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Sensory gardens as visitor experiences: Implications on well-being

UNIVERSITY OF ALGARVE

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Masters in Tourism Organizations Management

Dissertation made under the supervision of:

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Sensory gardens as visitor experiences: Implications on well-being

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I declare to be the author of this work, which is unique and unprecedented. Authors and works consulted are properly cited in the text and are included in the listing of references.

Joana Henriques de Almeida Antunes Ferreira

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(signature)

DEDICATION

I dedicate this work to my brother Paulo for being an inspiration even in your absence. Your unwavering support, boundless love, and indomitable spirit have left a permanent mark on my journey. Though you are no longer with us in body, your memory lives on every step of my life.

Thank you for teaching me to dream, you are my guiding light and I will see you again.

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ABSTRACT

This dissertation focuses on understanding the role of sensory gardens as visitor experiences in individuals' perceived well-being from a leisure and tourism perspective, using a managerial lens.

Although sensory gardens have been researched as therapeutic options for people with a wide variety of disabilities, there is a research gap regarding the implications of approaching sensory gardens as visitor (consumption) experiences and the potential consequences on their well-being. This work addresses this gap by applying a questionnaire assessing two distinct videos—one featuring a sensory garden and the other a typical garden—sought to uncover differences and correlations related to hedonic and eudaimonic well-being, inclusiveness, accessibility, and overall perceived experience.

The findings suggest that respondents perceived sensory gardens to be more inclusive and accessible. Additionally, both hedonic and eudaimonic dimensions of well-being exhibited a positive correlation when addressing sensory gardens, particularly in terms of inclusiveness and accessibility. This finding may imply that sensory garden experiences have the potential to contribute significantly to visitors' overall well-being. This study not only contributes to the growing knowledge within the realm of garden visits as sensory (consumption) experiences as garden visits but also underlines the relevance of inclusive design and accessibility considerations in shaping visitors' well-being.

Finally, both theoretical and managerial contributions are discussed, as well as limitations and directions for future research in tourism organisations management.

Keywords: Sensory gardens; Hedonic well-being; Eudaimonic well-being; Visitor experience management; Inclusiveness; Accessibility.

RESUMO

Esta dissertação tem como objetivo compreender o papel dos jardins sensoriais como experiências dos visitantes em relação ao bem-estar percebido pelos mesmos, a partir de uma perspetiva de lazer e turismo, do ponto de vista da gestão. Foram propostas sete perguntas de investigação para perceber esse mesmo papel.

Os jardins sensoriais ligam as experiências sensoriais à natureza e são importantes para que os visitantes percecionem uma experiência no jardim como inclusiva e acessível, e que contribui para uma sensação de bem-estar. Embora os jardins sensoriais tenham sido investigados como opções terapêuticas para pessoas com uma grande variedade de deficiências – como perturbações do espetro do autismo (ex.: Senjana & Putra, 2021), demência (ex.: Bourdon & Belmin, 2021), deficiências visuais (ex.: Senjana & Putra, 2021) e crianças com deficiências (ex.: Hussein, 2012) – existe uma lacuna de investigação no que diz respeito às implicações da abordagem dos jardins sensoriais como experiências para os visitantes e as consequências que isso teria no seu bem-estar.

Jardins sensoriais são normalmente espaços terapêuticos ligados à experiência sensorial na natureza (Sensory Trust, 2023), pensados estrategicamente e com elementos e características especificas como a acessibilidade, o valor estético, a manutenção, as plantas, a qualidade dos equipamentos de revestimento, o nível de segurança e a localização (Hussein, 2009). Além das aplicações terapêuticas referidas anteriormente, os jardins sensoriais são ainda benéficos a nível da redução do stress, aumento dos níveis de bem-estar (Souter-Brown et al., 2021) e a nível educacional (Hussein, 2012).

Considerando jardins típicos, isto é, que não foram desenhados com o propósito de serem jardins sensoriais, qualquer jardim é um espaço multissensorial capaz de criar experiências únicas, diferentes, originais e exclusivas (Silva & Carvalho, 2012). Adicionalmente, as diversas motivações para visitar um jardim incluem aspetos como saúde física e psicológica, tranquilidade, bem-estar, lazer, entre outros (Connell, 2004; Paiva et al., 2020), que podem ser considerados elos de ligação entre o turismo de jardim e os jardins sensoriais.

Do ponto de vista do turismo e com as estratégias de marketing adequadas, é possível transformar os jardins em atrações turísticas capazes de se tornarem o ponto central do destino turístico onde estão inseridos (Silva & Carvalho, 2012), já que cerca de um terço dos turistas visita jardins enquanto viaja (Benfield, 2013). Paralelamente, na perspetiva da gestão, faz sentido investir no turismo de jardim, já que representa um

potencial ponto de diferenciação em relação a outros destinos turísticos (Shapoval et al., 2021).

O estudo das experiências multissensoriais é considerado importante no contexto do turismo (ex.: Agapito, 2020; Agapito et al., 2014; Agapito et al., 2013; Kastenholz et al., 2020; Matteucci, 2016; Meacci & Liberatore, 2018), uma vez que entender como os sentidos afetam a perceção é uma forma de promover a satisfação do visitante (Erenkol & AK, 2015). Por outro lado, a diversidade sensorial e a interação com a comunidade estão ligadas a experiências turistas positivas e a sentimentos de apego ao destino (Kastenholz et al., 2020; Matteucci, 2016). Usar estímulos sensoriais é um instrumento que auxilia na gestão de um destino/atração, uma vez que qualquer lugar é multissensorial e passível de ser palco de experiências memoráveis holísticas e multissensoriais e personalizáveis para os visitantes (Agapito et al., 2013; Pine & Gilmore, 1998).

Apesar de o turismo no geral estar ligado às experiências multissensoriais, o turismo de bem-estar foca-se mais ainda nessa ligação (Agapito, 2020; Smith & Diekmann, 2017), já que é influenciado pela natureza e ambiente da experiência (Vada et al., 2020). Essa ligação ao bem-estar é feita tanto através das dimensões hedónica e eudaimónica (Lv & Wu, 2021; Smith & Diekmann, 2017; Vada et al., 2020). A primeira está relacionada com o prazer emocional e sentimento de satisfação e a segunda refere-se aos sentimentos de autenticidade e bem-estar psicológico e crescimento pessoal (Tsai, 2021). Idealmente, aliando ambos os tipos de bem-estar à utilização de experiências sensoriais é possível gerar uma ligação emocional a longo prazo com o destino turístico e, por sua vez, influenciar os níveis de felicidade dos turistas/visitantes, de forma dinâmica (Lv & Wu, 2021).

Para responder às questões de investigação, foi realizado um questionário a uma amostra de 124 respondentes pertencentes à geração Y (nascidos entre os anos de 1981 e 2000) (Roberts, et al., 2012; Goldgehn, 2004), maioritariamente feminina, solteira e de nacionalidade portuguesa. O questionário envolveu um de dois vídeos distintos - um com um jardim sensorial e outro com um jardim típico – a que o indivíduo teve de assistir antes de responder ao questionário. Do total de 124 respondentes, metade visualizou o vídeo com o jardim sensorial e a outra visualizou o jardim típico. O questionário tinha como o objetivo compreender as perceções dos respondentes relativamente ao jardim experienciado tendo em conta o bem-estar hedónico, o bem-estar eudaimónico, inclusão, acessibilidade, capacidade para envolver os cinco sentidos e experiência geral. O questionário permitiu também testar as correlações entre as mesmas variáveis.

Adicionalmente, foi realizada uma entrevista exploratória com uma especialista em jardins sensoriais para explorar e reforçar conhecimentos dentro do tema, com foco nas suas aplicações terapêuticas, vantagens, outros tipos de terapias sensoriais e possibilidade da aplicação dos jardins no turismo.

Tendo em conta as limitações do estudo, os resultados sugerem que os inquiridos consideram que ambas as experiências têm capacidade para elevar os níveis de bem-estar. Adicionalmente, sugerem que os jardins sensoriais são mais inclusivos e acessíveis. Relativamente ao bem-estar hedónico e eudaimónico, os resultados sugerem ainda que ambos os tipos de jardins demonstram correlações entre os dois tipos de bem-estar e as restantes variáveis, em especial com a capacidade de envolver os cinco sentidos e a experiência percebida global. Já relativamente aos jardins sensoriais, estes apresentaram correlações positivas com os conceitos de inclusão e acessibilidade. Assim, as experiências dos jardins sensoriais têm o potencial de contribuir significativamente para o bem-estar geral dos visitantes.

Este estudo contribui para o conhecimento crescente no domínio das experiências sensoriais enquanto visitas a jardins e sublinha a relevância do design inclusivo e das considerações de acessibilidade na formação do bem-estar dos visitantes. Desta forma, foram sugeridas potenciais aplicações dos jardins sensoriais na perspetiva da gestão, tendo em conta situações de lazer, turismo e marketing, assim como exemplos de recursos específicos (incluindo plantas endémicas da região do Algarve) para a criação de espaços de jardins sensoriais.

Palavras-chave: Jardins sensoriais; Bem-estar hedónico; Bem-estar eudaimónico; Experiência do visitante; Inclusão; Acessibilidade.

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ABBREVIATIONS LIST

TG	Typical Garden
SG	Sensory Garden
HW	Hedonic well-being
EW	Eudaimonic well-being

CHAPTER 1. INTRODUCTION

This dissertation tackles a research gap pertaining the implications of sensory gardens as visitor experiences on individuals' well-being from a leisure and tourism perspective, using managerial lenses. This study considers literature showing the links between multisensory tourism experiences (e.g., Agapito, 2020), garden tourism (e.g., Čakovská, 2018), sensory gardens (e.g., Bourdon & Belmin, 2021), and well-being (e.g., Smith & Diekmann, 2017).

Sensory gardens connect sensory experiences with nature and are important for visitors to perceive a garden experience as inclusive and accessible. Sensory gardens have been researched as therapeutic options for people with a wide range of disabilities such as autism spectrum disorder (Senjana & Putra, 2021), dementia (Bourdon & Belmin, 2021), visual impairments (Senjana & Putra, 2021), and children with disabilities (Hussein, 2012). In addition, sensory gardens are also known to be beneficial in terms of reducing stress and increasing levels of well-being (Souter-Brown et al., 2021).

Multisensory experiences, such as sensory gardens, are linked to well-being through both hedonia – related to emotional pleasure and a sense of enjoyment – and eudaimonia – feelings of authenticity, psychological well-being, and self-growth (Lv & Wu, 2021; Smith & Diekmann, 2017; Tsai, 2021; Vada et al., 2020). In parallel, tourism is also related to levels of happiness and well-being (Agapito, 2020; Smith & Diekmann, 2017), which makes sensory gardens a potential resource for leisure and tourism organizations that may want to a) focus on well-being tourism, and b) differentiate themselves in the sector. So far, to the best of the author's knowledge there is no study focused on the basis of sensory gardens in a leisure and tourism context and its well-being outcomes.

In this light, the **general objective** of this dissertation is to understand the role of sensory gardens as visitor experiences in individuals' perceived well-being from a leisure and tourism perspective, using managerial lenses. Following the main research objective, the dissertation addresses sensory gardens versus typical gardens to answer to **seven research questions:**

1. Are there differences between the reported eudaimonic well-being of visitors who experience a typical garden versus a sensory garden?

2. Are there differences between the reported hedonic well-being of visitors who experience a typical garden versus a sensory garden?
3. Are there differences between the reported inclusive experience of visitors who experience a typical garden versus a sensory garden?
4. Are there differences between the reported accessible experience of visitors who experience a typical garden versus a sensory garden?
5. Are there differences between the reported engaging sensory experience of visitors who experience a typical garden versus a sensory garden?
6. Are there differences between the reported global experience of visitors who experience a typical garden versus a sensory garden?
7. To what extent well-being (hedonic and eudaimonic) is correlated with the perception tourist experience elements in a sensory garden versus a typical garden?

