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What Affects the Depth of the Human–Garden Relationship in Freely Accessible Urban Sensory Gardens with Therapeutic Features in Various Users?

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Abstract: A human being comes into contact with the environment through the senses. That is why in the space of cities, where various intense stimuli negatively affect the living of people, there is important greenery that has a positive impact. Significant types of gardens within urban green areas are sensory gardens. In our article, we intended to answer the question of what specifically affects the formation of deeper human–garden relations in urban, publicly accessible gardens designed to have a sensory impact. Our research was conducted mainly in Poland. We used a method of assessing the behavior of garden visitors, using a five-point scale. We found that the existence of specific interiors in gardens that have been designed in such a way as to stimulate two to three selected senses, which we call the leading senses, can create an environment that allows for deeper relationships with the garden. We also concluded that when designing a public sensory garden, adaptation to specific user groups is one of the most important guidelines. A deeper contact with the sensory garden for people visiting a city, e.g., tourists, may occur especially when there is a positive surprise or when an additional need of this group is met in the garden. Sensory gardens, although they are a relatively new type of urban greenery, can become a permanent element of cities if they are carefully designed and meet the expectations of their recipients.

Keywords: sensory gardens; sensory garden design; five senses experience; therapeutic gardens; urban gardens; urban green spaces; urban tourism; well-being; durable green areas; urbanscape

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1. Introduction

1.1. The Importance of Sensor Gardens in Urban Space

Sensory gardens are a type of public urban greenery [1]. In urban environments, urban green spaces bring a wide variety of environmental, social, and psychological benefits [2]. The positive impact of the natural environment on human life and health has been the subject of numerous studies and publications since the 1980s [3,4]. Studies that investigated the direct impact of urban greenery found that it may have longitudinal effects on mental health [5]. Greenery in cities also has indirect positive effects, such as acting as a buffer to housing areas, limiting the negative health impact of stressful life events [6]. A typically urban environment is not natural to humans and can cause stress, and the availability of green spaces can have a positive effect on reducing it and improving health [7]. Studies in urbanized space in the center of Athens showed that in such conditions each sense of a person is affected by negative factors [8], which is why the presence of a network of urban green spaces can alleviate the impact of the urban environment. This is supported by E. Wilson's biophilia theory, which points to humans' natural need for contact with nature and to how its effect allows the body to regenerate [9].

Sensory gardens are gardens that can fulfill therapeutic functions [10], that is, that can influence both the improvement of a human well-being [11], but also, like the rest of urban greenery, influence the improvement of functioning in a hostile urban environment,

and, thus, improve the quality of life and give an opportunity to regenerate [12]. Such gardens function in urban public spaces as generally accessible green spaces and are not confined to sites that accompany healthcare centers, where they are intended for use by the clients of these institutions. According to the American Horticultural Therapy Association (AHTA), a therapeutic garden is "a plant-dominated environment purposefully designed to facilitate interaction with the healing elements of nature" [10]. Therefore, using natural elements via culture, namely the correct composition of these elements by humans, and the proper use of such spaces, it is possible to create a therapeutic environment in a sensory garden [10,11,13]. Human contact with nature takes place via individual senses, and a range of studies highlighted the significance of this contact in human development and well-being [14]. Wintherbottom and Wagenfeld [10] proposed to use the term 'nourish' rather than 'stimulate', as they believe it better reflects the effect that a therapeutic sensory garden should have. Sensory gardens provide a diverse range of stimuli that may be registered passively, without any action by the recipient, as well as with the recipient's involvement, i.e., actively [15,16]. Contact with a garden space, even when passive, may positively affect humans, as it was found that merely looking at natural elements may have therapeutic and even medicinal effects and bring about improvements in one's condition [3]. Within urban space, an increasing amount of attention is given to the sensory impact of the surroundings and its effect on humans, which may concern both urban green spaces, such as parks [17], as well as typically urban environments, which are associated with the term sensorial urbanism [18]. Based on the knowledge about the positive impact of greenery on humans, it has also been proposed to create well-being gardens, where one of the recommended features of these gardens is multisensory plantings, intensively affecting the senses [19].

So far, only a small number of studies were focused on freely accessible urban sensory gardens, which, due to positively affecting the senses, can create therapeutic environments in cities [16]. The beginning of the trend of building sensory gardens in freely accessible spaces, namely in urban green spaces, was identified by Hussein in the 1970s in Great Britain [20]. Individual gardens of this type that had been built even earlier for the blind and visually impaired and that were located in arboretums and botanical gardens in the United States, are also not without significance [21]. A publication by Krzeptowska et al. [16] shows where publicly accessible sensory gardens have appeared in Poland, including in urban spaces, and these have only begun to emerge here since the beginning of the 21st century. Furthermore, other studies [22,23] noted the additional impact of the thought of German pedagogue and mathematician Hugo Kükelhaus on the establishment of certain types of these complexes in this country, especially in combination with educational science gardens. Pawłowska [24] pointed to cases of small contemporary sensory gardens, especially those that target hearing, and which were built in densely built-up, heavily urbanized parts of New York, which are often visited by people who work in these city districts. The sensory gardens of Lithuania were discussed by Balode [25]. Krzeptowska et al. [16] noted the variety of possible audiences for urban sensory gardens.

The dynamic construction of gardens with sensory features in Poland, especially over the last decade, has inspired increased scholarly interest in them in this country. Urban green spaces as therapeutic environments, including their effects on the human senses, were investigated by Trojanowska [26,27]. Based on Trojanowska's studies, Krzeptowska et al. developed a method for analyzing contemporary urban sensory gardens as therapeutic spaces [16]. Krzeptowska et al. also published other studies on the presence of sensory gardens in urban space. In their publications were two problems: the function of aromatic plants in these gardens [11], and the biocenotic role of urban sensory gardens [28]. The significance of sensory gardens to persons with visual impairments, as well as in cities, was the focus of both Polish- and English-language publications [23,29], and studies that accounted for urban forests [30]. Places in Poland where therapeutic gardens with sensory features can be built also include former park areas of, among other places, psychiatric hospitals, where currently only parts of their grounds are closed, and the remainder is

publicly accessible, e.g., in Krakow around the Babiński Hospital. Such places are currently the subject of research, due to among other things their therapeutic effects [31,32]. These areas have their own genius loci, and nowadays there are attempts to introduce greenery with sensory effects there. In recent works, the importance of sensory gardens is noted, also as one important greenery element for the so-called smart sustainable city [33].

1.2. The State of Knowledge of Human-Sensory Garden Interaction

There is not, as mentioned above, a lot of literature on urban sensory gardens, although recently, more and more works have been published on this topic. However, there is still little research when it comes to their impact on the recipient. The situation is different in the case of specialized sensory gardens located at various medical or therapeutic centers, where these gardens are designed for specific groups of people who use these facilities (e.g., [10,20,34,35]). Firstly, there is a precisely defined recipient with specific needs, and secondly, it is possible to test the functionality of the gardens on an ongoing basis and introduce any changes. If we take into account publicly available city sensory gardens, the problem has not been thoroughly investigated so far. The exception are sensory gardens for people with visual impairments, which are better adapted to their users (e.g., [23]). This is because this group tended to be the main recipients of these gardens early on [20]. However, there are works that attempt to determine a more detailed possible location of gardens in the urban tissue [25]. In addition, based on the analysis of their urban surroundings, an attempt was made to identify their recipients [16]. However, there have been no studies so far that have focused on the recipient–garden relationship in publicly accessible urban sensory gardens. Our work fills this gap.

We observed that a sensory garden, even when it is rich in terms of plant material and is interestingly designed, is not always capable of attracting and keeping its visitors. Our study attempted to answer the question as to what specifically influences the formation of a deeper relationship with an urban, freely accessible sensory garden and such a relationship is formed in different user groups. Can existing gardens be used to find elements or attributes that can make a person stay inside the garden for longer and facilitate a deeper reception of the garden's environment using senses? Does it make a difference if the reception of the urban sensory garden is passive or active? The objective of this study was to find answers to these questions.

2. Method and Scope

The study consisted of two stages (Figure 1). In the first stage, the study method was used (composition analysis, description of the features of the garden), as well as an analysis of the behavior of visitors, which was presented using a five-point scale. In the second stage, the deepest relations observed between the recipient and the garden were referred to specific design solutions. In this study, which can be considered as the work initiating this issue, the focus was on qualitative research. The research was carried out in each garden for 1–3 days. On average, 30 visitor reports were surveyed for each garden.

