



Greening for meaning: Sense of place in green citizen initiatives in the Netherlands

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ABSTRACT

Increased global urbanisation has progressively disconnected humans and nature, resulting in public health challenges. Green citizen initiatives (e.g. food forests or community gardens) have the potential to reconnect people with nature and provide a source of meaning in life. This mixed methods study aimed to understand the meanings attributed to green citizen initiatives by using the concept of sense of place and to investigate which factors predict this sense of place. Surveys ($n = 130$) were used alongside interviews with 38 participants of ten green citizen initiatives in the Netherlands. Findings demonstrate a strong sense of place among participants in the green citizen initiatives, which was significantly predicted by meaningful experiences, sense of safety within the initiative and length of involvement. Participation in green citizen initiatives appears to create meaning across and beyond the three dimensions of sense of place – place attachment, place identity and place dependence – and, additionally, a broader societal meaning of place. Findings imply that green citizen initiatives are valuable assets for health and wellbeing.

1. Introduction

Global urbanisation has reduced access to green space and caused a progressive disconnect between humans and natural environments (Ives et al., 2018). This is profoundly concerning as it threatens both human and environmental health (Pritchard et al., 2020; Zylstra et al., 2014). In recent years, however, we have seen growing awareness of the value of green space in cities: urban green space contributes to a reconnection with nature and promotes health and biodiversity. In the Netherlands, this awareness has resulted in a trend to bring nature back into the city (Van Montfort & Michels, 2020).

In this study, we focus on one specific element of this trend: green citizen initiatives. We understand green citizen initiatives as bottom-up initiatives linked to specific physical places where citizens have started, are in the lead or take a central role in creating, improving or managing green space (Derkzen et al., 2021; Mattijssen et al., 2015; Van Dam et al., 2019). They are often located in the middle of a neighbourhood, where vacant lots or former schoolyards are being transformed into green spaces. Examples are community gardens, food forests and urban agriculture. Green citizen initiatives have social, health and environmental benefits and are characterised by active involvement of volunteers and local engagement (WHO, 2017).

Numerous studies have shown positive relationships between green spaces and health outcomes (e.g. De Vries et al., 2003; Hartig et al., 2014; Lee & Maheswaran, 2011; Van den Berg et al., 2015). Green spaces are associated with a decreased risk of chronic diseases (James et al., 2015; Jimenez et al., 2021; Van den Berg et al., 2015), provide opportunities for physical activity, and can have stress-reducing and restorative effects (Wendelboe-Nelson, 2019; Young et al., 2020). Through social interactions and shared experiences, green citizen initiatives foster social cohesion and a sense of place, which are concepts known to benefit our health (Eyles & Williams, 2008; Jennings & Bamkole, 2019; Turner, 2011).

Given the range of benefits, it is important to explore how green citizen initiatives provide meaning to people. Sense of place is a well-established concept to study people–place relationships and the shaping of meaning. Sense of place is a multidimensional and relational concept that encompasses feelings, beliefs, attitudes, values, symbols and behaviours connected to a particular place (Jorgensen & Stedman, 2001; Shamai, 1991; Tuan, 1977). Sense of place develops through human experiences in a specific place (Masterson et al., 2017), which encompasses an environmental and a social element. In the case of green citizen initiatives, the environmental element can be the type of vegetation present and the social element can be the interaction between

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people (Hidalgo & Hernández, 2001; Stedman, 2003).

Sense of place has been explored by researchers in a variety of disciplines, including environmental psychology, human geography, sociology, health studies and urban studies. This has resulted in a plethora of terminologies, approaches and methods (Nelson et al., 2020). Regarding terminology, sense of place could be thought of as an overarching concept under which several place-related terms reside, such as place attachment, place identity, place dependence, place satisfaction, rootedness and belonging. Among these, three components – place attachment, place identity and place dependence – consistently appear in the literature, presented by Jorgensen and Stedman (2001; 2006). Place attachment, the affective component, is defined as an emotional connection between a person and a place. Place identity, the cognitive component, is a person's sense of identity into which a place becomes incorporated (Proshansky et al., 1983). Place dependence, the behavioural component, is defined as a person's evaluation of how well a place enables goal achievement, given a range of alternatives (Jorgensen & Stedman, 2001). As Jorgensen and Stedman (2006) pointed out, understanding the affective, cognitive and behavioural dimensions of sense of place allows researchers to better “explore the potential for complexity in the concept” (p.371).