Following the introduction, this dissertation is comprised of literature review methodology, results, and discussion and conclusion. The literature is divided into five sub-sections on themes such as sensory gardens, garden tourism, tourism sensory experiences, sensory marketing and well-being tourism.

CHAPTER 2. LITERATURE REVIEW

2.1. Sensory gardens

2.1.1. The rationale of sensory gardens

According to the Sensory Trust (2023), a sensory garden is "a space with a principle focus on sensory experience" and it is "(…) designed to connect people closely with nature". Hussein (2012) cites Shoemaker (2002) in regards of their views on the need to consider the "human element", since such gardens are designed to be experienced closely, by all the human senses (e.g., vision, hearing, smell), rather than just looking at them from a distance.

Sensory gardens call for specific designs that should be thought carefully, from elements such as plant species (Menezes & Hardoim, 2013), patterns and colours (Senjana & Putra, 2021), to textures, noises, scents and tastes (Hussein, 2012). Important features to be considered in a well-developed sensory garden are:

a) to have a purposeful design;

b) to be located in a separated space specifically for that objective;

c) to be able to stimulate diverse human senses, focused on non-visual experiences;

d) to incorporate vegetation and other stimulating elements other than the garden itself (Zajadacz & Lubarska, 2020).

Additionally, understanding the visitors/users requirements and the garden's maintenance should also be considered as changes can alter the sensory impact and influence the attendance to the garden (Hussein, 2009).

Also, the garden's appeal to the senses is key (Zajadacz & Lubarska, 2020). According to Worden and Moore (2004), sensory gardens may be dedicated to only one or several senses and can be divided into sections (one per sense) or combine stimuli. Sensory gardens can incorporate interactive toys, rich vegetation and possess educational value (Zajadacz & Lubarska, 2020). Worden and Moore (2004) also mention that sensory gardens contain hardscape elements, which are "the components of the landscape not composed of living plants – paths, benches, arbors, walls, etc" (Worden & Moore, 2004: 1), along with a plant selection chosen having the garden's objective in mind. Therefore, plants may have several purposes.

Hussein (2009) mentions that the most important characteristics when planning a sensory garden, according to landscape architects, are its general accessibility, the aesthetic value, its maintenance, the plants, the quality of the surfacing equipment, the safety level and spatial location. In addition, in the same study, teachers and therapists in schools where the sensory gardens were placed revealed the relevance of "accessibility, maintenance, quality of sensory equipment, safety and the spatial location of the garden" (Hussein, 2009: 14). Senjana and Putra (2021) advocate the importance of the presence of geometric and repetitive patterns, as well as overlaying colours within the design for added focus from users with disabilities. Furthermore, the authors mention that elements such as ornamental vegetation and animals may contribute to therapeutic processes. Figure 2.1 shows an example of a sensory garden.

Figure 2.1- Example of sensory gardens.

Source: Photo courtesy of Zensenses.

Regarding specific elements to add to a sensory garden, it is necessary to consider the users' requirements, as well as the purpose of the garden. Regarding hardscape elements, plants, and specific sensory stimuli, Worden and Moore (2004) provide specific examples, as can be observed in table 2.1.

Table 2.1- Suggested specific elements considering users' requirements.

Hardscape elements	**Paving materials** (block paving, timber decking, mulch, and stone) with a width from 121.92cm to 152.4cm – wheelchair-friendly.
	Planting beds with different heights – accessible to several types of visitors (raised places for wheelchair users and visually impaired visitors, and lower heights for children).
	Places to sit – taking full advantage of the space considering materials that evoke different stimuli (rough-textured tree stumps, smooth metal seats that change temperature according to their exposure to sunlight, pergolas and gazebos).
	Clear signage – ways to do include signs with plant identification (colour coded and Braille), recorded audio systems and brochures.
Plant selection	Plants that **encourage interaction** – not poisonous, allergenic or that may need pesticides.
	Multi-purpose vegetation (e.g., mints have strong taste and smell).
	Organization of plants by theme – increase engagement and evoke memorable experiences (e.g., "regions of the world or cultures, moonlight gardens, and medicinal plants" (Worden & Moore, 2004: 2)).
Sight stimuli	**Colour** – Warm and cool colours have different effects on the visitors; the first revitalise emotions and encourage activity and the latter transmit soothing sensations and tranquillity. Colours also provide "balance, unity, rhythm, focal points, accents, and definition" (Worden & Moore, 2004: 2). (e.g., flowers, fruits, foliage and bark are ways to achieve a colourful environment). Colour should be added regardless of having been designed for the visually impaired, since some people might be able to perceive it in big blocks.
	Plants with visible textures and shapes – Possible textures, easily perceived: smooth, tough, ruffled, fuzzy or lacey. Possible shapes: upright, open, weeping, cascading, or columnar with round, toothed, and spherical leaves and/or fruits.
	Movement - Increase the perception of movement with plants that sway in the wind or float in the water, ponds with fish, birds and others. The sequence of plants and focal points may also evoke an idea of movement.
	Contrast between light and shadow – from subtle (when a tree creates a shade in the path) to dramatic (like a dark tunnel made of vines that leads to a sunny portion of the garden).
	Accessories to enhance visual pleasure (e.g., coloured lights, torches, mirrors, gazing globes, mobiles and sculptures).
Sound stimuli	**Plants that provide specifics sounds** (e.g., bamboo stems knocking against each other, the rustling grass and palm trees sawing in the wind). Other ideas include crunching fallen leaves by walking through them or using certain seeds to create maracas.
	Animals (e.g., squirrels and birds by adding plants to attract them or feeders).
	Accessories (e.g., waterfalls, fountains, harps, windchimes, music and others).
Olfactory stimuli	**Easily recognizable plants** – the sense of smell is a highly emotional sense, that may have great associative properties and help create long-lasting memories. Recognizing and identifying plants and its parts through crushing and smelling this may be a good strategy.
	Planning the arrangement of fragrances – gentle scents (e.g., nasturtium), strong perfumes (e.g., gardenia) or resinous (e.g., pine tree and needles). Placement should also be considered: alongside seating areas to relax, on the

Table 2.1- Suggested specific elements considering users' requirements.

	sides of the pathway to be brushed or touched, or along the pathway to be walked or wheeled on.
	Edible plants with strong scents (e.g., tomatoes, citruses, herbs and spices).
	Plants that release their fragrance in different parts of the day – with different temperatures or by being manipulated in different ways (such as crushing or by being touched).
	Timing maintenance will influence certain scents, such as the perfume of freshly cut grass.
	Accessories (e.g., incense or scented oils).
Tactile stimuli	**Durable and resistant plants** – should inspire touch and be resistant to frequent handling.
	Plant textures (e.g., flowers, leaves, moss, bark, succulents, seed pods, fruits and plant saps). Design may include plants that hold several textures within themselves.
	Accessories (e.g., lawns to lie down in, reachable water structures with water plants, outdoor misting machines and sculptures).
Taste stimuli	**Fruits, vegetables, herbs and spices –** a selection of plants that "can produce a **large number of edible parts** over time" (Worden and Moore, 2004: 4) will help guarantee that every visitor will have the opportunity to try them
	Edible plants may help with landscaping, agriculture and nutrition teaching moments, as well as induce memories and cultural exchange.
	Accessories (e.g., area for food preparation, cooking, eating, and tea preparation).

Source: Worden and Moore (2004)

The process of designing a sensory garden should keep in mind different types of stimuli and ensure a greater engagement of all visitors (with or without disabilities).

2.1.2. Health benefits and therapies of sensory gardens

Initially, "healing gardens" (Zajadacz & Lubarska, 2020: 28) were created for hospital and health care facilities' patients (Hussein, 2012; Zajadacz & Lubarska, 2020). Similarly, sensory gardens were developed by Hugo Kükelhaus to encourage visitors to perceive and experience the space and the world in a different way (Zajadacz & Lubarska, 2020). A different version of the origins of sensory gardens was presented by Stoneham (2006), cited in Hussein (2012), in which sensory gardens seem to have appeared in the United Kingdom, frequently placed in public places and commonly entitled as "Garden for the Blind". Here, the purpose of the sensory gardens existence was often related with the local authority's need to showcase inclusivity policies. Meanwhile, used expression was considered discriminatory since it segregated people with disabilities from able-bodied people. Nowadays, sensory elements are added to green spaces everyone may enjoy in an attempt at a more sustainable and inclusive approach.

Regardless of their origin, sensory gardens are closely related to several therapies (Pires, 2019; Hussein, 2012; Zajadacz & Lubarska, 2020), which may be classified as

passive or active. Passive therapy refers to when one simply enjoys the garden, while active therapy refers to activities done in the garden with specific purposes (Gonzalez & Kirkevold, 2013; Zajadacz & Lubarska, 2020). From the known therapies that involve sensory gardens, horticultural therapy may be highlighted, which includes:

> "interventions mediated by nature-oriented views and spaces such as gardens and everything associated with them, the plants and material related to them, garden tools and garden occupations performed among disabled people for healing and for restoring or improving health and well-being or for rehabilitation or simply for general benefit" (Söderback *et al.*, 2004:245 cited in Zajadacz & Lubarska, 2020:28).

In addition to active and passive therapies, there are also theories such as Relf's (1981) model of Horticultural Therapy, cited in Zajadacz and Lubarska (2020), that focuses on reaction, action and interaction when participating in horticulture. According to Zajadacz and Lubarska (2020), the impact of therapies tends to be higher when the garden uses it actively rather than in a more passive way.

Bourdon and Belmin (2021) and Senjana and Putra (2021) advocate the benefits of experiencing sensory gardens for people with dementia and visual impairment, respectively, attesting for this approach's consideration of aspects such as inclusiveness and accessibility. Furthermore, Souter-Brown *et al.* (2021) demonstrate that sensory gardens have beneficial effects regarding stress reduction and well-being enhancement. Hussein (2012) also mentions educational benefits of multisensory environments. As suggested above, sensory gardens show great potential for therapy use that can be designed with specific audiences in mind:

〉 Autistic Spectrum Disorder:

Autism Spectrum Disorder is a developmental disability that entails several different conditions that usually include "some degree of difficulty with social interaction and communication" (World Health Organization, 2021), as well as "atypical patterns of activities and behaviours" (World Health Organization, 2021) – struggle with activity transition, detail-oriented focus, sensory sensibility, among others – and it may exist in simultaneous with other conditions like epilepsy, depression, anxiety and attention deficit hyperactivity disorder (World Health Organization, 2021; CDC, 2020). According to the World Health Organization (2021), one in one hundred and sixty children are autistic.

When thinking of a sensory garden design, Senjana and Putra (2021) stress the effects that the use of geometrical elements, as well as repetition, may have in autistic

children's focus time, which tends to increase. Also, these elements seem to help on the diagnosis of a child's potential risk for autism.

Jones (2019) brings attention to the occurrence of forms of Sensory Integration Dysfunction (SID) in autistic children (which leads to hyper-sensitivity and sensory overloads), and to the consequent need to design garden spaces thought specifically for autistic children, capable of providing feelings of calmness and relaxation. The author also indicates that including toys and tasks, as well as a choice on what activities to participate in, may provide a path to dealing with the hyper-sensitivity regarding the environment and a sense of security and control, since children may pursue sensory stimulation to relax or self-regulate (Hussein, 2012).

〉 Dementia

Dementia is a cognitive function decreasing syndrome that affects over 55 million people in the world, and it impacts both patients and their families on the physical, psychological, social and economic levels, causing high levels of disability and dependency (World Health Organization, 2021).

Similar to the Autistic Spectrum Disorder, sensory gardens have also been known to positively affect patients with different types of dementia, including Alzheimer's Disease (e.g., Bourdon & Belmin, 2021; Collins et al., 2020; Gonzalez & Kirkevold, 2013).