We investigated the most well-known, freely accessible, urban sensory gardens or gardens with sensory features in Poland. Poland is a country located in Central Europe. Around a dozen garden complexes were studied in the following Polish cities: Gdańsk (1), Gdynia (1), Krakow (6), Leżajsk (1), Lublin (1), Łańcut (1), Poddębice (1), Rzeszów (1), Sandomierz (1), Tarnów (1), and Warsaw (1). All the Polish gardens investigated were studied and photographed in person.

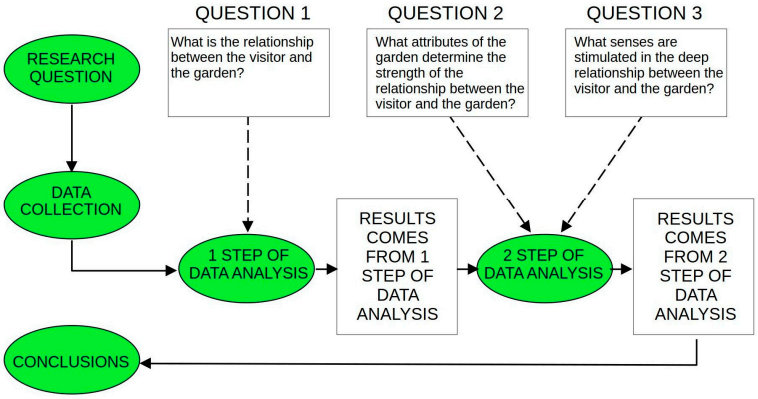

Figure 1. The methodology flow chart.

During the initial stage of the study, the behavior of visitors was observed, and the relationship of individual users and the gardens was described: whether such a relationship was present, whether it was long- or short-term, what characterized it, and whether it led to the engagement of a given individual's senses in the garden's space. It was also investigated which of the five fundamental senses could be stimulated in each environment and situation. Based on the observations, the garden–user relationship was generalized, and five relationship levels were isolated from "no relationship with the garden" (level I) to "the deepest relationship with the garden" (level V).

Afterwards, only the relationships identified as deep were analyzed, namely those which featured the highest degree of user–garden relationship (level V). The following four criteria were used to determine whether such a relationship level had been attained: (a) the person remained in the garden space for a lengthy period, (b) the person displayed a notable interest in the garden's environment, (c) the person's facial expression showed signs of positive reception (a smile, contentment, amusement, an expression of surprise combined with a smile), and (d) the person devised a way to engage with the space (i.e., find their place in it, trigger the release of a smell or the production of sound, playing with the sensory impact, etc.). A total of fifteen gardens were documented in Table 1, where such deep user–garden relations are described. The gardens included both Polish garden complexes (eleven cases)—Figure 2, and from other countries, as the analysis was expanded and supplemented to include selected cases of gardens with sensory features located in large cities located in countries from the Anglo-Saxon cultural sphere (Canada—Toronto, Great Britain—London, the US—New York (four cases))—where similar impacts were observed during visits, but these had a slightly different form. In these countries, sensory gardens have been present in public spaces for many years, while in Poland their construction began as late as in the 21st century [16]. Based on the results of our observations, specific garden attributes, namely design solutions that can generate a deeper contact with a garden, were identified. The attribute was characterized as: a feature of space or a type of equipment [16]. It was assumed that every garden fragment in which at least one person formed a high-level garden–user relationship could be seen as having successfully stimulated the senses. These features, isolated in this study, concerned specific gardens, and could be referenced to given types of urban sensory gardens, isolated depending on the urban activity zone where they were located [16], and thus assigned to a specific group of urban space users. The entire analysis was used to formulate the study's final conclusions.

Table 1. Overview of fifteen gardens selected for the second stage of the study.

Garden	Setting	Type of Nearest Neighborhood	Main Recipients	Features
A. Sensory Garden at the Franciscan Bernardine Center—LEŻAJSK (POLAND)	Church grounds	High compact fencing	Children and their caregivers—city residents, tourists	Very small garden, division into two enclosures, diversity of equipment
B. Children's play garden with features of a sensory garden, Jordan Park—KRAKOW (POLAND)	Urban park	Green park surroundings	Children and their caregivers—city residents (children's activity zone within the city green)	Division into different enclosures
C. Children's play garden with sensory garden features, Royal Baths—WARSAW (POLAND)	Urban park	Green park surroundings	Children and their caregivers—city residents (children's activity zone within the city green)	Variation of terrain in terms of relief
D. Gardens of the Bernardine Fathers with features of a sensory garden—RZESZÓW (POLAND)	Church grounds	Urban surroundings—streets, buildings	City residents of all ages, children, also tourists (sacred tourism zone, urban recreation zone)	Division into different enclosures
E. Sensory Garden in the Piaski Nowe housing estate—KRAKOW (POLAND)	Urban estate	Estate streets, high blocks of flats	The elderly—hortitherapy classes, residents of nearby blocks of flats (activity zone for residents of urban settlements)	Division into different enclosures and the division of space for each of the individual five senses
F. A garden with sensory garden features around Thrive headquarters, Battersea Park—LONDON (UK)	Urban park	Green park surroundings	City residents with special needs, especially young people—hortitherapy classes, the rest of the garden for other city residents and tourists (recreation zone within the urban greenery for residents and tourists, educational and therapeutic zone)	Flowerbeds with dense plantings, area for activities separated
G. Garden with the characteristics of a sensory garden at the J. Czapski Museum—KRAKOW (POLAND)	Area by the museum	Walls of tall buildings, a wall	Primarily tourists, people working in the city center but also residents, working or staying in the city center (urban tourism zone, museum education zone)	Small garden enclosure interacting with forms and subdued colors; plantings in high pots
H. Pocket garden—Paley Park—NEW YORK (USA)	Urbanized setting	Walls of tall buildings	People working near the garden, tourists (urban tourism zone, work activity zone)	Garden with terraces of varying heights, the dominant feature is a large waterfall
I. "Secluded Garden" sensory garden at the Royal Botanic Gardens, Kew—LONDON (UK)	Botanical garden	Green garden surroundings	Tourists, residents seeking relaxation in a garden setting (nature and museum education zone, urban recreation zone, urban tourism zone)	Garden with tall, dense plantings; diversity in terms of environmental features
J. Greenhouse in the park near the castle with strong sensory impact—Potocki Castle Museum—ŁAŃCUT (POLAND)	Park by the palace	Transparent greenhouse walls facing inwards—no view of the park	Tourists (urban tourism zone, nature education zone)	Dense greenery, water features, raised beds
K. Thyme path in the garden referring to the renaissance medical garden of Martin of Urzędów—SANDOMIERZ (POLAND)	Area by the museum	Urban environment—streets, buildings; green surroundings of the museum	Tourists (urban tourism zone, nature, and museum education zone)	Small geometric garden
L. Sensory garden in the public park—PODDĘBCE (POLAND)	Area in the urban park	Green park surroundings	Tourists, residents seeking relaxation in a garden setting (urban tourism zone within urban greenery, treatment zone—mineral water pump room)	Different enclosures surrounding by the greenery of the park

Table 1. *Cont.*

Garden	Setting	Type of Nearest Neighborhood	Main Recipients	Features
M. Garden of scents "Zapachowo" in the S. Lem Garden of Experiences—KRAKÓW (POLAND)	Area in the city park	Green park surroundings and educational surroundings	City residents, mainly children and youth (education zone, urban recreation zone)	Small garden in the form of a winding path surrounded by plants
N. Labyrinth of the senses on the "Alice trail" at the "Marszewo" Forest Botanical Garden—GDYNIA (POLAND)	Area in the city forest	Forest surroundings	City residents, mainly children and youth; tourists (education zone, urban recreation zone, tourism zone)	Garden in the form of a labyrinth with walls made of wood with pots filled with flowers
O. Music Garden—TORONTO (CANADA)	Urban green areas	The urban surroundings—streets, tall buildings, and the small harbor of Lake Ontario	Tourists, city residents (urban tourism zone, recreation zone within the urban greenery)	Diverse terrain in terms of relief, lots of different enclosures

Figure 2. Sensory gardens in Poland where deep user–garden relations were described.

3. Results

3.1. Relationships between Users and Gardens with Sensory Features

The results of the first stage of the study were collected in Table 2. Considering the behavior of sensory garden visitors, five levels of relationships with garden spaces were isolated. These were the following: I) no relationship with the garden, II) superficial reception of the garden, III) relationship coupled with an involuntary perception of the garden space, IV) relationship and engagement, which resulted in a deeper reception of the garden, V) remaining in a multi-dimensional relationship with the garden for some time.

The relationships are also diagrammatically presented in Figure 3.