Broadly speaking, research on sense of place can be divided into quantitative and qualitative research. Quantitative research uses methods to investigate sense of place in quantifiable terms and to identify its relationship to external factors, such as length of stay, social ties and sense of safety (Lewicka, 2011). Qualitative research uses methods to explore the deeper meanings and lived experiences of people in places (Raymond et al., 2017). Masterson et al. (2017) argue that these two strands ought not to be seen as oppositional, but rather complementary, as each provides insights that can be conjoined. To create a rich understanding of sense of place in the context of green citizen initiatives, the present study therefore combines quantitative and qualitative research methods.

Previous studies on sense of place have used diverse research settings, such as neighbourhoods, homes, recreational places and different types of green spaces, including wilderness areas, public green spaces and community gardens (Žlender & Gemin, 2020). Citizen science initiatives have also been research settings for sense of place (Haywood et al., 2020). However, to date, no studies have specifically focused on sense of place in green citizen initiative settings. In order to move beyond the limitations of small-scale qualitative studies localised to single sites, the present study aims to explore sense of place at multiple sites ($n = 10$) and to investigate its relationship to external factors. This is the first study to combine the qualitative exploration and quantitative assessment of sense of place using the three-component model by Jorgensen and Stedman (2001; 2006) in green citizen initiatives or comparable settings.

2. Methods

2.1. Research design

Sense of place was explored among participants in green citizen initiatives in the Netherlands through a survey ($n = 130$) and semi-structured interviews ($n = 38$). A convergent parallel mixed methods design was used (Creswell & Plano Clark, 2017; Supplementary Figure 1). Quantitative and qualitative data were collected and analysed separately, and the results were then paired to identify areas of convergence and divergence. This methodological triangulation provided comprehensive data and increased validity and understanding (Ivankova & Creswell, 2009). The three-component model posited by Jorgensen and Stedman (2001; 2006) was used to conceptualize sense of place. First, a survey was distributed among participants in green citizen initiatives to examine the strength of sense of place and the possible predictors of that strength. Second, participants were interviewed to gain insight into their experiences in the initiatives and to explore the

meaning of sense of place. All data collection, analysis, and interpretation was conducted between October 2021 and March 2022. Approval from the Social Sciences Ethics Committee of Wageningen University and Research was obtained prior to conducting the study, and all participants gave their informed consent.

2.2. Research context

The study area comprised ten green citizen initiatives in Arnhem and Nijmegen, two medium-sized cities in the Netherlands. These initiatives were selected as part of the PARTIGAN (Participatory Greening of Arnhem and Nijmegen) research project, based on the following criteria:

- the initiative has a garden or is connected to a garden;
- the initiative was started and is run by citizens;
- the initiative is linked to a place that is located in an urban neighbourhood;
- the initiative offers diverse activities;
- the initiative has volunteers, gardeners, cooks and/or regular visitors;
- the initiative is interested in participating in the PARTIGAN research project between 2020 and 2022 (Derksen et al., 2021).

Table 1 gives an overview of the ten initiatives and their main characteristics. Figs. 1 and 2 show the location and a photograph of each initiative included in this study. The classification of initiatives (A-F) in Table 1 corresponds to the letters in Figs. 1 and 2.

2.3. Survey

2.3.1. Materials

The survey (Supplementary File 1) comprised 22 closed questions to investigate the strength of sense of place and the possible predictors of that strength. The strength of sense of place was measured with the validated sense of place scale (Jorgensen and Stedman, 2001). This scale contains three subscales, each representing one of the three dimensions of sense of place (place attachment, place identity and place dependence). Each subscale comprises four items, leading to 12 items in total (Table 2). The survey items were tailored to the context of green citizen initiatives. For example, an item on place dependence from Jorgensen and Stedman (2001) was: ‘For the things I enjoy doing most, no other place can compare to my lake property’. In this study's revised version, the item states ‘For the things I enjoy doing most, no other place can compare to the initiative’. All items were translated into Dutch.

Six factors thought to predict the strength of sense of place were explored in the survey. These were identified in a literature review by Lewicka (2011), and these are: *length of involvement*, *frequency of involvement*, *length of stay*, *meaningful experiences*, *social ties* and *sense of safety*. Regarding *meaningful experiences*, it should be noted that this predictor is somewhat distinctive from the others as meaningful experiences are shaped by one's motivation to participate, one's personal background and one's values, such as social rootedness and affinity with nature (Ong et al., 2019). To design the questions on the above-described predictors, the study by Lewicka (2011) was used. General questions on participants' involvement were based on a survey on the health and wellbeing benefits of participation in the same initiatives as included in this study (Derksen et al., 2021). The survey did not collect any sociodemographic data, because of practical and ethical reasons. The need for disclosing privacy-sensitive information, the expected extra time investment for filling out the survey and how that time and effort could be fitted within participants' activities (as we collected data during their activities) were foreseen as barriers to participation. It was important that taking part in the survey was easy and accessible.