In the case of therapeutic environments applied to dementia treatment and care, the goal is to improve the levels of capacity to independently function, satisfaction, well-being and overall quality of life (Gonzalez & Kirkevold, 2013). Multisensorial environments (including sensory gardens) have shown promise on reducing behavioural issues and agitation levels – verbal non-aggressive and aggressive, and physical non-aggressive and aggressive –, improving sleep-wake patterns, as well as muscle strength, and quality of life (Collins et al., 2020; Gonzalez & Kirkevold, 2013). Consequently, and although influence seems to be stronger in outdoor environments, recreational therapies often have better results than medication itself (Collins et al., 2020).

According to Collins et al. (2020), the use of sensory gardens in dementia-related recreational therapies is based on both the Theory of Personhood and the Theory of Supportive Gardens. The former refers to the concept that a "person with dementia struggles to maintain their intersubjectivity (i.e., ability to understand oneself based on

how oneself relates to people and they relate to oneself), therefore losing their personhood" (Collins et al., 2020: 49). The latter focuses on the main purposes of gardens in healthcare settings, which are to "to provide stress relief and restoration through a sense of control, social support, physical movement and exercise, and access to nature and other positive distractions" (Collins et al., 2020: 50). Furthermore, the author advocates that a patient with dementia who is able to feel comfort, attachment, inclusion, and agency, may find their levels of intersubjectivity and well-being increased, which might be provided in a sensory garden-like experience.

The specific case of Alzheimer's Disease is the most common type of dementia that affects the control of thought, memory and language (CDC, 2020), counting for about 60 to 70% of all dementia cases (World Health Organization, 2021). Bourdon and Belmin (2021) state that enriched gardens (sensory gardens specifically designed for therapy purposes) embody an innovative method of therapy people with dementia and may boost their levels of cognition and independence.

〉 Visual impairment

According to the World Health Organization (2021), "at least 2.2 billion people have a near or distance vision impairment". Visual impairment creates considerable impacts in both personal and economic levels that can go from delayed child development in several areas, to lower participation and productivity levels in adult life, as well as depression and anxiety (World Health Organization, 2021).

People with visual impairments may also benefit from the existence of sensory gardens. According to Zajadacz and Lubarska (2020), sensory gardens designed for people with visual impairments need to convey a feeling of safety and comfort. Also, they need to allow its use in an independent manner and with little to no assistance, through the principles of the universal design (Kopeva et al., 2020; Senjana & Putra, 2021; Zajadacz & Lubarska, 2020). This approach can be used by considering unobstructed paths, rounded corners, railings positioned along the way (Zajadacz & Lubarska, 2020), keeping the planes geometrical and ensuring element repetition (Senjana & Putra, 2021), for example. The authors also advise organizing the garden with contrasting colours and by colour sectors, distinguishing the central area, and adopting a variety of paths, walls and fences with different materials to help with orientation. In regards of plants, Zajadacz and Lubarska (2020) mention the need to utilise raised beds so they are more accessible,

in addition to the need to select plants that display specific characteristics, such as interesting or atypical flowers, fruits, stems or leaves. It is important to stimulate hearing, smelling and tasting senses.

When it comes to information delivery, auditory and Braille information should be provided (Kopeva et al., 2020; Zajadacz & Lubarska, 2020). The use of Braille is currently a discussed topic among authors (e.g., Kopeva et al., 2020; Zajadacz & Lubarska, 2020), since it is more challenging to read, and only a few people are able to read it. Regardless, information in Braille should still be included in the design of a sensory garden for people with visual impairment. In cases in which only one method can be chosen, auditory information should be chosen over Braille (Zajadacz & Lubarska, 2020).

Overall, sensory gardens should apply elements, both natural and man-made (Kopeva et al., 2020), that may create condition for enhanced experiences to everyone, so all can benefit from the multisensory environments (Zajadacz & Lubarska, 2020).

〉 Children with disabilities:

When it comes to children with disabilities, sensory gardens may be key to the improvement of their well-being. The Building Bulletin 77 from the British Department for Education and Employment (1992), states the capacity of external places to offer a stimulating environment, which can aid mental development, physical and emotional health, social integration, and improve learning motivation (Hussein, 2012). According to Hussein (2012), teachers of children with disabilities state the benefits of outdoor areas on aggressive behaviour and bullying reduction. Choosing plants for sensory gardens with this audience in mind should focus on "the richness of the visual, auditory and tactile stimuli" (Hussein, 2012: 346), since each sensation is different. Touch is often the primary channel of communication (Hussein, 2012).

Sensory gardens may also be tailored to specific therapy methods based on Ayres' (2005) sensory integration theory – such as occupational, speech, physical, horticulture and ecotherapy (cited in Pires, 2019).

According to Pires (2019), designing a sensory garden with sensory integration theory in mind should focus on creating well defined areas to trigger the senses by way of vegetation, as well as play areas with no restrictions.

For occupational theory purposes, sensory gardens should allow interactions with green spaces (e.g., gardening), as well as with other people. In terms of speech therapy, sensory gardens could be helpful in the creation of relaxing areas. Regarding physical therapy, the authors believe exercise-friendly zones, as well as including therapy equipment, are the right choice. Therapeutic horticulture may benefit greatly from the existence of vegetable and farming areas and the existence of reduce mobility-friendly raised plant beds. Lastly, when thinking of ecotherapy, Pires (2019) suggest building meditation areas and encouraging interaction with biodiversity and water.

2.1.3. Universal design

Inclusively designed environments have the potential to assist people with disabilities, such as wheelchair users, people with visual disabilities and others. Additionally, all people with any kind of mobility challenge may benefit from a well-planned setting from an accessible point-of-view, such as families with prams, travellers with heavy luggage or even shoppers with trolleys (Darcy & Dickson, 2009).

According to the Disability Act (2005) (cited in National Disability Authority, 2020), Universal Design is defined by:

> "1. The design and composition of an environment so that it may be accessed, understood and used:
>
> i. To the greatest possible extent
> ii. In the most independent and natural manner possible
> iii. In the widest possible range of situations
> iv. Without the need for adaptation, modification, assistive devices or specialised solutions, by any persons of any age or size or having any particular physical, sensory, mental health or intellectual ability or disability, and
>
> 2. Means, in relation to electronic systems, any electronics-based process of creating products, services or systems so that they may be used by any person." (National Disability Authority, 2020)

According to the Disability Act (2005) (cited in National Disability Authority, 2020), Universal Design should also be user-aware, customisable, and follow seven principles:

1. Equitable use;
2. Flexibility in use;
3. Simple and intuitive use;
4. Perceptible information;
5. Tolerance for error;

6. Low physical effort;

7. Size and space for approach and use (National Disability Authority, 2020).

Keeping in mind the need for accessibility and inclusiveness features to create a sensory garden for all, following the guidelines of the Universal Design becomes a necessity (Kopeva et al., 2020; Senjana & Putra, 2021; Zajadacz & Lubarska, 2020). Zajadacz and Lubarska's (2020) reasoning comes from the idea that everyone may have different perspectives and abilities and may, therefore, require different types and levels of adaptation.

Considering Universal Design in sensory gardens, the American Society of Landscape Architects (n.d.), states that inclusive gardens should contain seasonal planting (that will give prominence and allow easy identification of seasonal changes, for example, by way of colours), circular or figure-eight paths (as to promote walking with a limited risk of wandering), frequent and flexible seating spots, multisensory wayfinding[1], restricted level changes, easily accessible bathrooms, engaging activities (such as gardening and farming), safe materials, and isolated areas (to regulate and decrease overstimulation) (American Society of Landscape Architects, n.d.).

2.2. Garden tourism

A garden is, according to Silva and Carvalho (2012), a "«natural» scenery built with morphologies, colours, sounds and smells" (p. 4) that invokes numerous sensations and feelings, which cause them to be highly attractive (Silva & Carvalho, 2012). Furthermore, they can be thought as a "living monument, a reflex of culture and history" (Paiva et al., 2020: 122), capable of producing unique, differentiated, original and exclusive (Silva & Carvalho, 2012) experiences with natural, cultural and historic elements (Paiva et al., 2020). Within the concept of gardens, one may find different types: botanical, historic, modern/contemporary, memorial, cemetery/graveyard, religious, rose and museum gardens (Paiva et al., 2020).

With the right marketing strategies, it possible to turn gardens into tourism attractions powerful enough to become the focal point of its tourism destination, and even to represent it entirely (Silva & Carvalho, 2012). Good examples of this, include the Central Park (New York, USA), Chateau de Versailles (France), Tivoli Gardens

[1] The concept of wayfinding refers to information systems that guide individuals through physical environments and enhance their understanding and experience of space. The concept, originated by Lynch (1960) and later developed by Passini (1984), relates to the consistent use of sensory cues in the outdoor environments.

(Copenhagen, Denmark), the Royal Botanic Gardens at Kew (Richmond, England), and many others (Marin et al., 2021; Paiva et al., 2020; Silva & Carvalho, 2012).

Garden tourism began in 1927 in England with the start of the National Garden Scheme, when over 3500 privately-owned gardens had their doors open to the public for charity purposes (Paiva et al., 2020). Regardless, long before this, garden visitation was already a reality, there have been found records of visits to gardens from the 16th century all the way to present day (Paiva et al., 2020), with a focus on the early Victorian period, in the 19th century, when the practice was highly enjoyed by the elites (Connell, 2002).

Research on gardens visitation, in general, goes far back as 1983, but only in the 90's, did gardens start to be researched from a tourism perspective (Lipovská, 2013). Literature on the subject brings many possible definitions to the concept. One may say that "garden tourism can be specified as a form of tourism, whose geographical or thematic destinations are gardens [usually private] or parks in their various forms" (Nie, 2021: 2). Another possible answer is given by Quintal (2009) as a tourism niche that focuses on botanical, historical and other gardens visitation. This goes in line with Connell's (2004) suggestion that garden tourism is the juxtaposition of gardens as historic features as well as contemporary, modern and "futuristic notions of space and design principles" (p.233). Additionally, Thomas et al. (1994) comprise in the notion of garden tourism the ideas of garden tours and festivals, as well as special events. Benfield (2013) defines it as the act of travelling away from home to "purchase, view or spend reflective or educational time in an area of horticultural creation" (p. 15). Fusté-Forné and Forné (2021) follow a different direction and include what they name "urban gardens" as a part of horticulture tourism. The authors recognise these urban gardens as sources of cooperation within the community, public stakeholders and tourists. Although Fusté-Forné and Forné (2021) do not technically consider urban gardens as "garden tourism", they still attest for the touristic potential of garden visitation. Despite current literature on the subject, according to Nie (2021), garden tourism has not been extensively researched as a tourism model, except in countries such as the United Kingdom, Austria, and Sweden (Nie, 2021).

According to Čakovská (2018), private gardens are open to the public with several explanations, such as charity support, social and community reasons, among others. Gardens' visitors also show several motivations/reasons for visitation, such as leisure, recreation, learning, witnessing specific plants, garden design, history and culture, nostalgia, period-specific techniques, scenery observation, environment/atmosphere,

spiritual matters, pursuit of peace, tranquillity, and freedom, as well as well-being, psychological and physical health, socialization, and interest in famous architects, gardeners and landscapists' work (Connell, 2004; Paiva et al., 2020).

Statistics on garden tourism state that about one-third of tourists visit gardens while travelling (Benfield, 2013). Gardens such as the Central Park or the Chateau de Versailles generate over 10 million visits a year, garden shows and events such as the National Garden Shown – *Bundesgartenschau* in Germany can gather up to 2.5 million visits per event (Paiva et al., 2020), and garden visits in the United Kingdom rose about 8% in 2021 (VisitBritain, 2022). The statistics suggest great relevance that garden tourism comprises within tourism studies. From a managerial perspective, garden tourism should be invested in, since it poses an opportunity to differentiate tourism destinations apt to grow both the number of tourists and tourism revenues (Shapoval et al., 2021). In Madeira island, Portugal, garden tourism alone (regarding the three main gardens) attracted 650 thousand visitants and generated over 3.5 million euros in 2009 (Silva & Carvalho, 2014). Shapoval et al. (2021) suggest focusing on first-time visitors by generating high levels of satisfaction to increase desire to re-visit, as well as positive WOM recommendations, through the quality of the gardens' design – directional signs, layout, quality of paths, and convenience. To appeal to repeat visitors, the authors propose improving visitor's experience through tangibles and services' quality (Shapoval et al., 2021).