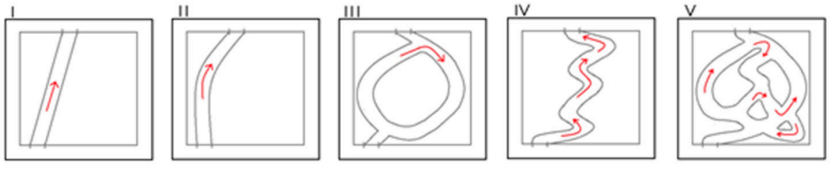

Figure 3. Five degrees of relationship with the garden space presented schematically, distinguished based on observed cases of visitors' behavior in sensory gardens.

Table 2. Garden–user relationship levels defined based on observing human behavior in sensory gardens.

Type of Relationship	Behaviors Observed	Brief Behavior Description	The senses Involved; Sequenced by Intensity of Stimulation
I. No relationship with the garden	- Hurriedly passing through the garden using the shortest path, lost in one's own thoughts; no relationship with the garden, not even using sight	'I will pass through quickly'	None
II. Superficial reception of the garden	- Entering the garden and forming a visual relationship, but typically stopping to the side or passing through using a short path, sometimes the use of a camera; short relationship and exit from the garden space	'I will enter, take a peek, and move on'	Sight
III. Relationship with involuntary perception of the garden space	- Entering the garden with the intent to be in it, but not to actively perceive it—e.g., a babysitter with a child, preoccupied with watching over it, conversing with another babysitter or with a phone call	'I will enter and focus on what I am doing'	Smell or sight or hearing
IV. Relationship with engagement	- Pausing for a moment in the garden space to take it in, e.g., to listen to the sound of the fountain and look at the flowing water, smell fragrant plants, but the relationship is short, e.g., the person touches certain plants or tastes fruit out of curiosity	'I will enter and take a closer look at what the garden offers, but I want to quickly return to what I was doing previously'	Touch, smell, sight, hearing, taste—either separately or jointly
V. Remaining in multidimensional relationships with the garden for some time	(1) The relationship between a child and a play garden with sensory features—touching plants, running around and racing in a plant labyrinth, splashing around water from water features or a fountain	'I will play in this space and experience this garden, and use any elements that I might find'	Various senses, between two and all five depending on the relationship type
	(2) The garden's effects during hortitherapy in its space, the user is actively engaged in being present in the garden, in using their senses, e.g., in planting and maintaining plants	'I will be here and engage in a garden-associated activity I am offered'	
	(3) Being present in a sensory garden's space while using a garden café or restaurant, pausing for some time in the space, perceiving it using different senses	'I will stay here, eat, or drink, and so engage the sense of taste, and absorb the environment with my other senses'	
	(4) Pausing in a garden interior, lying in a sunbed or on the grass, or in a wooden chair in a quiet spot, e.g., among a bamboo or willow grove	'I will stay here and relax in a friendly sensory environment'	
	(5) Passage through a trail that saturates and nourishes the senses, that affects the user via various stimuli	'I will pass through this garden space and subject myself to intense sensory stimuli'	

The absence of a relationship (I) means that the visitor came to the garden completely at random. These are typically people who search for the quickest path to their destination and only pass through the garden space on their way to work, if the garden happens to be along the way. Such persons pick the shortest available path to their destination. They do not pay attention to the surroundings and no garden–user relationship is formed.

The next level of relationship is the superficial perception of the garden (II). People in such relationships can be tourists, who can enter a garden out of curiosity, look at it, take a photo or two, and then leave. They can also be people who take their dog for a walk and be present in the space for a brief period. Such a user notes that they are in a garden space, but only enters into a very shallow relationship with it—which is typically visual.

The level above is the involuntary perception of garden space (III). In this case, a person has deliberately chosen to stay at the garden but does not enter into a deeper relationship with it; they are instead in an involuntary, random relation with it. This relationship involves the passive perception of stimuli. The user can be a person who is accompanied by a child in a stroller and is going for a walk. The visitor can, thus, choose the garden as it is simply an urban green space fitting for a stroll, or where one can simply stay, but they are not interested in the type of this garden or what it can offer. Such a person will involuntarily perceive smells or look at some garden element, they can hear the sound it produces, provided they choose to focus on these stimuli. This level equates passive garden perception.

The next level is a relationship that features visitor engagement (IV), and results in a deeper perception of the garden. In this case, the visitor must deliberately choose to stay in this type of garden, enter into an active relationship with it, and be present there for an extended time, but not long enough to form a truly close relationship. Such a person may actively search for a way to stimulate their senses, they will touch or smell the surroundings. It can be said that they will enter the garden interior. However, their relationship will be limited to a superficial and quick perception of the garden, or to pausing at some of its elements, e.g., only to satisfy their curiosity.

At the highest level (V), the user enters into and remains in multidimensional relationships with the garden. They focus on perceiving their environment with different senses and feel a need to stay there for an extended period. They will be mindful of their surroundings. If the garden is large enough, the user may stroll around it. It is not necessary to see the garden in its entirety or only in part. The person in this relationship is deliberately, consciously present in the sensory garden's space, enters into a relationship with it, and 'immerses themselves in this space'.

The first two levels—I and II—describe situations in which a sensory garden is not perceived as intended by its designers, as the user is present there for only a brief period. Even in the second case, the relationship is much too shallow. The three consecutive levels, III, IV, and V, illustrate entering into specific relationships with a garden, relationships that enable its sensory perception. In the case of level III, the user passively uses the garden space—they are not active in it, but merely being present allows them to be passively exposed to the sensory garden's influence. Table 3 shows whether each stimulus affects a given sense in a passive or active manner. It is possible to passively perceive a garden through sight. However, there are two other senses, which also do not require engagement: smell and hearing. Although in the case of passive garden perception there may be cases where only a specific section of its potential is used. Touch and taste are called close senses, as in gardens they are stimulated by a close, direct relationship with a garden element, while sight, hearing, and smell are distance senses, as they can be used over a distance [32]. Considering that sensory gardens are spaces where relations with garden elements should be very close and user activity is desired in many cases, many stimuli are perceived by both passive and active contact with garden spaces, as they can be actively triggered by the user.

In the case of level IV, the garden's full potential is not utilized, and short stays do not allow one to enter into a deep relationship with the space. However, there is active and close contact with the garden in such cases. Level V signifies the deepest relationship with a garden, which is multidimensional and can affect multiple senses.

Table 3. Perception of specific types of stimuli that affect the five human senses.

Stimulus	Sense	Sense Depending on Stimulus Perception as Defined by McLinden and McCall [36]	Stimulus Perception by a User in a Sensory Garden
Images	Sight	distance sense	Typically passive—P
Sounds	Hearing	distance sense	Passive and active—P and A
Smells	Smell	distance sense	Passive and active—P and A
Surface structures	Touch	close sense	Typically active—A
Flavors	Taste	close sense	Active—A

3.2. Examples of Sensory Gardens That Allow for Deep Garden-User Relationships

In the case of the deepest garden–user relationships, i.e., those at level V, based on observing sensory garden user behaviors, we identified and specified the activity types in a specific physical garden environment that may lead to its deep impact. It is clear that deeper garden–user relationships engage more than one sense, which leads to building multidimensional relationships. In each of these cases, active senses were mentioned in a specific sequence, starting with those whose stimulation is the highest in a given case. It was observed that different senses came to the fore in terms of nourishment in different cases, as opposed to the same senses in each case. The senses most stimulated in a given space of the garden could be both close and distant senses (Table 4).

Table 4. Sensory gardens or gardens with sensory features in which deep relationships with garden space was observed: in Poland and in countries with predominant Anglo-Saxon cultural influences.

