human immune system^[35]. Additionally, physical activities and social

interactions conducted in the natural environment also contribute to the betterment of immune system functionality.

3 Prospects

3.1 Construction of an Interdisciplinary Theoretical Framework Ranging from Horticultural Therapy to Natural Healing

In the strategic context of the “Healthy China” initiative, forthcoming investigations in natural healing emphasize the substantial potential for cross-disciplinary integration and the imperative for a cohesive theoretical framework. The proposed framework aims to integrate the five healing types of horticultural therapy, landscape for well-being, agriculture for well-being, forest therapy, and natural healing into a comprehensive “One Health” model. This integration seeks to synthesize diverse disciplinary perspectives including psychology, ecology, and medicine to elucidate the mechanisms by which natural healing influences human health and to assess its long-term benefits.

3.2 Strategic Development and Innovative Practices Within the Five Healing Types

3.2.1 Practice Direction Based on the Needs of Different Groups

Research in natural healing should increasingly focus on the unique needs of different groups to foster more targeted and personalized healing interventions. This involves detailed investigations into how each of the five healing methods uniquely benefits various demographic groups, including special urban groups and different age brackets. Examples include utilizing horticultural therapy for specific medical conditions, leveraging agriculture for well-being to strengthen community ties, and employing forest therapy to enhance holistic health across diverse age groups. Additionally, forthcoming research must further explore the roles and underlying mechanisms of neural and immune modulation across these healing types to solidify the empirical and theoretical foundations of natural healing.

3.2.2 Practice Direction Based on Media and Industry Characteristics

Future practices in natural healing will also need to clearly articulate and develop unique strategies reflective of their inherent media and industry characteristics within the “Healthy China” framework. This encompasses refining standards and developing educational programs for horticultural therapy, exploring long-term health benefits of landscape for well-being and integrating landscape for well-being into urban design, advancing comprehensive agriculture for well-being models that integrate cutting-edge technologies, and optimizing forest therapy initiatives to cater to a wider audience through enhanced understanding of forest ecosystem services. Moreover, natural healing is poised to become an essential component of mental health interventions, with potential applications in green health tourism and urban planning, thereby highlighting its versatility and capacity for integration with technological advancements to improve clinical application and outcome assessment.

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Sources of Figures and Tables:

Fig. 1 is adapted and redrawn by the authors based on reference [28]. Fig. 2, Tab. 1 are drawn by the authors. Tab. 2 is adapted and redrawn by the authors based on reference [29].

(Editor / LIU Yufei)