2.3.2. Data collection

The survey was distributed both on paper and digitally among

Table 1
Overview of the green citizen initiatives and their main characteristics.

Initiative	Type	Number of volunteers	Place size	Location in the neighbourhood	Number of surveys completed	Number of interviews conducted
A	Food forest	5	1 hectare	Outskirts	1	1
B	Urban agriculture	100	1.5 hectares	Outskirts	29	6
C	Community garden	20	500 m ³	Middle	11	4
D	Community garden	3	800 m ³	Middle	3	2
E	Food forest	25	2.7 hectares	Outskirts	12	4
F	Community centre with connection to garden	100	-	Middle	9	1
G	Community garden	20	800 m ³	Middle	6	7
H	Community centre with garden	20	300 m ³	Middle	11	2
I	Community garden	30	500 m ³	Middle	13	1
J	Community gardens and kitchens	50	1.6 hectares over four gardens	Middle	35	10



Fig. 1. Location and photographs of the green citizen initiatives in Arnhem.

participants in the ten green citizen initiatives. Participants included predominantly volunteers ($n = 88$) and visitors ($n = 33$), plus a small number of professionals ($n = 9$). Volunteers were people who voluntarily spent their time in the initiative by actively contributing through one or more activities, such as gardening, cooking, doing chores or making coffee and tea. Visitors were people who stopped by the initiative site to look around, to take a walk or to sit down for a meal without having a specific role in the initiative. Professionals were people who were involved in the initiative as paid workers, either as coach or intern to support participants in activities. These three groups of participants were included to understand what the initiatives mean to people being involved in different ways. All participants were included regardless of their gender, age, level of education, activity or any other characteristic. The survey was pilot-tested in two different initiatives included in the study to ensure that the questions were clear and accessible. No adjustments were necessary. During field visits, the researcher brought the survey on paper and a printed QR code. Coordinators of the initiatives also helped to distribute the survey among participants. Furthermore, the survey was digitally distributed by the coordinators via WhatsApp, Facebook groups, email or newsletters. Of the 130 completed surveys, 83 were filled out offline and 47 online. It took respondents five to ten minutes to complete the survey. Prior to starting the survey, each respondent received an information page to read, informing them that their data would be handled confidentially.

2.3.3. Data analysis

The survey data were statistically analysed using IBM SPSS Statistics

26. The sense of place items were rated on a five-point Likert scale ranging from 'strongly disagree' (scored as 1) to 'strongly agree' (scored as 5). Item 9 was reverse coded. The mean and standard deviation were calculated for each item, subscale and total sense of place scale. The mean reflects the strength of sense of place. In the literature, there is no standard to determine when sense of place can be called strong. Lewicka (2011) reflected on strength and explained strong scores as scores that fall above the arithmetic average of the scale. In this study, we applied this guideline and considered sense of place to be strong when the score was above the arithmetic average of three and weak when the score was below three.

Additionally, a multiple linear regression was conducted to test the relationship between sense of place (dependent variable) and the six predictors (independent variables). To analyse sense of place more deeply, we also used the three dimensions as dependent variables. The mean and standard deviation were calculated (numerical data) for four of the six predictors (*length of stay*, *meaningful experiences*, *social ties* and *sense of safety*), and the median was calculated (ordinal data) for two predictors (*length of involvement* and *frequency of involvement*). Furthermore, sense of place data were disaggregated by participant group (professionals, volunteers, visitors) and a Kruskal-Wallis Test was conducted to identify whether sense of place differed between these groups. Finally, an independent samples t-test was conducted to identify whether sense of place differed among participants depending on the activities they performed in the initiative. We categorised the activities based on the answers given to the question 'What activities do you do here [in the initiative]?' (Supplementary File 1, question 5) into green



Fig. 2. Location and photographs of the green citizen initiatives in Nijmegen.

Table 2
Sense of place items, composed by the authors, adapted from [Jorgensen and Stedman \(2001\)](#).