Multidimensional Garden-User Relationships Based on Observed Behaviors	Cases of Sensory Gardens	Applied Specific Solutions (Attributes) to Enable a Deeper Relationship with the Garden	Senses Involved in Receiving the Garden (Leading Senses—Thick Font)
(1) Relationship with a sensory garden space as experienced by a child at play	- Sensory garden at the Franciscan Center located at the Church of the Order of St Bernard—LEŻAJSK (POLAND)	- Colorful, moving elements—hanging colorful umbrellas over the sensory path and hanging, colorful ribbons, e.g., in the gate dividing the garden space into two parts; colorful butterflies on the garden wall - Mirrors of various sizes and shapes on the wall—they reflect the interior of the garden, as well as the viewer, and can give the effect of "light reflections of the so-called hares"; surface contrast: rough wall and smooth mirrors - Café by the garden with seating in the garden interior, for the caregivers of children	CHILDREN: **sight**, **touch**, hearingGUARDIANS: **taste, smell, sight**
	- Children's play garden with features of a sensory garden, Jordan Park—KRAKOW (POLAND)	- A fountain at ground level, spouting water upwards, at different heights and at different rates, from nozzles hidden in the pavement - Sand and water garden for manual play - Water devices requiring activity to trigger them, such as squatting - A plant maze of medium-height hedges	CHILDREN: **touch, hearing, sight, spatial orientation** GUARDIANS: no special sensory elements for this group
	- Children's play garden with sensory garden features, Royal Baths—WARSAW (POLAND)	- Sand and water gardens with pumps for sensory play - Water devices requiring activity—in the form of mushrooms that eject water when pressed, and a shallow stone channel through which water flows - Sound squares made of rubber that make sound when jumping - A hill covered with grass for rolling or sliding	CHILDREN: **touch, hearing, sight** GUARDIANS: no special sensory elements for this group
	- Gardens of the Bernardine Fathers with features of a sensory garden—RZESZÓW (POLAND)	- Gazebo in the middle of a square pond with fountains, overgrown with vines, with a bridge leading from each of the four sides - Plant pattern—a maze, with paths strewn with gravel; patterns of low hedges form a sort of labyrinth; paths between them strewn with rustling gravel	**hearing, sight,** touch

Table 4. *Cont.*

Multidimensional Garden-User Relationships Based on Observed Behaviors	Cases of Sensory Gardens	Applied Specific Solutions (Attributes) to Enable a Deeper Relationship with the Garden	Senses Involved in Receiving the Garden (Leading Senses—Thick Font)
(2) Interactions with the garden of a participant in horticulture and gardening classes	- Sensory garden in the Piaski Nowe housing estate—KRAKOW (POLAND)	- A large wooden activity table in the middle of the garden; it is shaded by a fabric sail that forms a roof, and the benches around the table are joined by pots containing aromatic herbs; it is surrounded by a garden that has a sensory impact, including through the birds and insects for which it is friendly - Sense of taste guideline: you can taste the raspberry fruit	**touch, smell, sight**, hearing, taste
	- A garden with sensory garden features around Thrive headquarters, Battersea Park—LONDON (UK)	- A separate part of the garden with equipment for hortitherapy classes; special tables for people with disabilities, e.g., in wheelchairs; there are also appropriate tools and equipment; qualified staff in the field of horticultural therapy and volunteers are available - Part of the garden with colorful flowerbeds; many plants that stimulate the sense of sight, smell, and hearing	**touch, sight, smell,** hearing
(3) Relationships with a garden space as experienced by a garden café or restaurant user present in its vicinity	- A garden with the characteristics of a sensory garden at the J. Czapski Museum—KRAKOW (POLAND)	- The café opens onto the garden and is equipped with a wooden terrace in the garden space (Figure 4) - The garden is surrounded by building walls and a garden fence which create a peaceful environment, isolated from the bustle of the city - The possibility of picking and tasting aromatic herbs in tall containers - A meeting place usually for small groups	**taste, smell, sight,** hearing, touch
	- Pocket garden—NEW YORK (UNITED STATES OF AMERICA)	- Café in a garden space, chairs can be arranged as desired - The garden, surrounded by high walls, creates an isolated environment - A large waterfall creates a highly impactful sensory element in the garden while drowning out the sounds of the urban environment	**taste, smell, hearing,** sight, touch

Table 4. *Cont.*

Multidimensional Garden-User Relationships Based on Observed Behaviors	Cases of Sensory Gardens	Applied Specific Solutions (Attributes) to Enable a Deeper Relationship with the Garden	Senses Involved in Receiving the Garden (Leading Senses—Thick Font)
(4) Relationships with a garden as experienced by a person who paused for longer in a specific interior of sensory garden	- Sensory garden in the Piaski Nowe housing estate—KRAKOW (POLAND)	- A grassy piece of area with wooden sunbeds, partially covered by dense planting that provides stimuli for the sense of hearing (the rustle of grass, birds singing, crunching gravel); the possibility of staying longer in the garden, lying on a sunbed or directly on the grass (Figure 5) - A wigwam made of willow sticks for children's games: right next to the meadow; possibility to stay there with one's family	**touch, hearing**, smell, sight
	- "Secluded Garden" sensory garden at the Royal Botanic Gardens, Kew—LONDON (UK)	- Seating areas in various secluded areas of the garden: 1. − (a) A wooden chair among bamboo bushes—allows individual sensory experience 2. − (b) A hedge arbor with a fountain in the middle - A guideline for the sense of hearing: keep quiet so that sound stimuli, for example, are better heard	**hearing, sight, touch**
	- Pocket garden—NEW YORK (UNITED STATES OF AMERICA)	- Seating areas near the waterfall; chairs can be rearranged to any location; this allows for strong isolation from both the urban environment and others in the space	**hearing, sight, touch**, smell
(5) Interaction with the garden of a person who passes through the interior or a path that strongly nourishes the senses	- Greenhouse in the park near the castle with strong sensory impact—Potocki Castle Museum—ŁAŃCUT (POLAND)	- Equipment that periodically disperses a water mist under the ceiling of a low greenhouse, providing an extraordinary sensory experience - Eye-catching colors, shapes, and orchid flowers of different sizes - Large variety of flower fragrances of different orchid species, many interesting and surprising fragrances	**sight, touch** or **sight, smell, hearing,** touch
	- Thyme path in a garden that references the Renaissance Garden by Marcin of Urzędów—SANDOMIERZ (POLAND)	- The path is made of stones and the smell of trampled thyme growing between them is very intense and has a surprising effect	**smell, sight,** touch

Table 4. *Cont.*

Multidimensional Garden-User Relationships Based on Observed Behaviors	Cases of Sensory Gardens	Applied Specific Solutions (Attributes) to Enable a Deeper Relationship with the Garden	Senses Involved in Receiving the Garden (Leading Senses—Thick Font)
(5) Interaction with the garden of a person who passes through the interior or a path that strongly nourishes the senses	- Sensory garden in the urban park—PODDĘBICE (POLAND)	- A waterfall for walking under, the water suddenly stops flowing when somebody approaches the waterfall (Figure 6) - Walls with different textures, especially the walls with flowing water stimulate the senses	**sight, hearing** or **sight, hearing, touch**
	- Garden of scents "Zapachowo" in the S. Lem Garden of Experiences–KRAKÓW (POLAND)	- An insect house in the shape of a large, colourful hive open at the front, where many bees fly, gives the effect of surprise - Patches of aromatic plants, along the path near the insect house, give an intense smell on warm days	**sight, hearing, smell**
	- Labyrinth of the senses on the "Alice trail" at the "Marszewo" Forest Botanical Garden—GDYNIA (POLAND)	- A path in the form of a labyrinth with walls formed by tall pots with plants with colorful and often aromatic species	**sight, smell, spatial orientation,** touch, hearing
	- Music Garden—TORONTO (CANADA)	- A colorful flowerbed resembling a whirlpool; it is created with tall grasses, and colorful flowering perennials; the shape of the flowerbed and the colors give the effect of visual surprise and auditory stimulation (noise of grass leaves, buzzing of insects) - A music gazebo with stairs in the form of an amphitheater; intimate music concerts in a garden setting are possible here; and a grass staircase created as a reverse amphitheater (the stage is on top) is directed towards open vistas of Lake Ontario, framing the view with greenery	**sight, hearing** or **hearing, sight**

Figure 4. Garden at the J. Czapski Museum is attractive even in wintertime. A wooden terrace in the background of the picture (2022).

Figure 5. A grassy piece of area with wooden sunbeds in the sensory garden in the Piaski Nowe housing estate in Kraków (2020).

Figure 6. A waterfall for walking under in a sensory garden in an urban park in Poddębice (Poland) (2023).

The examples presented here show that it is possible to apply such specific solutions to create the right environment in the garden space, one that enables the potential of such gardens to be used in the right way, i.e., to nourish the senses (Table 4; Figure 7). These are, therefore, illustrations of good design practice in the creation of sensory gardens, as these gardens, as our research found, have the characteristics needed to establish a deeper relationship between the user and the garden.

In our opinion, when establishing deeper relationships with the environment, it is irrelevant which senses are nourished and whether they are close or distant senses. It should be noted, however, that often in the case of a deep relationship, there will be more intense nourishment of usually two or three senses at the same time. We named the senses that are most strongly stimulated in a given environment as leading, and those that will be less strongly stimulated as supporting and those that will not be stimulated at all as absent, as shown in Figure 8.

3.3. Users of Urban Sensory Gardens

A well-designed sensory garden should be tailored to the audience that is most likely to use it in a given urban area. Our research found that, considering specific urban activity zones, the main audiences for urban, publicly accessible sensory gardens are city residents, but not exclusively, as a large proportion of sensory gardens can also be visited by tourists. Some sensory gardens are created in areas where this group will form the majority of the garden's user base. Our research found that it is also possible for this group to enter into a deep relationship with an urban sensory space.