So far, to the best of the author's knowledge there is no study focused on the basis of sensory gardens in a leisure and tourism context and its well-being outcomes.

2.3. Tourism experience and senses

In the context of consumer experiences, research following the line of the experience economy is mostly focused on aspects related to what Pine and Gilmore (1998, 1999) name positive and memorable experiences. Apart from considering a theme, the authors recommend managers to focus on memorabilia and positive cues as well as eliminating negative cues. Also, it is important to consider multiple sensory stimuli (five senses) in the design of experiences, which is the key to "more effective and memorable" (Pine & Gilmore, 1998: 104) consumer experiences. In accordance, Urry (2002) stresses the need for holistic approaches regarding human senses when considering tourist/leisure experiences. Considering the previous domination of sight as the sense to be stimulated, many researchers have stressed the importance to study multisensory experiences in the

context of tourism (e.g., Agapito, 2020; Agapito et al., 2014; Agapito et al., 2013; Kastenholz et al., 2020; Matteucci, 2016; Meacci & Liberatore, 2018).

Meacci and Liberatore (2018) advocate the need to understand that, in tourism, experiences are a process of consumption starting with a stimulus, which is then interpreted and perceived, potentially influencing tourist's emotions. Agapito et al. (2013, 2014) acknowledge the multidimensional feature of the tourism experience and the importance to create holistic experiences from a sensory point a view, which is highly connected with tourists perceived positive experiences (Matteucci, 2016).

The ability to impact visitors' emotions through the use of sensory stimuli is something of great importance in literature (e.g., Kastenholz et al., 2020; Matteucci, 2016; Meacci & Liberatore, 2018). According to Kastenholz et al. (2020), different sensory stimuli can impact emotions in different ways. While combinations of vision, olfaction and touch are associated with the feeling of delight, combinations of senses such as vision, hearing and smell are linked with the feeling of relaxation (Kastenholz et al., 2020). Furthermore, sensory diversity, as well as interaction with the community (Matteucci, 2016), is connected with positive tourist experiences and their perception of attachment to the given locations (Kastenholz et al., 2020).

From a managerial perspective, making use of sensory stimuli may be of aid when managing a destination, since places are always multisensory settings. If planned correctly, destination managers should be able to provide personalized experiences to all visitors (Agapito et al., 2013), keeping in mind that specific sensory stimuli have specific impacts (Kastenholz et al., 2020).

Multisensory tourism experience can also be connected with aspects such as inclusivity, accessibility and well-being (Agapito, 2020). In fact, tourism experiences were found to be beneficial for mental and physical well-being (Smith & Diekmann, 2017). Sensory stimuli are then efficient in generating positive tourist emotions, which "improve well-being over time" (Matteucci, 2016: 16). This way, authors such as Smith and Diekmann (2017) and Vada *et al*. (2020) stress the need to follow a managerial approach envisioning well-being strategies in tourism experience, such as the case of sensory gardens (Souter-Brown et al., 2021).

2.4. Sensory marketing

2.4.1. Senses and consumer's perception

When thinking of sensory marketing, it is important to address perception. Understanding how the senses affect perception – which Krishna (2012) defines as "the awareness or understanding of sensory information." (p. 334) – helps to understand the importance of sensory stimuli in behavioural outcomes (moderated by individual and situational characteristics). For example, interacting with a product – through sight, smell, sound, taste and touch – can have added effects such as the reduction of perceived risk (Erenkol & AK, 2015).

Sight is the sense that receives the most amount of information in regards of differences and changes in the surrounding environment (Erenkol & AK, 2015; Hultén, 2011). The sense of sight is also the one most commonly used (Agapito et al., 2012), since visual aesthetics have been accepted as an important factor in advertisement and marketing (Krishna et al., 2016). Characteristics such as colour, light, brightness, product/store designs and layouts are all important factors when triggering sight (Erenkol & AK, 2015).

Hearing stimuli are known to trigger emotions and feelings (Hultén, 2011), and even provide clues regarding product quality (Erenkol & AK, 2015). The rhythm of the music being played and the sound metal hitting porcelain or glass are both examples of sounds that trigger sensations. The first example may impact the consumer's energy and mood, while the second influences the perception of the quality of the product (Erenkol & AK, 2015).

Smell is the sense that is easiest to recall and can be stored in long term memory. A human can memorize about 10 000 scents and remember 65% of them after one year (in comparison, one can only remember about 50% of visual stimulus three months after). This way, some store brands, like Stradivarius, make use of scents that consumers are able to recognize as part of the brand (Krishna, 2012; Erenkol & AK, 2015). The sense of smell is also said to be related to pleasure and well-being (Hultén, 2011).

Taste is frequently interacting with the other senses (Hultén, 2011) like smell, sight, hearing and even the touch sense. Interaction with smell can create memories and invoke experiences from the past, colours and presentation (sight) may interfere in taste perception, and sounds are often associated with specific tastes, such as the sound chips

make when one chews them or the sound of a beverage can being opened. Additionally, touch can also influence taste and the perception of its quality. In fact, taste is highly susceptible to being influenced by all the other senses, since humans can only distinguish five pure tastes (sweet, salty, sour, bitter and umami) (Krishna, 2012). Some examples of this notion are the difference in taste perception regarding the use of glass water bottles versus plastic bottles (Erenkol & AK, 2015) or the difficulty to distinguish a potato from an apple without the sense of smell (Krishna, 2012). Taste is also very important physically and socially, since it varies from culture to culture and from person to person, even if from the same culture (Erenkol & AK, 2015).

Lastly, touching is very important in consumer perception; how a product feels to the touch may impact both assessment and perception. Krishna (2012) invokes Aristotle's theory saying that the use of the senses is hierarchical and that touch is the first step. Touch also affects the purchasing decision process; many tend to buy products they were allowed to touch, since this sense is very connected with quality perception and pleasure (Krishna, 2012; Erenkol & AK, 2015). Additionally, physical touch may also influence interpersonal relationships, specially through trust, which may influence generosity and, in turn, willingness for consumption (Krishna, 2012).

Invoking and simulating all five senses is an important task in sensory marketing: it influences both consumer's perception and consumption behaviour (Agapito et al., 2012), keeping in mind the possibility for issues such as sensory-overload and sensory conflict (Krishna, 2012).

2.5. Health, well-being tourism and sensory experiences

According to the Cambridge Dictionary, well-being is "the state of feeling healthy and happy" (Cambridge Dictionary, 2022). When applying the concept to tourism, Vada et al. (2020) argue that tourist well-being is influenced by the natural and social environments in the tourism experience and that one of the types of tourism that is capable to provide such a situation is the wellness tourism. The authors also found that wellness tourism, due to the "meaning from vacation experiences" (p.7), is connected with the intention to return, word of mouth and destination attachment (Vada et al., 2020).

Well-being tourism falls under health tourism – which also includes other sorts of tourism, such as spa, spiritual, medical and meditation (Konu, 2015), as well as a diverse set of activities like seawater treatments and pilgrimages for physical and spiritual healing

(Hartwell et al., 2018). However, while health tourism implies travelling to take care of the individual's health – to heal –, well-being (or wellness) tourism tries to prevent illness or maintain the current health state (Konu, 2010, 2015). Other authors separate the concepts of well-being tourism and wellness tourism, even if they are mostly used as synonyms (Konu, 2015): Sheldon and Bushell (2009: 11, cited in Konu, 2015: 5) define wellness tourism as

> "a holistic mode of travel that integrates a quest for physical health, beauty, or longevity, and/or a heightening of consciousness or spiritual awareness, and a connection with community, nature, or the divine mystery. It encompasses a range of tourism experiences in destinations with wellness products, appropriate infrastructures, facilities, and natural and wellness resources.",

Motivations for well-being tourism include self-indulgence, health retreats, and personal well-being (Björk et al., 2011), as well as pampering, refreshment of body and mind (Hartwell et al., 2018), spiritual awareness, exercise and luxury (Konu, 2015). Additionally, Hartwell et al. (2018) advocate the good impacts on skills, self-esteem, awareness of nature, personal development and identity formation of pampering, and refreshment of body and mind.

As previously stated, well-being tourism goes hand in hand with multisensory experiences (Agapito, 2020; Smith & Diekmann, 2017). Sensory gardens constitute places that offer multisensory experiences (ZenSenses, 2017) with shown positive effects on a number of different afflictions and disorders (e.g., Bourdon & Belmin, 2021; Collins et al., 2020; Hussein, 2012). Additionally, sensory gardens are connected with nature in many different forms. As nature resources are also known to be connected with well-being tourism (mineral waters and hot springs are common features) (Konu, 2015), sensory gardens may be considered a form of applying well-being tourism. Biophilia hypothesis suggests there is an innate bond between humans and other living systems, as nature. These elements, multisensory in nature, can provide conditions for optimal defining for sensory experiments with well-being benefits (Qiu et al., 2021).

Multisensory experiences in tourism have been connected to well-being, through both hedonia and eudaimonia (Lv & Wu, 2021; Smith & Diekmann, 2017; Vada et al., 2020). Hedonia is related to the "positive mood and alleviate worrisome concerns, focusing on emotional pleasure and sense of delight" (Tsai, 2021, p. 1049). Eudaimonia refers "to reinforce meaning in life and increase awareness about self, focusing on feelings of authenticity and psychological wellbeing" (Tsai, 2021, p. 1049).

According to Lv and Wu (2021), tourism is highly associated with the ability to create happiness, whether it be by means of the hedonic concept or the eudaimonic. Although tourism research has been mainly focused on the hedonia side of well-being, current literature is starting to centre its attention to eudaimonia (Zheng et al., 2016; Knobloch et al., 2017), since emotions and the sense of meaning are of great importance in order to achieve a good touristic experience (Knobloch et al., 2017). This way, there is a necessity for both these types of happiness to co-exist in order to generate a long-term emotional connection with a tourism destination (Lv & Wu, 2021). Lv and Wu (2021) further highlight the importance of the use of sensory experiences, specially "extraordinary sensory experiences" (p. 181), which tend to make tourists feel special and more attached long-term. These experiences have great influence on both momentary and retrospective levels of happiness. This way, it stands to reason that, if a sensory garden is capable to touch on both hedonic and eudaimonic happiness, it can also be a resource of well-being tourism.

By default, people with disabilities (developmental, physical or mental) have a greater number of struggles adapting to day-to-day life (Mactavish et al., 2007). This challenge also applies to leisure and tourism experiences. Page et al. (2015) mention the important role of these challenges in the well-being of people with dementia.

Keeping in mind that perceived well-being is directly related to lived experiences, in order for people with disabilities to adapt to an environment, specially to a new one, experiences need to have accessible and inclusive components - focusing on universal design, capacity for independence, equity, and dignity (Darcy & Dickson, 2009). Sensory stimulating elements can be used to create positive responses to the encounter. This process can result in perceived well-being. In this line, Agapito and Guerreiro (2023) focused on a multisensory approach that can contribute to designing enhanced slow tourism experiences deemed accessible and this can be related to sense of well-being.

As caregivers are often informal and family members (Bauer, 2019), more accessible and inclusive designed environments should also help improve the caregivers/families perceived well-being while traveling and undertaken leisure activities. As Page et al. (2015) put it: "tourism can make a positive contribution to enhancing the well-being and strengthen bonds in groups where a family member has dementia" (p. 468).