Sense of place dimension	Item description
Place attachment	1. I feel at home in the initiative. 2. Participating in the initiative makes me feel happy. 3. I feel part of the initiative.
Place identity	4. I miss the initiative when I have not been there for a long time. 5. I can be myself in the initiative. 6. That I participate in the initiative says much about who I am. 7. I have the feeling that the initiative is a little bit mine. 8. I have the feeling that the initiative is a part of who I am.
Place dependence	9. I am considering searching for another place for my activities. 10. Participating in the initiative is one of my favourite things to do. 11. In the initiative, I have found what I was searching for. 12. For the things I enjoy doing most, no other place can compare to the initiative.

activities (e.g. gardening, harvesting) and non-green activities (e.g. cooking, making coffee and tea).

2.4. Semi-structured interviews

2.4.1. Materials

The semi-structured interview guide (Supplementary File 2) comprised 24 open-ended questions with sub-questions, divided into two main parts. The first part covered participants' involvement in the green citizen initiative. The second part covered participants' experiences and the meanings they attribute to the initiative, reflecting their sense of place. The interview guide was based on a previously developed interview guide for the PARTIGAN project about the meaning and wellbeing effects of participation in the initiatives. Six additional sense of place questions were developed based on the three-component model by [Jorgensen and Stedman \(2001; 2006\)](#). The semi-structured nature of

the interviews allowed to cover the above-mentioned topics while at the same time leaving flexibility for the interviewees to freely express their thoughts, feelings and ideas on what they considered important.

2.4.2. Data collection

Participants were approached by the researcher or coordinator of the initiative and asked to participate in an interview. Additionally, respondents could indicate in the survey that they were open to being interviewed. In total, 38 interviews were conducted either face-to-face at a location convenient for the participant, such as at the initiative site ($n = 30$), the participant's home ($n = 4$), or by phone ($n = 4$). As the initiative sites were visited by invitation of the coordinators, the researcher was dependent on the time available for conducting interviews. The interviews were held in Dutch and lasted between 10 and 65 minutes ($M = 25$ min.). Prior to the interviews, all participants gave their informed consent to have their interview audio-recorded and

Table 3

Mean scores for 12 sense of place scale items ($n = 130$), composed by the authors, adapted from Jorgensen and Stedman (2001).

Item	<i>M</i>	<i>SD</i>
1. I feel at home in the initiative.	4.4	0.7
2. Participating in the initiative makes me feel happy.	4.3	0.6
3. I feel part of the initiative.	4.1	0.7
4. I miss the initiative when I have not been there for a long time.	3.9	1.0
<i>Place attachment subscale</i>	4.2	0.6
5. I can be myself in the initiative.	4.3	0.7
6. That I participate in the initiative says much about who I am.	4.0	0.8
7. I have the feeling that the initiative is a little bit mine.	3.7	0.9
8. I have the feeling that the initiative is a part of who I am.	3.6	0.9
<i>Place identity subscale</i>	3.9	0.6
9. I am considering searching for another place for my activities. *	4.1	0.9
10. Participating in the initiative is one of my favourite things to do.	3.9	0.7
11. In the initiative, I have found what I was searching for.	3.8	0.8
12. For the things I enjoy doing most, no other place can compare to the initiative.	3.1	0.9
<i>Place dependence subscale</i>	3.7	0.6
<i>Total sense of place scale</i>	3.9	0.5

Note: Items were scored on a five-point Likert scale from 'strongly disagree' (1) to 'strongly agree' (5) with a neutral point (3). Higher scores can be interpreted as higher levels of sense of place.

* This item was reverse coded for inclusion in the summed scales.

transcribed in a confidential and anonymous manner. To thank them for their participation, all interviewees received a fairtrade chocolate bar.

2.4.3. Data analysis

The interview data were coded and analysed using Atlas.ti 9. The data were thematically analysed following the six steps by Braun and Clarke (2006): The researcher (1) became familiarised with the data, (2) generated preliminary codes and (3) categorised codes in overarching themes and subthemes. Next, two researchers (4) reviewed the themes to ensure an accurate representation of the data and (5) further defined and named them accordingly. Finally, (6) four main themes (i.e. place attachment, place identity, place dependence and broader societal meanings) were interpreted and summarised through a narrative summary, which revealed key meanings attributed to green citizen initiatives. The analysis procedure was repeatedly discussed and reflected upon with all authors to ensure trustworthiness of the findings. In the results section, interviewees are cited using pseudonyms.