Local residents, as sensory garden users, are a very diverse group, both in terms of age and needs: children needing to move and play, children and adolescents aiming for education, young people with special needs, people working in the city center, residents of housing estates, people looking for recreation in an urban green environment, or older people who need group activities (Figure 9). Each of these subgroups expects slightly different design solutions from a sensory garden.

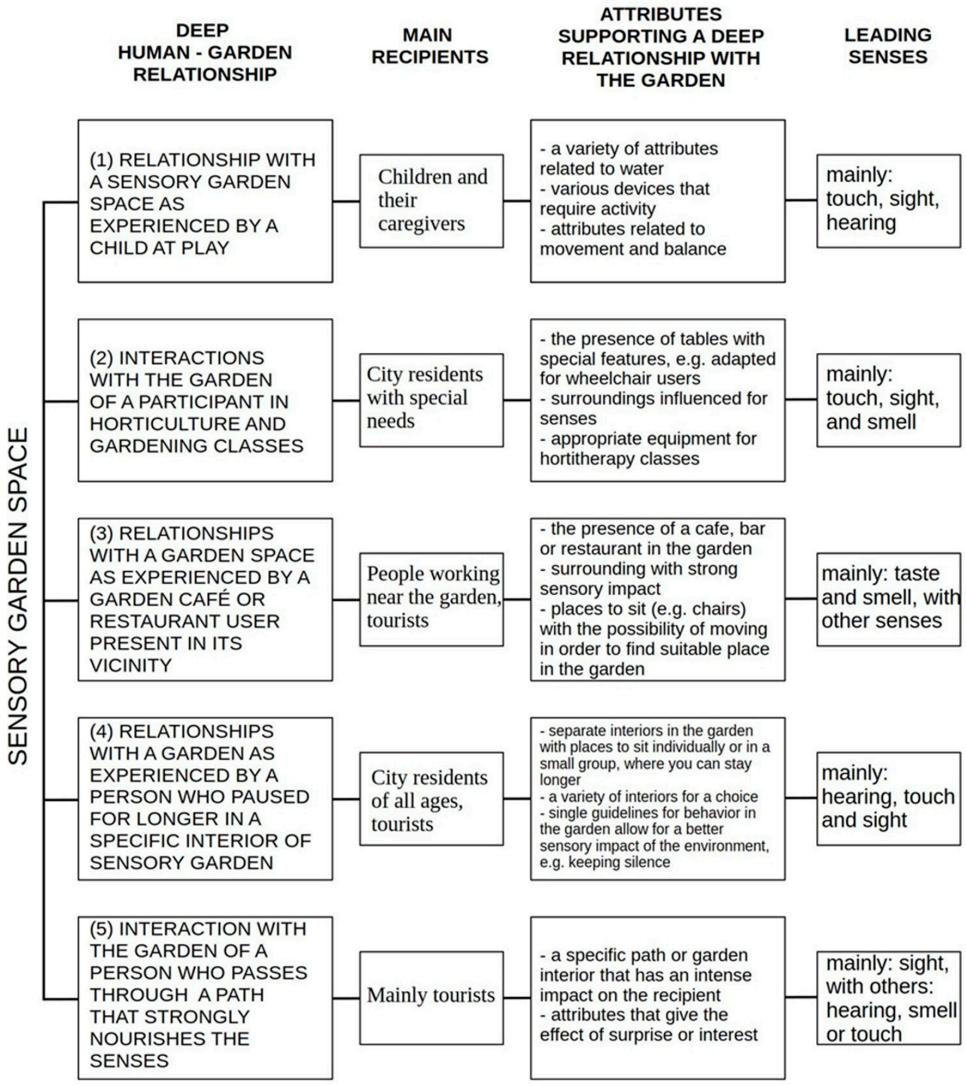

Figure 7. Summary of the second stage of research presented in the form of a graph.

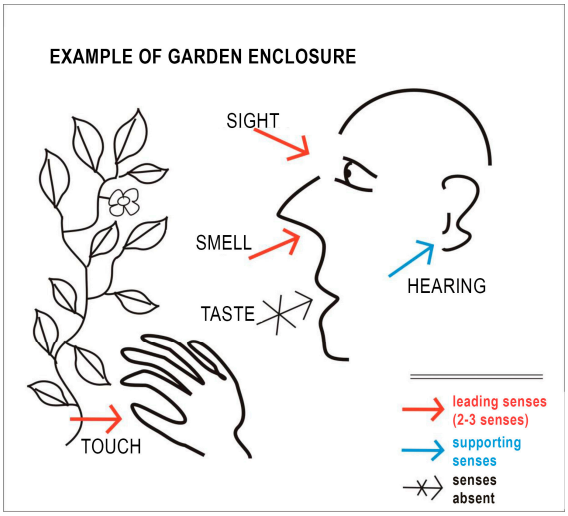

Figure 8. Contribution of the senses to the perception of a specific enclosure of the sensory garden. Graphic representation of the impact on the viewer of a specific, selected exemplary garden enclosure. As a result of stimuli in a definite garden environment, takes place the nutrition of the recipient's body and a specific relationship with the garden is formed.

Figure 9. A large wooden activity table in the middle of the sensory garden for example for older people who need group activities (2020).

Tourists are also users of urban sensory gardens. As a group they are characterized by the need to explore, so they want to see many of the sites of interest to them in a particular city. In terms of basic needs, this group can be considered more homogeneous than residents. The sensory gardens they visit are typically located in area zones with the following: museums, religious and secular cultural monuments, as well as areas of interest due to their unique natural surroundings or intriguing landscaped greenery, such as parks and urban gardens. Tourists, who can be called people on the move, will not benefit from this type of garden space, as their stay in the garden will have to be shorter. People on the move will primarily include tourists, but also people who work in the city. If they fail to find elements in the garden to their liking, their contact with the garden will be cursory and too quick to nourish their senses. Based on the examples analyzed, we concluded that for this group it will be important to either satisfy some additional need to keep them in the space for a more extended period, or to have a specially designed path or some part of the garden that intensively nourishes the senses, where an important feature will be a surprise effect that can lead to a greater openness to the garden environment and offer a break from the rush. In the first case, this additional need, which will allow them to pause, will certainly be the opportunity to eat in a sensory environment (such as the pocket garden in New York, USA). In the second case, in well-designed existing gardens, there is no shortage of examples of such spaces that both intensively nourish the senses and use the element of surprise (e.g., the orchid greenhouse walkway in Łańcut, Poland).

4. Discussion

4.1. The Depth of the Garden–User Relations—Design Guidelines and the Significance of Sense Groups Involved in Garden Perception

When designing a specific garden of this type, adaptation to specific user groups is, in our opinion, one of the most important guidelines. Although gardens are open to the public, it is necessary to tailor a particular garden to the needs of specific audiences. Designing an urban sensory garden 'for everyone' is difficult [37], does not seem to be an ideal solution for the usually small area of a sensory garden [16], and, based on our research, it does not seem possible that a deeper immersion into the space of a specific garden for each visitor will occur. However, the garden should not have architectural barriers that will be an obstacle for people with special needs [10]. Hussein [20] distinguished the following garden features to be considered when designing sensory therapeutic gardens: safety, accessibility, quantity of sensory features, the quality of these features, the quality of surfaces—soft and hard,

planting, the garden's location within space, especially in relation to a building, aesthetic value, garden maintenance. These are general but important indications that determine the high utilitarian value of any such therapeutic garden layout, also geared to sensory perception. On the other hand, specific design solutions and their precise adaptation to urban audiences will determine which senses will be stimulated most intensively and whether a deeper garden–user relationship and nourishment of the human body will occur. Studies in parks in the US city of Portland, Oregon, found that visitors expressed a need for park greenery elements that clearly stimulate the senses and, consequently, that urban users expected that the plant variety used should be sufficient to stimulate different senses [38]. Creating conditions in the city to stimulate and nourish the senses through greenery and, thus, influence bodily functions can be important for users of urban greenery, and can be implemented in a particular way through the establishment of sensory gardens, tailored so that specific audiences can enter into a deeper relationship with them. Stigsdotter and Grahn [37] noted that a medicinal garden, and in a broader sense a therapeutic garden, should communicate with the viewer through their senses: 'A healing garden must be able to communicate with the visitor on many levels, through sight, smell, hearing, etc.'. Engaging the senses is, therefore, important for the therapeutic impact of greenery on urban users and can lead to their immersion in the garden space, a break from the typical urban environment [39].