CHAPTER 3. METHODOLOGY

3.1. Research objectives

This dissertation focuses on a research gap regarding the implications of sensory gardens as visitor experiences on individuals' well-being. Therefore, the general objective of this dissertation is to understand the role of sensory gardens ~~as visitor experiences~~ in individuals' perceived well-being from a leisure and tourism perspective, using managerial lenses. Following the main research objective, the dissertation addresses sensory gardens versus typical gardens to answer to seven research questions:

1. Are there differences between the reported eudaimonic well-being of visitors who experience a typical garden versus a sensory garden?
2. Are there differences between the reported hedonic well-being of visitors who experience a typical garden versus a sensory garden?
3. Are there differences between the reported inclusive experience of visitors who experience a typical garden versus a sensory garden?
4. Are there differences between the reported accessible experience of visitors who experience a typical garden versus a sensory garden?
5. Are there differences between the reported engaging sensory experience of visitors who experience a typical garden versus a sensory garden?
6. Are there differences between the reported global experience of visitors who experience a typical garden versus a sensory garden?
7. To what extent well-being (hedonic and eudaimonic) is correlated with the perception tourist experience elements in a sensory garden versus a typical garden?

To fulfil the dissertation's general objective, as well as respond to the previous seven questions, a questionnaire was applied.

3.2. Survey instrument and measures

First, two videos were prepared by the author. One video representing the characteristics of a sensory garden (available on youtu.be/Z7PR3ZMfTB0), and another video representing the ones of a typical garden (available on youtu.be/KJ8K-Ndn4Y0). The first video was composed of images and videos of regular/typical gardens collected

from free online banks of images as well as public YouTube videos. The second video was made with images from sensory gardens provided by ZenSenses, as well as images from free online banks of images and public YouTube videos. Original sound was removed to avoid preference and bias and the same instrumental sound stimuli was added. Both videos have a duration of 61 seconds.

The participants were divided into two samples and were invited to watch video 1 or 2. Afterwards, the participants were asked to respond to a questionnaire and to imagine they were experiencing a visit to the garden while they were watching the video.

The questionnaire comprised 12 questions with a 7-point Likert scale (from 1 – strongly disagree to 7 – strongly agree), which were adapted from the literature as displayed in table 3.1, plus the socio-demographic section. Within the questionnaire, there were six main topics:

- Hedonic Well-being

This portion of the questionnaire was related to the feelings of relaxation, contentment, joyfulness, and excitement while visiting the garden displayed in the video.

- Eudaimonic Well-being

The Eudaimonic well-being part of the questionnaire included items related to, worthwhileness, accomplishment, meaningfulness and happiness.

- Inclusiveness

Inclusivity focused on whether the respondent felt that the video seen demonstrates a garden ready to be used and enjoyed by all, regardless of their requirements.

- Accessibility

The accessibility section mentioned was meant to capture the respondents' views regarding the physical requirements for the garden to be considered accessible to all.

- Experience

The questions about the experience are related to the capacity of the garden to engage the senses and overall experience.

Scales assessing happiness, hedonic well-being, eudaimonic well-being were adapted from the scale used by Lv and Wu (2021) and inclusivity, accessibility and experience were inspired by Darcy and Dickson (2009).

The questionnaire was created on an online survey platform named GoogleForms in English (Appendix 1) and Portuguese. There was first a pre-test in which the questionnaire was tested with five respondents and then was distributed through online

platforms for a period of one week in July of 2022. To minimize bias, none of the questionnaires were identified in regards of which garden type they presented to the respondent.

Table 3.1- Questionnaire variables adapted from the literature.

Variable	Items	Scale	Reference(s)
Hedonic well-being	〉 I feel relaxed while visiting the garden 〉 I feel content while visiting the garden 〉 I feel joyful when visiting the garden 〉 I feel excited when visiting the garden	7-point Likert scale	Lv and Wu (2021)
Eudaimonic well-being	〉 This visit is worthwhile in my life 〉 This visit brings accomplishment in my life 〉 This visit is meaningful in my life 〉 I feel happy while visiting the garden.	7-point Likert scale	Lv and Wu (2021)
Inclusiveness	〉 This garden is inclusive of people with different requirements.	7-point Likert scale	Inspired by Darcy and Dickson (2009)
Accessibility	〉 This garden is accessible to all.	7-point Likert scale	Inspired by Darcy and Dickson (2009)
Experience	〉 This is a good experience. 〉 This garden engages my senses positively (e.g., vision, hearing, touch, smell).	7-point Likert scale	Inspired by Darcy and Dickson (2009) and Agapito (2020)

3.3. Sampling and data collection

The target of the study is the generation Y, which includes the millennials. Although literature varies, it mostly means people born between 1981 and 2000 (Goldgehn, 2004; Roberts et al., 2012). Millennials are a big portion of current tourists, posing great influence in tourism types and trends due to their innovative tendencies (Cavagnaro et al., 2018).

Participants were invited to participate in the study through Instagram, Facebook and WhatsApp. After acceptance, two groups were created and the link of one video was sent with the instructions. Both the questionnaires were distributed through snowball sampling, maintain similar sample numbers. There was a total of 124 responses, of which 62 people responded to the questionnaire with video number 1 (typical garden) and 62 responded to the questionnaire with video number 2 (sensory garden). None of the questionnaires identified the type of garden displayed.

In addition to the experiment mentioned above, there was additional data collected through an exploratory interview with an expert on sensory gardens (Appendix 2). This exploratory interview was conducted in order to understand what is necessary when creating a sensory garden and the conditions that need to be met for visitation. More precisely, the exploratory interview was carried out on June 19th of 2022 with the founder of the ZenSenses[2] (Dr. Ana Frutuoso). ZenSenses is a company which specializes in therapy with senses, relaxation and multisensory stimulation and it was also the first organisation "to introduce a Snoezelen Room (…) for the general public in Portugal" (ZenSenses, 2017). Moreover, ZenSenses offers a course on sensory gardens: how to design and utilize them in an adequate way. Furthermore, the entity commercialises equipment to aid in the garden creation task (ZenSenses, 2017).

3.4. Data analysis methods

The collected data was analysed through IBM SPSS Statistics 29. First, frequencies for sociodemographic variables were calculated through descriptive analysis. Chi-square tests were also employed in order to test independence between the socio-demographic characteristics of the subsamples and the type of garden experienced in the video (Howell, 2018).

Next, each item for hedonic and eudaimonic well-being, as well as inclusiveness, accessibility, and experience, were tested separately. Percentages for each level of the scale in each item, as well as means and standard deviation were considered. Overall means were provided and it was employed the Cronbach's alpha reliability to assess internal consistency (Hair, et al., 2019). Additionally, differences in sensory garden and typical type (regarding hedonic well-being, eudaimonic well-being and the perceived aspects related to experiences) were examined through two-sided independent samples t-

[2] ZenSenses' website: www.zensenses.org

test. These were applied to compare means of two independent groups (the two subsamples) to test for significant differences between them (Howell, 2018).

Lastly, Pearson correlations were performed to assess the relationships between the items related to well-being and items associated with perceived experience (Howell, 2018).

CHAPTER 4. RESULTS

4.1. Sample's characteristics

In terms of sociodemographic characteristics of the surveyed sample, the information retrieved focuses on gender, marital status, nationality, education level and employment status. Results can be found in table 4.1.

According to table 4.1 below, the majority of respondents were female in both subsamples (Typical Garden [TG] – female: 62.9%; Sensory Garden [SG] – female: 69.4%). The subsample was predominantly composed of single respondents (TG – single: 75.8%; SG – single: 77.4%), and of Portuguese nationality (TG – Portuguese: 88.7%; SG – Portuguese: 91.9%). Regarding education level, in general individuals had university degrees (TG – University: 64.5%; SG – University: 62.9%), and, concerning employment status, most of the participants was employed in both situations (TG – Employed: 77.4%; SG – Employed: 74.2%).

Table 4.1- Sociodemographic characteristics of the overall sample and subsamples.

	Typical Garden		*Sensory Garden*		*Total*	
	n	***Percentage (%)***	***n***	***Percentage (%)***	***n***	***Percentage (%)***
Gender						
Female	*39*	*62.9%*	*43*	*69.4%*	*82*	*66.1%*
Male	*23*	*37.1%*	*19*	*30.6%*	*42*	*33.9%*
Marital Status						
Divorced/ Separated	*1*	*1.6%*	*2*	*3.2%*	*3*	*2.4%*
Married/ Living together	*14*	*22.6%*	*12*	*19.4%*	*26*	*21%*
Single	*47*	*75.8%*	*48*	*77.4%*	*95*	*76.6%*
Portuguese vs. Foreign						
Portuguese	*55*	*88.7%*	*57*	*91.9%*	*112*	*90.3%*
Foreign	*7*	*11.3%*	*5*	*8.1%*	*12*	*9.7%*
Nationality						
Belgian	*1*	*1.6%*	*0*	*0%*	*1*	*0.8%*
Brazilian	*2*	*3.2%*	*1*	*1.6%*	*3*	*2.4%*
British	*1*	*1.6%*	*0*	*0%*	*1*	*0.8%*
Finnish	*0*	*0%*	*1*	*1.6%*	*1*	*0.8%*
German	*2*	*3.2%*	*1*	*1.6%*	*3*	*2.4%*
Iranian	*1*	*1.6%*	*1*	*1.6%*	*2*	*1.6%*
Portuguese	*55*	*88.7%*	*57*	*91.9%*	*112*	*90.3%*
USA	*0*	*0%*	*1*	*1.6%*	*1*	*0.8%*
Education Level						
Secondary school	*13*	*21.0%*	*14*	*22.6%*	*27*	*21.8%*
Technical/ Professional Education	*9*	*14.5%*	*9*	*14.5%*	*18*	*14.5%*
University	*40*	*64.5%*	*39*	*62.9%*	*79*	*63.7%*
Employment Status						
Employed	*48*	*77.4%*	*46*	*74.2%*	*94*	*75.8%*
Entrepreneur	*5*	*8.1%*	*2*	*3.2%*	*7*	*5.6%*
Housewife/ Househusband	*0*	*0%*	*2*	*3.2%*	*2*	*1.6%*
Student	*7*	*11.3%*	*9*	*14.5%*	*16*	*12.9%*
Unemployed	*2*	*3.2%*	*3*	*4.8%*	*5*	*4%*

According to table A3.1 (in Appendix 3), we verified that subsamples' sociodemographic profile is independent from the type of garden experienced in the video (all Chi-square independence tests: $p > 0.05$), meaning that both subsamples report a similar socio-demographic profile. Moreover, there is no significant difference between

the average age of the two subsamples (TG: 29.2 years old; SG: 28.68 years old) (t-test for two independent samples: $p > 0.05$).

4.2. Perceived eudaimonic well-being

As noted previously, the questions used in the questionnaire were divided considering the type of well-being (Eudaimonic and Hedonic), as well as the questions related to inclusiveness, accessibility, sensory engagement and global experience.

In table 4.2, it is possible to acknowledge the results of the questions regarding the eudaimonic well-being, considering both the typical and sensory gardens, as described below.

As for the item "**I feel happy while visiting the garden**.", the results from both gardens show that the highest percentage of responses fall within the strongest agreement value (TG – 7: 58.1%; SG – 7: 38.7%), as well as the highest average agreement level in both subsamples (TG mean = 6.32; SG mean = 6.06). For this item, the means difference is not statistically significant (independent samples *t* test: $p = 0.121 > 0.05$) [3].

Regarding the second item – "**This visit is worthwhile in my life**" – responses considering the typical garden showed a much higher level of agreement than the ones regarding the sensory garden in what regards the point 7 of the Likert scale (TG – 7: 40.3%; SG – 7: 27.4%), as well as smaller percentage of responses within the disagreement side of the 7-point scale (TG – 1: 0%; 2: 0%; 3: 1.6%; SG – 1: 0%; 2: 4.8%; 3: 4.8%). On average, agreement level is higher for the typical garden (mean = 5.52) comparing to the sensory garden (mean = 5.35), and this difference is statistically significant ($p = 0.016 < 0.05$).