3. Results

3.1. Survey results

3.1.1. Scale reliability

Reliability coefficients (Cronbach's α) were calculated for the total sense of place scale as well as for the three subscales. The total sense of place scale had good internal consistency ($\alpha = .87$). The subscales (place attachment, place identity and place dependence) were also reliable ($\alpha = .76, \alpha = .75, \alpha = .73$, respectively).

3.1.2. Strength of sense of place

Overall, respondents expressed a strong sense of place (Table 3). The average sense of place score across initiatives was 3.9 out of 5. The data showed that respondents scored highest on the place attachment subscale ($M = 4.2$), followed by place identity ($M = 3.9$) and place dependence ($M = 3.7$). The highest scores on place attachment are reflected by item 1 ($M = 4.4$), where respondents stated to feel at home in the initiative, and by item 2 ($M = 4.3$), where respondents expressed that participating in the initiative makes them feel happy. The lowest score on place dependence is reflected by item 12 ($M = 3.1$), where respondents considered the item 'For the things I enjoy doing most, no other place can compare to the initiative'.

Table 4

Overall sense of place score per participant group.

Participant group	<i>M</i>	<i>SD</i>
Professionals ($n = 9$)	4.5	0.3
Volunteers ($n = 88$)	4.0	0.5
Visitors ($n = 33$)	3.7	0.5

Note: Higher scores can be interpreted as higher levels of sense of place.

When disaggregated by participant group, sense of place was highest for professionals ($M = 4.5$), followed by volunteers ($M = 4.0$) and visitors ($M = 3.7$) (Table 4). A Kruskal-Wallis test showed that sense of place significantly differed between these groups, $\chi^2(2,130), N = 19.18, p < .001$. Post-hoc comparisons using Dunn's method with a Bonferroni correction for multiple tests indicated that all three groups significantly differed from each other in sense of place score.

Respondents also varied in their sense of place depending on the activities they performed in the initiative. An independent samples t-test showed that volunteers and visitors who performed green activities ($n = 74$)¹ such as gardening and harvesting had a significantly stronger sense of place ($M = 4.0, SD = 0.4$) compared to respondents who did not perform such green activities ($n = 47; M = 3.7, SD = 0.6; t = -2.5(119), p = 0.01$).

3.1.3. Predictors of sense of place

Generally, respondents were involved in the initiative for between one and three years (*Mdn*), participated once a week (*Mdn*) and stayed for 3.3 hours each time (*M, SD = 1.4*). Respondents expressed a very high sense of safety within the initiative ($M = 4.4, SD = 0.6$). Meaningful experiences was scored with a mean of 3.9 ($SD = 0.7$), reflecting that respondents experience moments of happiness, connection and goodness in the initiative. Social ties within the initiative was scored with a mean of 3.7 ($SD = 0.6$).

Multiple linear regression analysis was conducted to identify which factors significantly predicted the strength of sense of place. The overall regression was statistically significant (*adjusted R*² = .80, $F(6, 94) = 28.201, p < .001$). Analysis revealed that overall sense of place was significantly predicted by meaningful experiences, sense of safety within the initiative and length of involvement (Table 5). Differences between the three dimensions exist, for example length of involvement predicted place identity particularly well. Interestingly, other factors than the above-mentioned were found to significantly predict the three dimensions of sense of place. For example, social ties within the initiative ($\beta = .22, p = .02$) and length of stay ($\beta = .19, p = .03$) significantly predicted the strength of place dependence. See the supplementary material for the regression results with place attachment, place identity and place dependence as dependent variables (Supplementary Tables 1, 2 and 3).

Table 5

Regression results for respondents' overall sense of place ($n = 130$).

Variable	<i>B</i>	<i>SE (B)</i>	β	<i>T</i>	<i>p</i>
Meaningful experiences	.43	.06	.53	7.27	<.001*
Sense of safety within the initiative	.18	.06	.24	3.36	.001*
Length of involvement	.07	.03	.18	2.71	.008*
Length of stay	.04	.02	1.13	1.83	.071
Frequency of involvement	.06	.04	.10	1.58	.118
Social ties within the initiative	.07	.06	.09	1.16	.248

Note:

* significant at $p < .05$. *R*² adjusted = .80.

¹ Professionals ($n = 9$) were excluded from this analysis because their professional responsibilities bound to the initiatives (whether including or excluding green activities) made their sense of place scores above average.