Hussein [20] pointed out that sensory gardens belong to a type of gardens where the user should experience the garden up close. Our research confirmed that for a deeper relationship to be established through the different senses, the user needs to get closer, immerse themselves in the garden space. This is possible through the use of specific design solutions, collated by us above, that enable such a close relationship to emerge. Among others, Zajadacz [23], in a listing of sensory garden features, noted that such a garden should stimulate all the five senses. Our research showed that it is important to create specific conditions in individual interiors for a deep perception of the environment using two to three senses as the leading senses. On the other hand, different interiors can stimulate different groups of senses, and the user can make a choice as to in which they would like to stay. As stated, the variety of interiors means that it will be perceived as attractive by more visitors [37].

In a given garden interior, or even in an entire garden layout, it is possible to be nourished only through the distant senses, as exemplified by the musical garden in Toronto, where stimuli are primarily directed towards auditory and visual effects. Cordwell and Evans also argued that it is likely that for people who cannot enjoy other types of green spaces, e.g., parks, being in a garden even passively brings mental well-being [40]. Even exposure to a setting that has the characteristics of a natural environment can itself have a soothing effect [3].

We found that designing a sensory garden in such a way that there is a separation of stimuli so that they separately act on individual senses only makes sense in certain types of sensory gardens, e.g., this may work well in educational gardens. Meanwhile, the accumulation of multiple stimuli in one interior, so that all the senses can be stimulated simultaneously at a given time, may not always work, especially not in gardens in highly urbanized areas, where the city itself generates too many intense and usually negative stimuli [8]. The viewer, located in an urban environment, may, therefore, prefer a low-intensity and selective impact on the senses.

Some, e.g., Pawłowska [24], remarked that design typically considers four human senses, as sensory gardens were originally dedicated primarily to persons with visual impairments. In most of the urban public sensory gardens we surveyed, there was no special focus on this group of people, did not have special features designed for such users, and the sense of sight was equally important as the other senses. However, sensory green spaces designed with a special focus on the visually impaired are developed in cities [23,29].

4.2. Adaptation of the Urban Sensory Garden for Specific Users

Our previous research, carried out in Krakow, highlighted the wide variation in the audience for publicly accessible sensory gardens within a single city [16]. Our current research provided data from a wider area and confirmed our earlier report. Due to their location in specific urban zones, the main addressees of such gardens will be city residents of different ages and with different needs, in addition to tourists.

Our analyses found that one particularly large group that can be expected to form such gardens' user base are children and youth. In addition to learning at school, children also need to learn through a variety of experiences, which can also take place in cities by creating, for example, adventure playgrounds, where they can experience contact with natural elements in the environment and create their own play structures and their own play world [41]. Since children's senses play an important role in these cases, in our opinion a similar role can be fulfilled by well-designed play gardens with sensory gardens features. Examples of which can already be found in Polish cities such as Krakow and Warsaw. Such gardens allow all children to experience playgrounds in an individual, personal way [42]. This fits into the trend of so-called environmental learning [43]. Other types of urban sensory gardens for children and young people are gardens that are primarily geared towards nature-focused education. In Poland, education sensory gardens were the first to be established, among public sensory gardens, not only in cities [16]. We found this type of space in Poland's urban environments in, among other places, the Botanical Garden in Lublin. In the case of cities, there are reports of the role of botanical gardens, e.g., in stress reduction [44], or the beneficial effects on city residents through opportunities to interact with nature [45]. In a big-city environment, visiting urban green spaces provides different types of well-being benefits than strolling outside the city, allowing for a reduction in anxiety [40], as reported in UK-based research. However, in the case of an educational sensory garden, which is a small layout within educational-type gardens, these benefits may be less extensive. This may be due to orientation towards other objects, which affects their size, design, and specialized adaptations, including adaptations for people with visual impairments. In botanical gardens, or arboretums in Poland, the main part of such sensory gardens are well-insolated raised beds, and signage with a wide range of educational content to introduce cognitive value. Educational gardens at children and youth education centers, whose gardens feature correctly prepared programs, e.g., at schools, can bring many different benefits to children [46]. Such gardens can also be sensory gardens at botanical gardens, arboretums, and gardens at national parks.

A special group to which sensory gardens can be addressed are children with visual impairments, who also need a nourishing environment for their senses in urban public spaces. This was demonstrated during a workshop in Krakow, where landscape architecture students worked together with blind children to design sensory elements for an urban park. The workshop showed the need to use different body parts in such a space to receive sensory stimuli in different ways, for example, by inventing instruments that produce sound using the sound of a hand. For example, instruments were invented that produce sound by sitting, jumping, climbing, tugging, hitting, etc. [47]. Some similar solutions were found in the sensory play gardens analyzed, e.g., within the playground in the Royal Baths Park in Warsaw, squares of rubber that make sounds when jumping on them or instruments for hitting with sticks were used. Research conducted in sensory gardens at institutions for children with special education needs in the UK by Hussein [48] pointed to the many benefits of such gardens, including encouraging social contact. Based on the results of the above-mentioned workshop [47], as well as our current research, it can be concluded that sensory play gardens could become a place for the integration of children with and without visual impairments, as they are sensory solutions that both groups could enjoy using together.

In addition to a city's residents, another important group that can visit the various gardens of the senses are tourists because, as we found, many of the gardens investigated are located in tourist zones. Studies on European countries indicate that this group is

keen to use urban green spaces [49]. Tourists use their senses to explore the space they are visiting, and stimulating their senses during a visit has the effect of forming long-time memories of the places they visit, and may even lead to revisiting a particular destination in the future [50]. This type of memory applies both to impressions of wildlife encounters [51] and landscaped greenery in cities, e.g., urban forests [52]. One reason for visiting urban gardens can also be the desire to discover new plant fragrances or experience new tactile sensations, especially in the case of family tourism, where children participate in addition to adults [53]. This view is also confirmed by research conducted in one of the parks located in Canada, where, according to the survey, a large variety of greenery, which can be perceived with the five senses, was important for tourists [54]. Publicly accessible urban sensory gardens can, therefore, fulfill these tasks, important for town visitors.

Sensory gardens in Poland are small-scale green spaces, either stand-alone or located within large areas of urban greenery [16]. Research from Italy shows that small green spaces in cities are visited more often by individual users than larger ones, but it was found that they stay in such spaces for shorter durations [55]. Some sensory gardens situated within larger green complexes, e.g., parks, have surroundings that may be equally attractive to visitors and provide various other experiences. These will also be experiences related to natural elements, composed of greenery and plants not introduced intentionally, such as plants accompanying humans, i.e., synanthropic plants, or even plants spreading as a result of climate warming, including invasive ones [56,57], but also species that are part of the local flora present in city parks [58,59]. Sensory gardens that function as small stand-alone urban layouts should have features that are attractive also to people who are on the move, with less time to spare, and these are the features our research points to. We observed that for those intent on sightseeing, the encounter with a sensory garden was sometimes brief, even in gardens with an interesting composition and a rich set of species. For this encounter not to be merely a superficial experience of the garden, our analysis suggests that two types of solutions can be used. The first is related to the sense of taste and the need to eat a meal. In the case of tourists, this may be a necessity rather than a mere attraction, although this group is sometimes interested in learning about local products or dishes prepared according to local recipes, and, thus, tasting new flavors [60]. The desire to satisfy this need will keep a person in a particular sensory garden interior for a longer period of time, which is possible in those sensory gardens that have some type of food and drink establishments on their premises. For tourists, the dining environment itself is not insignificant and determines their experience, i.e., the way the dishes are served or the acquisition of knowledge about local delicacies or even the preparation of the dishes [60]. There are studies that confirm that not every urban environment positively affects perception, and even factors negatively affecting only one sense can disturb it [61]. In a sensory garden, an environment that stimulates a user's senses during a meal can also determine the reinforcement of positive experiences, e.g., through the sense of smell [11]. This sense also influences positive memory-related impressions [11,62]. The sense of sight is important to sightseers [52], and our research showed that it is often the dominant sense in the perception of the environment when deeper user–garden relationships emerge. The second factor that increases the attention of tourists in gardens with sensory features can be a feeling of positive surprise and, thus, can create a desire for closer inspection in a particular garden or part of it. It is something that can be understood as a surprise, arousing curiosity and interest at the sight of something new and different. Often, tourism literature discusses 'novelty', which is an important feature associated with travel [63]. The impact of the garden will probably be shorter than in the first case, but certainly intense. In both cases, it will be a source of positive impressions, e.g., the satisfaction of a tasty, original meal [60], which certainly improves one's mood. If the user stops and has a positive reception of the garden, it will reduce the intensity of stress caused by the urban environment [8] and fatigue caused by intensive sightseeing. Sensory gardens in cities can act as restorative gardens if conditions that can restore a human body's internal balance can be created [64]. These are places in cities that, due to the needs of people who live or even who briefly stay

in urban space, can become durable fixtures of cities. Sensory gardens can permanently enter the urban greenery system, not only because of their impact on human well-being, but also because:

- many of them are implemented in such a way as to become animal-friendly spaces, and, thus, fulfill some ecological functions and fit in with the ideas of sustainable development [28];
- they can also perform educational or social functions [10].