The responses for the third item, which was focused on the sense of accomplishment ("**This visit brings accomplishment in my life**"), showed a higher percentage of responses of the typical garden within the neutral value of agreement (TG – 4: 25.8%). However, and regardless of the higher percentage of level 4 responses in the typical garden, this garden was able to get more responses in the three higher levels of agreement (levels 5, 6 and 7), as well as less responses in the lower levels representing disagreement (levels 3, 2 and 1), than the sensory garden. Comparing to previous item, this one reports lower agreement levels (TG mean = 4.90; SG mean = 4.69). However, for this one, the means difference is not statistically significant ($p = 0.478 > 0.05$).

[3] Independent t-tests can be found in appendix 4, table A4.1.

Regarding the forth item of the eudaimonic well-being "**This visit is meaningful in my life**", the most frequent response was in the level 6 of agreement in the typical garden questionnaire and level 5 of agreement in the sensory garden questionnaire, which implies a higher agreement value towards the typical garden. Similar to the previous question, the typical garden respondents showed a higher percentage of responses in the three higher levels of agreement and a smaller percentage of responses in the three lower levels. The average value is higher for respondents who experienced the typical garden video (TG mean = 5.16; SG mean = 4.84). Nevertheless, the means difference is not statistically significant ($p = 0.253 > 0.05$).

The overall mean for both the typical garden (5.48) and sensory garden (5.24) shows a moderately high level of agreement with the eudaimonic well-being aspects of the gardens. Furthermore, all of the responses were supported by low standard deviations (table 4.2), and the scale reports a good internal consistency, as indicated by the Cronbach's Alpha coefficient (α), specifically for the sensory garden (TG $\alpha = 0.871$, SG $\alpha = 0.925$).

Table 4.2- Eudaimonic well-being results for typical and sensory gardens.

	Typical Garden										**Sensory Garden**									
	Valid Percentages							Descriptive Stats.			Valid Percentages							Descriptive Stats.		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**Mean**	**St. Dev.**	**N**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Mean**	**St. Dev.**	**N**
I feel happy while visiting the garden.	0%	0%	0%	6.5%	12.9%	22.6%	58.1%	**6.32**	0.94	62	0%	0%	0%	4.8%	22.6%	33.9%	38.7%	**6.06**	0.90	62
This visit is worthwhile in my life*	0%	0%	1.6%	11.3%	21.0%	25.8%	40.3%	**5.52**	1.11	62	0%	4.8%	4.8%	19.4%	19.4%	24.2%	27.4%	**5.35**	1.44	62
This visit brings accomplishment in my life.	3.2%	3.2%	9.7%	25.8%	19.4%	19.4%	19.4%	**4.90**	1.57	62	3.2%	9.7%	12.9%	17.7%	19.4%	19.4%	17.7%	**4.69**	1.71	62
This visit is meaningful in my life	3.2%	1.6%	8.1%	19.4%	21.0%	24.2%	22.6%	**5.16**	1.53	62	3.2%	6.5%	9.7%	17.7%	27.4%	17.7%	17.7%	**4.84**	1.60	62
Overall mean	5.48										5.24									
Cronbach's Alpha	0.871										0.925									

Legend: 1- Strongly Disagree; 7- Strongly Agree

**Independent samples t test: $p < 0.05$*

4.3. Perceived hedonic well-being

Table 4.3 refers to the results for hedonic well-being regarding the typical and sensory gardens.

According to the results from the applied questionnaire, regarding the item **"I feel relaxed while visiting the garden**", both garden types show the majority of responses within level 7, strongly agree, which is the highest level of agreement (TG – 7: 56.5%; SG –7: 50%). This item also reports the highest average agreement level (TG mean = 6.39; SG mean = 6.06).

In the following item – "**I feel content while visiting the garden**" – there was a higher percentage of responses in the strongly agreement level, compared to the other levels in both gardens (TG – 7: 46.8%; SG – 7: 40.3%). This also happens in the third item which refers to the **feeling of joy when visiting the garden** (TG – 7: 48.4%; SG – 7: 38.7%). On average, agreement level is higher for the typical garden comparing to the sensory garden in both questions (Content: TG mean = 6.06; SG mean = 5.87; Joy: TG mean = 6.11; SG mean = 5.74).

In the final item concerning hedonic well-being ("**I feel excited when visiting the garden")**, the responses (although still more concentrated in the highest level of agreement [7 – Strongly Agree], with higher percentages in the typical garden), were more distributed throughout the other levels. Compared to the previous questions, this one reports lower agreement levels (TG mean = 5.68; SG mean = 5.31).

Out of all the questions, the ones with the highest number of responses in the disagreement side of the scale (levels 1-3) were the ones from the sensory garden. However, only two questions had responses in level "1 – Strongly Disagree" level (highest level of disagreement) – "I feel content while visiting the garden" and "I feel excited when visiting the garden" – and they were both within the typical garden context. Despite the means differences, they are not statistically significant in any item (independent samples *t* tests: $p > 0.05$) [4].

The overall mean for both the typical garden (6.06) and sensory garden (5.75) shows a general high level of agreement with the hedonic well-being aspects of both gardens. Furthermore, all of the responses show low standard deviations (table 4.3), and

[4] Independent t-tests can be found in appendix 4, table A4.2.

the scale reports a good internal consistency, specifically for the sensory garden (TG α = 0.879, SG α = 0.933).

Table 4.3- Hedonic well-being results for typical and sensory garden.

	Typical Garden										**Sensory Garden**									
	Valid Percentages							Descriptive Stats.			Valid Percentages							Descriptive Stats.		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**Mean**	**St. Dev.**	**N**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Mean**	**St. Dev.**	**N**
I feel relaxed while visiting the garden	0%	0%	0%	4.8%	8.1%	30.6%	56.5%	**6.39**	0.84	62	0%	0%	3.2%	11.3%	11.3%	24.2%	50.0%	**6.06**	1.17	62
I feel content while visiting the garden	1.6%	0%	0%	6.5%	19.4%	25.8%	46.8%	**6.06**	1.16	62	0%	0%	4.8%	11.3%	16.1%	27.4%	40.3%	**5.87**	1.21	62
I feel joyful when visiting the garden	0%	0%	0%	8.1%	21.0%	22.6%	48.4%	**6.11**	1.01	62	0%	1.6%	4.8%	9.7%	24.2%	21.0%	38.7%	**5.74**	1.29	62
I feel excited when visiting the garden	1.6%	1.6%	1.6%	9.7%	27.4%	24.2%	33.9%	**5.68**	1.32	62	0%	3.2%	8.1%	19.4%	21.0%	21.0%	27.4%	**5.31**	1.43	62
Overall mean	6.06										5.75									
Cronbach's Alpha	0.879										0.933									

Legend: 1- Strongly Disagree; 7- Strongly Agree

4.4. Perceived aspects related to experiences

The last table refers to the questions related to **sensory engagement, inclusiveness**, **accessibility,** and **global experience** in typical and sensory gardens (table 4.4).

Regarding **sensory engagement,** most respondents from both gardens selected the highest available level of agreement: 7 – Strongly Agree (TG – 7: 62.9%; SG – 7: 45.2%). Additionally, this item reports the highest average agreement level for the typical garden, which was higher than the sensory garden (TG mean = 6.45; SG mean = 6.00). This means difference is statistically significant (independent samples *t* tests: $p = 0.015 < 0.05$).

In the question concerning perceived **inclusiveness**, responses presented a higher level of agreement in the sensory garden than in the typical garden, especially in the highest level (7 – Strongly Agree) (TG – 7: 21%; SG – 7: 53.2%). On average, agreement level is higher for the sensory garden comparing to the typical garden (TG mean = 5.19; SG mean = 6.10) and the means difference is statistically significant (independent samples *t* tests: $p = 0.001 < 0.05$).

Similar to the question about inclusiveness, the question regarding **accessibility** perception also obtained higher levels of agreement in the sensory garden (TG –7: 17.7%; SG – 7: 50%). Additionally, it presented a bigger percentage of responses in the disagreement and neutral levels of the spectrum within the typical garden. This question reports the lowest agreement levels for typical garden and a lower agreement level for the same garden in comparison with the sensory garden (TG mean = 4.90; SG mean = 6.03). This means difference is statistically significant (independent samples *t* tests: $p = 0.001 < 0.05$).

In the last question, which focused on the **global experience**, both types of gardens showed the biggest percentage of responses to be within the highest level of agreement (TG –7: 54.8%; SG –7: 45.2%). The average value is higher for respondents who experienced the typical garden video (TG mean = 6.29; SG mean = 5.98). Despite the means difference, it is not statistically significant (independent samples *t* tests: $p = 0.098 > 0.05$) [5].

[5] Independent t-tests can be found in appendix 4, table A4.3.

Table 4.4- Results for sensory engagement, inclusiveness, accessibility and global experience in typical and sensory gardens.

	Typical Garden										**Sensory Garden**									
	Valid Percentages							Descriptive Stats.			Valid Percentages							Descriptive Stats.		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**Mean**	**St. Dev.**	**N**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Mean**	**St. Dev.**	**N**
This garden engages my senses positively (e.g., vision, hearing, touch, smell). *	0%	0%	1.6%	0 %	12.9%	22.6%	62.9%	**6.45**	0.84	62	0%	0%	3.2%	12.9%	9.7%	29.0%	45.2%	**6.00**	1.17	62
This garden is inclusive of people with different requirements. *	0%	1.6%	4.8%	27.4%	25.8%	19.4%	21.0%	**5.19**	1.28	62	0%	0%	4.8%	9.7%	9.7%	22.6%	53.2%	**6.10**	1.21	62
This garden is accessible to all. *	1.6%	4.8%	11.3%	21.0%	24.2%	19.4%	17.7%	**4.90**	1.51	62	0%	0%	6.5%	9.7%	8.1%	25.8%	50.0%	**6.03**	1.25	62
This is a good experience.	0%	0%	0%	4.8%	16.1%	24.2%	54.8%	**6.29**	0.91	62	0%	0%	3.2%	6.5%	24.2%	21.0%	45.2%	**5.98**	1.12	62

Legend: 1- Strongly Disagree; 7- Strongly Agree

**Independent samples t test: $p < 0.05$*

4.5. Correlations between well-being and perceived experience

Tables 4.5 and 4.6 present the correlation coefficients between well-being (hedonic and eudaimonic) and constructs related to the perceived experience for sensory and typical gardens, respectively.[6]

As showed in table 4.5, overall, in the sensory garden, the significant correlations are low to strong, with the highest value as 0.724 between hedonic well-being and the global experience. Results also show that all correlations are positive and are significant at 1%. It is possible to note that all correlations regarding accessibility are moderate (Hedonic [HW]: 0.484; Eudaimonic [EW]: 0.463). Concerning inclusiveness, the correlations are strong and moderate with the hedonic and eudaimonic well-being (HW: 0.565; EW: 0.482), respectively. Correlations concerning the positive sensory engagement (HW: 0.690; EW: 0.550) and the global experience (HW: 0.724; EW: 0.619) are strong.

In contrast, table 4.6 shows that the correlations between hedonic and eudaimonic well-being and inclusiveness and accessibility are not significant, in the typical garden case. Furthermore, correlations between hedonic well-being and overall experience are stronger (TG: 0.760; SG: 0.724) for the typical garden, but weaker in the case of eudaimonic well-being (TG: 0.603; SG: 0.619). The correlations related to positive sensory engagement are stronger for the sensory garden in both well-being types (H– TG: 0.624; SG: 0.690; E– TG: 0.395; SG: 0.550).