One of the limitations that may arise when designing urban sensory gardens is the location of a given area in a dense urban development. The space may have unfavorable features that will be difficult to completely eliminate in order to achieve an effect that allows for a deeper relationship between the visitor and the garden. On the other hand, examples of existing sensory gardens can provide inspiration to face various design problems. Street noise is a significant problem in the city environment. It is difficult to eliminate and may significantly affect the sensory perception in gardens.

5. Conclusions

Our work addresses the following issues:

- It offers new ways of researching both existing gardens and emerging garden projects, apart from the most commonly used survey method.
- It highlights the need to specify in detail the recipients of urban sensory gardens, both when conducting research on existing gardens and in the design process. Among them will be residents of the city of different ages and with different needs, people working in the city, as well as tourists.
- It gives examples of groups of attributes that can be used in sensory gardens, which allow establishing deeper relationships between the garden and the recipient.
- It draws attention to the groups of senses we call "leading senses", which, when stimulated in a given garden interior, allow for the establishment of deep garden–recipient relationships.

Our research, as well as further research on urban sensory gardens, will certainly result in a better understanding of these types of gardens and strengthen the need for their presence in urban space. This will determine the durability of the existence of this type of greenery within urban greenery.

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References

1. Harasimowicz, A. Green spaces as a part of the city structure. *Econ. Environ.* **2018**, *65*, 45–62.
2. Haq, S.M.A. Urban Green Spaces and an Integrative Approach to Sustainable Environment. *J. Environ. Prot.* **2011**, *2*, 601–608. [CrossRef]
3. Ulrich, R.S. Health Benefits for Gardens in Hospitals. In Proceedings of the Plants for People, International Exhibition Floriade, Haarlemmemeer, The Netherlands, 6 April–20 October 2002; pp. 1–10.
4. Houlden, V.; Scott, W.; de Albuquerque, J.; Javris, S.; Rees, K. The relationship between greenspace and the mental wellbeing of adults: A systematic review. *PLoS ONE* **2018**, *13*, e0203000. [CrossRef]

5. Alock, I.; White, M.P.; Wheeler, B.W.; Fleming, L.E.; Depeledge, M.H. Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas. *Environ. Sci. Technol.* **2014**, *48*, 1247–1255. [CrossRef]
6. van den Berg, A.; Maas, J.; Verheij, R.A.; Groenewegen, P.P. Green space as a buffer between stressful life events and health. *Soc. Sci. Med.* **2010**, *70*, 1203–1210. [CrossRef]
7. Grahn, P.; Stigsdotter, U. Landscape planning and stress. *Urban For. Urban Green.* **2003**, *2*, 1–18. [CrossRef]
8. Kanelli, A.A.; Dimitrakopoulos, P.G.; Fyllas, N.M.; Chrousos, G.P.; Kalantzi, O.-I. Engaging the Senses: The Association of Urban Green Space with General Health and Well-Being in Urban Residents. *Sustainability* **2021**, *13*, 7322. [CrossRef]
9. Wilson, E.O. *Biophilia*; Harvard University Press: Cambridge, MA, USA, 1984.
10. Wintherbottom, D.; Wagenfeld, A. *Therapeutic Gardens: Design for Healing Spaces*; Timber Press: Portand, OR, USA, 2015.
11. Krzeptowska-Moszkowicz, I.; Moszkowicz, Ł.; Porada, K. Urban Sensory Gardens with Aromatic Herbs in the Light of Climate Change: Therapeutic Potential and Memory-Dependent Smell Impact on Human Wellbeing. *Land* **2022**, *11*, 760. [CrossRef]
12. van den Berg, A.; Hartig, T.; Staats, H. Preference for Nature in Urbanized Societies: Stress, restoration, and the pursuit of sustainability. *J. Soc. Issues* **2007**, *63*, 79–96. [CrossRef]
13. Hussein, H.; Omar, Z.; Ishak, S.A. Sensory Garden for an Inclusive Society. *Asian J. Behav. Stud.* **2016**, *1*, 33–43. [CrossRef]
14. Franco, L.S.; Shanahan, D.F.; Fuller, R.A. A Review of the Benefits of Nature Experiences: More Than Meets the Eye. *Int. J. Environ. Res. Public Health* **2017**, *14*, 864. [CrossRef] [PubMed]
15. Lohr, V.I.; Pearson-Mims, C.H. Children's active and passive interactions with plants influence their attitudes and actions toward trees and gardening as adults. *HortTechnology* **2015**, *15*, 472–476. [CrossRef]
16. Krzeptowska-Moszkowicz, I.; Moszkowicz, Ł.; Porada, K. Evolution of the Concept of Sensory Gardens in the Generally Accessible Space of a Large City: Analysis of Multiple Cases from Kraków (Poland) Using the Therapeutic Space Attribute Rating Method. *Sustainability* **2021**, *13*, 5904. [CrossRef]
17. Zhang, T.; Liu, J.; Li, H. Restorative effects of multi-sensory perception in urban green space: A case study of urban park in Guangzhou, China. *Int. J. Environ. Res. Public Health* **2019**, *16*, 4943. [CrossRef] [PubMed]
18. Zardini, M. Toward a sensorial urbanism. In Proceedings of the Ambiances in action/Ambiances en acte(s)—International Congress on Ambiances, Montreal, QC, Canada, 19–22 September 2012; pp. 1–26.
19. Harries, B.; Chalmin-Pui, L.S.; Gatersleben, B.; Griffiths, A.; Ratcliffe, E. Designing a wellbeing garden' a systematic review of design recommendations. *Des. Health* **2023**, *7*, 180–201. [CrossRef]
20. Hussein, H. Sensory Garden in Special Schools: The issues, design and use. *J. Des. Built Environ.* **2009**, *5*, 77–95.
21. Salisbury, K.V. Enhancing the Experiences of Blind and Visually Impaired Visitors in Botanical Gardens. Master Thesis, Faculty of the University of Delaware, Newark, DE, USA, 2000. Available online: http://udspace.udel.edu./server/spi/core/bitstream/8e079f9d-5bd9-4dfa-ab1c-93918aa03f73/content (accessed on 29 July 2023).
22. Dąbski, M.; Dudkiewicz, M. Przystosowanie ogrodu dla niewidomego użytkownika na przykładzie ogrodów sensorycznych w Bolestraszycach, Bucharzewie i Powsinie. *Teka Kom. Archit. Urban. Stud. Kraj.* **2010**, *6*, 7–17.
23. Zajadacz, A.; Lubarska, A. Sensory gardens as places for outdoor recreation adapted to the needs of people with visual impairments. *Stud. Perieget.* **2020**, *30*, 25–43. [CrossRef]
24. Pawłowska, K. Ogród sensoryczny. In *Dźwięk w Krajobrazie Jako Przedmiot Badań Interdyscyplinarnych, Prace Komisji Krajobrazu Kulturowego PTG, 11*; Bernat, S., Ed.; Polihymnia: Lublin, Poland, 2008; pp. 143–152.
25. Balode, L. The design guidelines for therapeutic sensory gardens. *Res. Rural. Dev.* **2013**, *2*, 114–119.
26. Trojanowska, M. *Parki i Ogrody Terapeutyczne*; Wydawnictwo Naukowe PWN SA: Warszawa, Poland, 2017.
27. Trojanowska, M. The Universal Pattern of Design for Therapeutic Parks. *Methods of Use. Int. J. Sci. Eng. Res.* **2018**, *9*, 1410–1413.
28. Krzeptowska-Moszkowicz, I.; Moszkowicz, Ł.; Porada, K. Znaczenie miejskich ogrodów sensorycznych o cechach przyjaznych organizmom rodzimym, na przykładzie dwóch przypadków z terenu dużych miast europejskich: Krakowa i Londynu. In *Integracja Sztuki i Techniki w Architekturze i Urbanistyce*; Wydawnictwa Uczelniane Uniwersytetu Technologiczno-Przyrodniczego: Bydgoszcz, Poland, 2020; T. 6/1; pp. 61–69.
29. Zajadacz, A.; Lubarska, A. *Ogrody Sensoryczne Jako Uniwersalne Miejsca Rekreacji Dostosowane Do Potrzeb Osób Niewidomych w Kontekście Relacji Człowiek-Środowisko*; Bogucki Wydawnictwo Naukowe: Poznań, Poland, 2020.
30. Wajchman-Świtalska, S.; Zajadacz, A.; Lubarska, A. Recreation and Therapy in Urban Forests—The Potential Use of Sensory Garden Solutions. *Forests* **2021**, *12*, 1402. [CrossRef]
31. Staniewska, A. Obłędne ogrody. In *Terapeutyczne Właściwości Krajobrazu Jako Podstawa Kompozycji Zespołów Szpitali Psychiatrycznych XIX i na Początku XX w*; Wydawnictwo Politechniki Krakowskiej: Kraków, Poland, 2020.
32. Staniewska, A. Gardens of Historic Mental Health Hospitals and their Potential Use for Green Therapy Purposes. *Land* **2022**, *11*, 1618. [CrossRef]
33. Zajadacz, A.; Lubarska, A. Sensory gardens as a new form of urban green space in smart sustainable cities. *Geogr. J.* **2023**, *94*, 125–145. [CrossRef]
34. Hussein, H.; Omar, Z.; Amano, J.; Zakaria, A. Therapeutic sensory simulation garden for a residential care facility, Nozomi-No-Sato, Japan. *J. Archit. Plan. Constr. Manag.* **2022**, *12*, 27–39.
35. Elbasyoni, M.E.M.; Gammaz, S.A. A Qualitative Therapeutic Design Approach for Sensory Garden Design for People with Dementia. *Civ. Eng. Archit.* **2023**, *11*, 2110–2122. [CrossRef]