Focusing on the results for the sensory garden and hedonic well-being, table 4.5 shows that the higher correlation is with “This is a good experience” (0.724), followed by “This garden engages my senses positively (e.g., vision, hearing, touch, smell)” (0.690), “This garden is inclusive of people with different requirements” (0.565) and “This garden is accessible to all” (0.484). Regarding eudaimonic well-being, table 4.6 shows that the highest correlation is related to “This is a good experience” (0.619), followed by “This garden engages my senses positively (e.g., vision, hearing, touch, smell)” (0.550), “This garden is inclusive of people with different requirements” (0.482), and “This garden is accessible to all” (0.463).

[6] The correlation coefficient ranges from -1.0 (perfect negative) to 1.0 (perfect positive); values at 0 (zero) reflect no correlation. Moreover, the closer coefficients are to 0, the weaker the correlations are (Berenson, et al., 2018).

Table 4.5- Correlation matrix of well-being and perceived experience in sensory gardens.

		This garden engages my senses positively (e.g., vision, hearing, touch, smell)	This garden is inclusive of people with different requirements	This garden is accessible to all	This is a good experience
Hedonic	Pearson Correlation	0.690**	0.565**	0.484**	0.724**
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001
	N	62	62	62	62
Eudaimonic	Pearson Correlation	0.550**	0.482**	0.463**	0.619**
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001
	N	62	62	62	62

** Correlation is significant at a 0.01 level
* Correlation is significant at a 0.05 level

Table 4.6- Correlation matrix of well-being and perceived experience in typical gardens.

		This garden engages my senses positively (e.g., vision, hearing, touch, smell)	This garden is inclusive of people with different requirements	This garden is accessible to all	This is a good experience
Hedonic	Pearson Correlation	0.624**	-0.013	0.103	0.760**
	Sig. (2-tailed)	<0.001	0.918	0.428	<0.001
	N	62	62	62	62
Eudaimonic	Pearson Correlation	0.395**	-0.008	0.138	0.603**
	Sig. (2-tailed)	0.002	0.953	0.284	<0.001
	N	62	62	62	62

** Correlation is significant at a 0.01 level
* Correlation is significant at a 0.05 level

Table 4.7- Summary of correlations significance for sensory and typical gardens.

Correlations		**Results**	
		SG	**TG**
H1	Hedonic well-being ←(+)→ Engagement of senses	Supported	Supported
H2	Hedonic well-being ←(+)→ Inclusiveness	Supported	Not Supported
H3	Hedonic well-being ←(+)→ Accessibility	Supported	Not Supported
H4	Hedonic well-being ←(+)→ Global experience	Supported	Supported
H5	Eudaimonic well-being ←(+)→ Engagement of senses	Supported	Supported
H6	Eudaimonic well-being ←(+)→ Inclusiveness	Supported	Not Supported
H7	Eudaimonic well-being ←(+)→ Accessibility	Supported	Not Supported
H8	Eudaimonic well-being ←(+)→ Global experience	Supported	Supported

CHAPTER 5. DISCUSSION AND CONCLUSION

5.1. General discussion and conclusion

The main purpose of this dissertation was to understand the role of sensory gardens as visitor experiences in individuals' perceived well-being from a leisure and tourism perspective, using a managerial lens.

In doing so, this dissertation addresses a research gap concerning the comprehension of the implications regarding the approach of sensory gardens as visitor experiences on individuals' well-being, considering literature on multisensory tourism experiences (e.g., Agapito, 2020), garden tourism (e.g., Čakovská, 2018), sensory gardens (e.g., Bourdon & Belmin, 2021) and well-being (e.g., Smith & Diekmann, 2017).

To be named sensory gardens, gardens need to possess a set of elements and characteristics, such as plants, patterns, colours, textures, noises, scents and tastes (Hussein, 2012; Menezes & Hardoim, 2013; Senjana & Putra, 2021). Furthermore, sensory gardens are focused on sensory experiences connected to nature (Hussein, 2012; Sensory Trust, 2023), contributing to health and well-being (Pires, 2019; Hussein, 2012; Zajadacz & Lubarska, 2020), and are meant to be inclusive and accessible.

Multisensory experiences, such as those found in sensory gardens, are connected to well-being, encompassing both hedonic – associated with emotional pleasure and enjoyment, and eudaimonic aspects – related to feelings of authenticity, psychological wellness and self-growth (Lv & Wu, 2021; Smith & Diekmann, 2017; Tsai, 2021; Vada et al., 2020). The realm of leisure and tourism is intrinsically tied to levels of contentment and well-being (Agapito, 2020; Smith & Diekmann, 2017). Therefore, we highlight sensory gardens' potential as a valuable asset for leisure/tourism entities aiming to focus on well-being tourism, and establish distinctive positioning within the industry.

Following the main research objective, the results of this dissertation allow to answer the **seven research questions.**

Research Question (RQ) 1 "Are there differences between the reported eudaimonic well-being of visitors who experience a typical garden versus a sensory garden?"

The results suggest that the only significant statistically difference between the two gardens concerns the reported worthwhileness of the visit in the respondents' lives. This

way, the typical garden seems to allow the experience to be more worthwhile than the sensory garden. These results are partially in accordance with literature because, although sensory gardens can actively improve the general well-being (Hussein, 2012), visiting gardens in general may have many different motivations (e.g., as leisure, recreation, learning, etc.), and provoke different feelings (e.g., peace, tranquillity, freedom, etc) and help with the overall well-being of the visitor (Connell, 2004; Paiva et al., 2020).

RQ 2 "Are there differences between the reported hedonic well-being of visitors who experience a typical garden versus a sensory garden?"

The results do not suggest any significant differences in any of the items between garden types. Keeping in mind that hedonia refers to the capacity to create "positive mood and alleviate worrisome concerns, focusing on emotional pleasure and sense of delight" (Tsai, 2021: 1049), these results are in accordance with literature. As mentioned before, gardens in general are able to produce unique, different, original and exclusive experiences with natural, cultural and historic elements, capable of generating various sensations, emotions, and feelings (Paiva et al., 2020; Silva & Carvalho, 2012). Here it could be included affective states of relaxation, contentedness, joy, and excitement.

RQ 3 "Are there differences between the reported inclusive experience of visitors who experience a typical garden versus a sensory garden?" and **RQ 4 "Are there differences between the reported accessible experience of visitors who experience a typical garden versus a sensory garden?"**

The results suggest that the sensory garden tackles this inclusiveness issue in a better way than the typical garden and indicate that the sensory garden is favourable to those with accessibility issues when compared with the typical garden. Additionally, data suggest that the typical garden does not necessarily present facilities for higher levels of accessibility. Both research questions 3 and 4 follow the idea present in literature that sensory gardens are closely related to inclusiveness and accessibility (Hussein, 2009), for example, by using the principles of universal design (Senjana & Putra, 2021; Kopeva et al., 2020; Darcy & Dickson, 2009). It is important to keep in mind how perspectives and abilities may differ according to the physical and mental requirements of each visitor (Zajadacz & Lubarska, 2020).

RQ 5 "Are there differences between the reported engaging sensory experience of visitors who experience a typical garden versus a sensory garden?"

The results show that, unlike the inclusiveness and accessibility items, the sensory engagement aspect of the experience seems to be clearer in the typical garden experience. These results contrast with the literature that states that one of the main focus of sensory gardens is to engage all the senses of the visitor, by existing as a collection of sensory stimuli (Zajadacz & Lubarska, 2020). This may be explained by the lack of access to the actual gardens, since only the visual and auditory components were present in the videos to the participant. A well-designed sensory garden must have a variety of components that can only truly be experienced when *in loco*.

RQ6 "Are there differences between the reported global experience of visitors who experience a typical garden versus a sensory garden?"

The results of this study show no significant differences in the experiences for either of the gardens regarding repeated global experience.

Considering that a garden is a "«natural» scenery built with morphologies, colours, sounds and smells" (Silva & Carvalho, 2012: 4), able to produce unique, different, original and exclusive experiences with natural, cultural and historic elements, capable of generating various sensations and feelings (Paiva et al., 2020; Silva & Carvalho, 2012), these results are in accordance with literature. Multisensory experience, which gardens have the capacity to contribute to, are widely accepted to be of great importance when designing a global satisfying experience (e.g., Agapito, 2020; Agapito et al., 2014; Agapito et al., 2013; Kastenholz et al., 2020; Matteucci, 2016; Meacci & Liberatore, 2018; Pine & Gilmore, 1998).

RQ 7 "To what extent well-being (hedonic and eudaimonic) is correlated with the perception tourist experience elements in a sensory garden versus a typical garden?"

Results suggest that both hedonic and eudaimonic well-being types are correlated with the constructs related to the perceived tourist experience, specifically regarding sensory engagement and the overall experience, in which the correlations are stronger for both types of well-being. Furthermore, although all correlations are positive, the ones with hedonic well-being tend to be stronger than those of eudaimonic well-being.

These results are in line with Lv and Wu's (2021) idea that both hedonia and eudaimonia should be present in an experience that aspires well-being. Additionally, it contrasts literature that urges the need to focus on eudaimonic well-being rather than hedonic (Zheng et al., 2016; Knobloch et al., 2017). However, this may be due to the fact that the respondents did not have the chance to actually live the experience, only imagining the experience through the video.

It is noteworthy to add that for accessibility and inclusiveness the results are all statistically significant in the sensory garden experiment, showing a relationship between well-being and sensory garden which does not happen in the typical garden.

These results are in accordance with the ideas in literature regarding sensory gardens need to focus on accessibility and inclusiveness (Hussein, 2009), along with the thought that tourism should be more accessible and inclusive for the increased well-being of people with disabilities, caregivers (Bauer, 2019; Page et al., 2015), and the overall population. This goes in line with Agapito and Guerreiro's (2023) focus on a multisensory approach that can contribute to designing enhanced slow and accessible tourism experiences that affect well-being.

Overall, the results suggest that, although typical gardens can provide good and sensory engaging experiences, able to increase hedonic and eudaimonic well-being for the visitor, sensory gardens have the capacity to provide the same but in an inclusive and accessible way. This allows everyone experiment the multisensory experience provided by a sensory garden, regardless of the disability they might possess or the context they may find themselves in (e.g., tourism).

5.2. Contributions to management

Following the results obtained in this study, it is possible to suggest that sensory gardens may have the potential to be applied to management and to make some suggestions regarding the potential use of sensory gardens as a management resource.

Many types of organizations may benefit from the existence of sensory gardens. For example, resorts with big areas may find the space to incorporate a sensory garden for their guests to use. Municipalities may also create sensory gardens for public use.

Sensory gardens may also be used in event management and for promotion purposes, for example, in a temporary approach in exhibitions to show resources or even

tourism destinations and attractions, such as an already existing garden or the overall flora of the destination. This temporary approach may also be applied as a pop-up experience, for example, in a city, a hotel, an airport and many others.

Ana Frutuoso from ZenSenses further corroborates, in the exploratory interview (Appendix 2), the need to apply sensory gardens as a management tool by mentioning the creation of private gardens by ZenSenses that can be visited by the general public through appointment.

Examples of sensory gardens can already be found in the Algarve, Portugal. The Costume Museum in São Brás de Alportel has applied this approach, and accommodation Centre Algarve in Moncarapacho (Ferreira, 2022), amongst many other resources, possesses a sensory garden. Although both of these examples are mainly though to be resources for the disabled population, they can both be visited by the population in general, specifically the museum.

These examples, although few, are already proof that sensory garden can be applied in a management setting and further demonstrate the need to invest in these types of resources.

Suggestions may also be made regarding the specific resources of the sensory garden as can be seen in table 5.1, which focus on the usage of endemic plants and resources.

Table 5.1- Resource suggestions for sensory gardens in management.