36. Hussein, H. Affordances of Sensory Garden towards Learning and Self Development of Special Schooled Children. *Int. J. Psychol. Stud.* **2012**, *4*, 135–149. [CrossRef]
37. Stigsdotter, U.; Grahn, P. What Makes a Garden a Healing Garden? *J. Ther. Hortic.* **2002**, *13*, 60–69.
38. Talal, M.L.; Santelmann, M.V.; Tilt, J.H. Urban park visitor preferences for vegetation—An on-site qualitative research study. *Plants People Planet* **2021**, *3*, 375–388. [CrossRef]
39. Ulrich, R.S.; Simons, R.F.; Miles, M. Stress recovery during exposure to natural and urban environments. *J. Environ. Psychol.* **1991**, *11*, 201–230. [CrossRef]
40. Coldwell, D.F.; Evans, K.L. Visits to urban green-space and the countryside associate with different components of mental well-being and are better predictors than perceived or actual local urbanisation intensity Do's and don't children's experiences of the primary school playground. *Landsc. Urban Plan.* **2018**, *175*, 114–122. [CrossRef]
41. Moor, R.C. Compact Nature: The Role of Playing and Learning Gardens on Children's Lives. *J. Ther. Hortic.* **1996**, *8*, 72–82.
42. Thomson, S. Do's and don'ts: Children's experiences of the primary school playground. *Environ. Educ. Res.* **2007**, *13*, 487–500. [CrossRef]
43. Barratt Hacking, E.; Hacking, R.J.; Scott, W. Engaging Children: Research Issues around Participation and Environmental Learning. *Environ. Educ. Res.* **2007**, *13*, 52–544. [CrossRef]
44. Kohlleppel, T.; Bradley, J.; Jacob, S. A Walk through the Garden: Can a Visit to a Botanic Garden Reduce Stress? *HortTechnology* **2002**, *12*, 489–492. [CrossRef]
45. Carrus, G.; Scopelliti, M.; Panno, A.; Lafortezza, R.; Colanelo, G.; Pirchio, S.; Ferrini, F.; Salbitano, F.; Agrimi, M.; Portoghesi, L.; et al. A Different Way to Stay in Touch with 'Urban Nature": The Perceived Restorative Qualities of Botanical Gardens. *Front. Psychol.* **2017**, *8*, 914. [CrossRef]
46. Dyg, P.M.; Wistoft, K. Wellbeing in school garden—The case of the Garden for Bellies food and environmental education program. *Environ. Educ. Res.* **2018**, *24*, 1177–1191.
47. Pawłowska, K. Dźwięk w krajobrazie jako przedmiot badań i środek wyrazu w sztuce ogrodowej i architekturze krajobrazu. *Pr. Kult.* **2012**, *XIII*, 31–56.
48. Hussein, H. Using the sensory garden as a tool to enhance the educational development and social interaction of children with special needs. *Support Learn.* **2010**, *25*, 25–31. [CrossRef]
49. Terkenli, T.S.; Bell, S.; Živojinović, I.; Tomićević-Dubljević, J.; Panagopoulos, T.; Straupe, I.; Toskovic, O.; Kristianova, K.; Straigyte, L.; O'Brien, L. Recreational Use of Urban Green Infrastructure: The Tourist's Perspective. In *The Urban Forest Cultivating Green Infrastructure for People and the Environment*; Springer: Berlin/Heidelberg, Germany, 2017; pp. 191–216.
50. Agapito, D.; Pinto, P.; Mendes, J. Tourists' memories, sensory impressions and loyalty: In loco and post-visit study in Southwest Portugal. *Tour. Manag.* **2017**, *58*, 108–118. [CrossRef]
51. Buckley, R.C.; Cooper, M.-A. Tourism as a Tool in Nature-Based Mental Health: Progress and Prospects Post-Pandemic. *Int. J. Environ. Res. Public Health* **2022**, *19*, 13112. [CrossRef]
52. Shao, M.; Lin, D. A Study on How the Five Senses Are Affected When Tourists Experience Towns with Forest Characteristics: An Empirical Analysis Based on the Data of Fujian, Guangdong and Sichuan in China. *Sustainability* **2021**, *13*, 8283. [CrossRef]
53. Fusté-Forné, F.; Fusté-Forné, M. Urban Gardens as Sustainable Attractions for children in Family Tourism. *Resources* **2021**, *10*, 111. [CrossRef]
54. He, M.; Wang, Y.; Wang, W.J.; Xie, Z. Therapeutic plant landscape design of urban forest parks on the Five Senses Theory: A case study of Stanley Park in Canada. *Int. J. Geoheritage Parks* **2022**, *10*, 97–112. [CrossRef]
55. Chiesi, L.; Costa, P. Small Green Spaces in Dense Cities: An Exploratory Study of Perception and Use in Florence, Italy. *Sustainability* **2022**, *14*, 4105. [CrossRef]
56. Krzeptowska-Moszkowicz, I.; Moszkowicz, Ł. Selected problems of Ailanthus altissima (Mill.) Swingle presence in urban spaces: The case of the city centre of Kraków. In Proceedings of the Plants in Urban Areas and Landscape, Nitra, Slovakia, 14–15 May 2014; pp. 56–62.
57. Sudnik-Wojcikowska, B. The effect of temperature on the spatial diversity of urban flora. *Phytocoen. Suppl. Cartogr. Geobot.* **1998**, *10*, 97–105.
58. Moszkowicz, Ł.; Krzeptowska-Moszkowicz, I. Impact of the public parks location in the city on the richness and diversity of herbaceous vascular plants on the example of Krakow Southern Poland. In Proceedings of the Plants in Urban areas and Landscape, Nitra, Slovakia, 7–8 November 2019; pp. 98–103.
59. Moszkowicz, Ł.; Krzeptowska-Moszkowicz, I.; Porada, K. Relationship Between Parameters of Public Parks and Their Surroundings and the Richness, Diversity and Species Composition of Vascular Herbaceous Plants on the Example of Krakow in Central Europe. *Landsc. Online* **2021**, *94*, 1–16. [CrossRef]
60. Sthapit, E. Memories of gastronomic experiences, savoured positive emotions and savouring processes. *Scand. J. Hosp. Tour.* **2017**, *19*, 1–25. [CrossRef]
61. Zhang, J.; Li, D.; Ning, S.; Furuya, K. Sustainable Urban Green Blue Space (UGBS) and Public Participation: Integrating Multisensory Landscape Perception from Online Reviews. *Land* **2023**, *12*, 1360. [CrossRef]
62. Waskul, D.; Vannini, P.; Wilson, J. The Aroma of Recollection: Olfaction, Nostalgia, and the Shaping of the Sensuous Self. *Senses Soc.* **2009**, *4*, 5–22. [CrossRef]

63. Blomstervik, I.H.; Olsen, S.O. Progress on novelty in tourism: An integration of personality, attitudinal and emotional theoretical foundations. *Tour. Manag.* **2022**, *93*, 104574. [CrossRef]
64. Westphal, J.M. Hype, Hyperbole, and Health: Therapeutic site design. In *Urban Lifestyles: Spaces, Places People*; Benson, J.F., Rowe, M.H., Eds.; Brookfield A. A. Balkema: Rotterdam, The Netherlands, 2000.