Sensory dimension	Resources	Possible plants	Highlight	Example in management	Reference
Touch	Cork, Succulents, Palm tree, Tiles, etc.	E.g., Cork oak, White stonecrop, Dwarf fan palm	Rough vs smooth textures	Accommodations with spacious gardens may include stations with cork in different processing states for texture contrasts. Possibly add other textured plants	Avis-Riordan (2020)
Taste Smell Touch	Local herbs	E.g., Lavender, Rosemary, Basil, Sage	Difference in flavours	Tea-making station – herbs preparation	Worden and Moore (2004) Thorogood and Hiscock (2014)
Sight Smell	Tall trees	E.g., Pine tree, Carob tree	Light and shade contrast; difference in smells	Accommodations with spaces with pine trees, may create paths with seating/laying places to enjoy sun/shade	Avis-Riordan (2020)
Taste Smell Touch Sight	Plants with edible components	E.g., Strawberry tree; Lemon tree; Orange tree; Grape; Carob tree	Difference in flavours; participation in creative process	Station to utilize products from garden – e.g. to eat, cook, drink (medronho) etc. Accommodation and restaurants that use produce from their own herb and/or vegetable garden may create experiences to do this after the visit to the garden	Avis-Riordan (2020) Worden and Moore (2004)

Sensory elements may, this way, be used in a structured and planned way by managers in order to design experiences for all, i.e., not only visitors with disabilities but enhancing the experience of all visitors.

5.3. Limitations and future research

Although this exploratory study revealed some promising results, limitations are a reality in any research. However, limitations often translate to future possibilities of research.

The target population chosen was comprised of people from the millennial generation for convenience of access to the author. This means that future research could

be done by involving respondents from other age groups. In the same line, no elements of the sample had any known disabilities, which may cause specific aspects of the gardens to fall unnoticed due to them not being priorities to the respondents, specifically regarding accessibility and inclusiveness. Future research could expand the study with a more diverse sample. Regardless, the objective of the study is to understand the value of applying the usage of sensory gardens in well-being tourism for the general public, since the literature is already extensive on the effects of sensory gardens in contexts with people with a variety of disabilities.

The experiment was done using only videos edited from existing online imagery (publicly available), since it was not possible to do it entirely from scratch for lack of time and resources. Furthermore, videos only allow the representation of visual and auditory stimuli (auditory component was equal in both situations to minimize bias). Both of these aspects make it impossible to comprehend and experience the full extent of either garden context. Thus, future research could focus on a different experimental approach and either gather original videos or, ideally, apply the study *in loco*.

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APPENDICES

Appendix 1. Questionnaire in English

Garden tours in the context of leisure and tourism.

This study is carried out as part of the Master in Management of Tourism Organizations of the Faculty of Economics, University of Algarve. The aim is to understand the impact of gardens on well-being in the context of leisure and tourism. Your answers will be statistically treated globally and used exclusively for academic purposes. There are no correct or incorrect answers, and the questionnaire is anonymous and confidential. Any clarification can be requested through the address a49444@ualg.pt . Thank you.

*Obrigatório

Please sit in a comfortable place indoors, maximize the screen to watch the video in full screen and, ideally, use headphones while watching the following video (1 minute).

http://youtube.com/watch?v=Z7PR3ZMfTB0

Imagine that you are visiting for the first time a garden with the characteristics that were depicted in the video. Please indicate your level of agreement/disagreement with the following statements.

1. I feel happy while visiting the garden. *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

2. This visit is worthwhile in my life *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

3. This visit brings accomplishment in my life *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

4. This visit is meaningful in my life *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

5. I feel relaxed while visiting the garden *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

6. I feel content while visiting the garden *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

7. I feel joyful when visiting the garden *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

8. I feel excited when visiting the garden *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

9. This garden engages my senses positively (e.g., vision, hearing, touch, smell). *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

10. This garden is inclusive of people with different requirements. *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

11. This garden is accessible to all. *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

12. This is a good experience. *

Marcar apenas uma oval.

	1	2	3	4	5	6	7	
Strongly Disagree	◯	◯	◯	◯	◯	◯	◯	Strongly Agree

Socio-demographic Section

13. Gender *

Marcar apenas uma oval.

- ◯ Female
- ◯ Male
- ◯ Other

14. Age *

_____

15. Nationality *

16. Occupation *

17. Marital Status *

Marcar apenas uma oval.

- ◯ Single
- ◯ Married/
- ◯ Divorced/Separated
- ◯ Widowed

18. Education Level *

Marcar apenas uma oval.

- ◯ Primary school
- ◯ Secondary school
- ◯ Technical/Professional Education
- ◯ University

19. Employment status *

Marcar apenas uma oval.

- ◯ Employed
- ◯ Entrepeneur
- ◯ Unemployed
- ◯ Student
- ◯ Retired
- ◯ Housewife/Househusband

Appendix 2. Exploratory interview to the founder of ZenSenses (Dra. Ana Frutuoso)[7].

-How was the introduction of the sensory gardens at ZenSenses born?

ZenSenses started with my passion for the world of Multisensory Stimulation / Snoezelen. When I started training in this area I became aware of the existence of sensory gardens. There are many countries where they have existed for a long time, but in Portugal only recently has there been more talk and creation of more spaces. Up until now, what there were more were Multisensory Stimulation rooms. When we started to give training in Snoezelen, we also approached the subject, and people started to ask us for material, more information, scientific articles, so we began to research what existed in other countries and try to bring it here, at this moment we have already implemented some and we also give specific training on this subject. For us, it was the continuity of the work developed always thinking about the relationship with the senses. There are other environments, such as the aquatic Snoezelen, which is still more recent, there are only 2 or 3 in the country.

-Studies have pointed out the sensory gardens as having therapeutic effects in several situations such as disabilities and dementia, for example. What are the main benefits and opportunities that you consider the sensory garden approach can bring to the level of well-being in contexts related to tourism/leisure in general?

A sensory garden is meant to be accessible to all, so all people can enjoy this space. You can create corners like lounge areas, for relaxation, with pouffes, sofas, suspended swings, with wind chimes, rain sticks, for example; tables and chairs for leisure activities, environmental education, psychomotricity activities, are some examples too; and areas for stimulation of the different senses, with musical panels, pergolas with acrylics of different colours, panels, tables and pavements with different textures, sizes, shapes and colours, for tactile (hands and feet) and visual stimulation, aromatic plants, and much more. Regarding tourism/leisure, we have already created some time ago a Sensory Garden in the central region, which is operated by a private company and is open to the public by appointment. And we have recently created one with the same purpose in Oporto, where visits will be booked with us, to stimulate activities. So it's something that

[7] Date of interview: July 19th, 2022
ZenSenses' website: www.zensenses.org

is already happening, and it's a good thing, because everyone really loves being in this space and enjoying this environment!

-What are the biggest advantages of using sensory gardens versus other types of sensory therapies?

Comparing to the Snoezelen room, which is the most common, the Sensory Garden has gained more and more importance in this pandemic period, creating a therapeutic and rehabilitation space outside, where there is less risk of contagion, in IPSS's that work with risk population, is very important, it allows the continuity of the work developed and that people do not regress or have faster progression in several pathologies. The Snoezelen room is a closed space, and we verified that for a long time most institutions kept the rooms closed due to the possibility of transmission of covid-19. On the other hand, in general, other themes can be worked, the contact with nature, smell and taste gain another importance in this space, balance and vestibular with the swings, are some of the differences. And it seems that, in some cases, they gain another motivation to participate in activities, being in an outdoor space, when indoors they are not so participative. Autonomy and responsibility can also be worked on, with the users being responsible for the maintenance of the garden, with supervision, and that is also very important.

-What are the opportunities for selecting sensory stimuli for the planning/design/construction of a sensory garden based on local resources (e.g. local plants and materials) in order not only to obtain the benefits of sensory stimuli, but also to educate users (e.g. visitors) about the endogenous resources of regions?

Yes, without a doubt it is interesting and logical to use local resources, and generally we discuss with each entity this issue, in relation to flowers and aromatic plants for example that we are going to put. Then they can work with the clients on Environmental Education, planting and preparing a tea, these are some of the activities developed.

Appendix 3. Subsamples' sociodemographic profile vs type of experienced video (pearson chi-square tests)

Table A3.1- Pearson Chi-Square Tests to Subsamples' Sociodemographic Profile Vs Type of Experienced Video

Gender	**Chi-square**	**0.576**
	df	1
	Sig.	0.448
Marital Status	Chi-square	0.498
	df	2
	Sig.	0.780
Portuguese vs. Foreign	Chi-square	0.369
	df	1
	Sig.	0.544
Nationality	Chi-square	4.702
	df	7
	Sig.	0.696
Education Level	Chi-square	0.050
	df	2
	Sig.	0.975
Employment Status	Chi-square	3.778
	df	4
	Sig.	0.437

Appendix 4. Independent t-tests

Table A4.1- Independent samples t-tests – Eudaimonic Well-being

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
I feel happy while visiting the garden.	Equal variances assumed	0.455	0.501	1.562	122	0.060	0.121	0.258	0.165	-0.069	0.585
	Equal variances not assumed			1.562	121.835	0.060	0.121	0.258	0.165	-0.069	0.585
This visit is worthwhile in my life	Equal variances assumed	5952	0.016	2.450	122	0.008	0.016	0.565	0.230	0.108	1.021
	Equal variances not assumed			2.450	114.443	0.008	0.016	0.565	0.230	0.108	1.021
This visit brings accomplishment in my life.	Equal variances assumed	1.093	0.298	0.711	122	0.239	0.478	0.210	0.295	-0.374	0.793
	Equal variances not assumed			0.711	121.008	0.239	0.478	0.210	0.295	-0.374	0.793
This visit is meaningful in my life	Equal variances assumed	0.035	0.851	1.148	122	0.127	0.253	0.323	0.281	-0.234	0.879
	Equal variances not assumed			1.148	121.733	0.127	0.253	0.323	0.281	-0.234	0.879

Table A4.2- Independent samples t-tests – Hedonic Well-being

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
I feel relaxed while visiting the garden	Equal variances assumed	5.276	0.023	1.764	122	0.040	0.080	0.323	0.183	-0.039	0.685
	Equal variances not assumed			1.764	110.378	0.040	0.080	0.323	0.183	-0.040	0.685
I feel content while visiting the garden	Equal variances assumed	0.671	0.414	0.911	122	0.182	0.364	0.194	0.212	-0.227	0.614
	Equal variances not assumed			0.911	121.782	0.182	0.364	0.194	0.212	-0.227	0.614
I feel joyful when visiting the garden	Equal variances assumed	4.135	0.044	1.781	122	0.039	0.077	0.371	0.208	-0.041	0.783
	Equal variances not assumed			1.781	115.265	0.039	0.078	0.371	0.208	-0.042	0.784
I feel excited when visiting the garden	Equal variances assumed	1.519	0.220	1.502	122	0.068	0.136	0.371	0.247	-0.118	0.860
	Equal variances not assumed			1.502	121.123	0.068	0.136	0.371	0.247	-0.118	0.860

Table A4.3- Independent samples t-tests – Experience

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
This garden engages my senses positively (e.g., vision, hearing, touch, smell).	Equal variances assumed	3.641	0.059	2.461	122	0.008	0.015	0.452	0.184	0.088	0.815
	Equal variances not assumed			2.461	110.722	0.008	0.015	0.452	0.184	0.088	0.815
This garden is inclusive of people with different requirements.	Equal variances assumed	0.728	0.395	-4.039	122	<0.001	<0.001	-0.903	0.224	-1.346	-0.461
	Equal variances not assumed			-4.039	121.642	<0.001	<0.001	-0.903	0.224	-1.346	-0.461
This garden is accessible to all.	Equal variances assumed	2.707	0.103	-4.526	122	<0.001	<0.001	-1.129	0.249	-1.623	-0.635
	Equal variances not assumed			-4.526	117.973	<0.001	<0.001	-1.129	0.249	-1.623	-0.635
This is a good experience.	Equal variances assumed	2.173	0.143	1.667	122	0.049	0.098	0.306	0.184	-0.057	0.670
	Equal variances not assumed			1.667	117.073	0.049	0.098	0.306	0.184	-0.058	0.670