3.2. Interview results

3.2.1. Place attachment

Feelings of attachment were strongly reflected in respondent narratives, informed by both an environmental and a social element of participating in the initiative. For many, the connection with nature was fundamental, with Emilia reflecting: “It makes me feel very good to be outside and to perceive the cycle of nature. I feel incredibly rich when I harvest a vegetable: a courgette or a cauliflower. Then I feel connected with Mother Earth, with nature.” Sandra enjoyed putting her “hands in the dirt”. Yvette emphasised the beauty of the garden and that “seeing everything grow and blossom is so wonderful.”

This connection with nature made many respondents consider the initiative setting as a health promoting place, bringing physical, mental and social health benefits. For example, Lars noted that he “gets more physical exercise” and “eats more healthily”. Respondents frequently spoke of the garden as a destressing environment that was calm and relaxed and that allowed them to escape from their own worries and the hustle and bustle of the city. Some commented that gardening helped to get rid of tension, as Kirsten remarked: “If I have been busy and I have a lot on my mind, then I can literally discharge into the ground and completely forget what else is going on.”

The social element of participating was another major reason for respondents to feel attached to the initiative. For many, the pleasant atmosphere amongst participants was characterised by “respect for each other” (Anna), “mutual acceptance and appreciation” (Tina) and “a safe space” (Nora). Working together and sharing experiences created a sense of community where people “clicked” (Johanna) and found a sense of belonging to a group. Many respondents emphasised feeling at home in the initiative. Yvette explained: “It is a very nice group of people. I came here and I felt welcome immediately. I remember that I had not done anything yet, but [a fellow participant] suddenly came over with two large courgettes and asked if I wanted to have one too.” Some respondents suggested that this feeling of home arose because the initiative brings together like-minded people with similar interests and values. However, other respondents mentioned enjoying meeting new people with different backgrounds. Either way, respondents perceived initiatives as promoting social connectedness, where social interactions brought most people joy. Bob commented: “People vary in their need for social contact, but there is room for everyone to do whatever they like.” Connections between people were mostly confined to the place, but sometimes they extended beyond the initiative setting to meaningful friendships. Clashes of opinion or conflicts were sporadically mentioned. Most of the time, “they are easily solved by talking clearly to each other” (Valerie).

3.2.2. Place identity

Respondents reflected on the initiatives and how they formed an integral part of how they identified themselves. Many respondents saw themselves as “outdoorsy”, “pro-nature” and a “gardener”, which are identity descriptions that fit with the green citizen initiatives’ character. Several respondents mentioned that growing food, eating fresh produce from the land and sharing it with people has been part of their lives since childhood. References were made to a “lifelong interest” in gardening facilitated through parents and grandparents, with Anna explaining: “I was brought up with vegetable gardening and being outside, so gardening is just part of who I am.”

The initiatives and activities formed a common interest, bringing people together from diverse backgrounds. However, no matter how diverse people’s backgrounds were, all respondents expressed being able to be themselves and “exactly who they are” (Peter). As Johanna reflected, everyone is equal and can learn from each other’s ways of working or looking at things: “There are quite a lot of people with a migration background. And I think that is very nice, working together with foreign people, who also have their own ideas about gardening. That has also been an enrichment.” Some respondents emphasised a

sense of ownership over the initiative. Alice described the garden as “a place I feel responsible for”. Others felt a sense of ownership over a certain part of the initiative, such as Valerie mentioning that “the flowers are sort of my thing.”

It was widely agreed among respondents that the gardens function as learning environments, on a practical, social and personal level. Irene stated: “I learn a lot about gardening. I did not know much about it when I came here, so I keep learning as I go.” Several respondents also mentioned that their interest in gardening, vegetarian cooking and/or sustainability in general has grown since they became involved in the initiative and that they have started to invest more time in these topics in their spare time. Socially, many respondents expressed learning “how to cooperate and consult with others” (Elisabeth). Participating in green citizen initiatives also gave people the opportunity to develop personally, for instance, by “being able to better indicate boundaries” (Lisa) and “gaining self-confidence” (Emilia). Owen said that participating in the initiative is “a learning process not only in the area of cultivation, but also a learning process in the area of being a human.”

3.2.3. Place dependence

In different ways, respondents described the initiatives as embedded in places that enabled them to meet certain needs or goals and undertake desired behaviours, given a range of alternative places. Participation in the initiative provided a valuable reason for respondents to get out of the house and simply “have something to do” (Peter), especially for people who did not have a regular job or were retired. For some respondents, it gave “some stability, something to hold on to” (Emilia). That the initiative provided structure or rhythm in the day or week was frequently mentioned. The initiative can also function as a steppingstone to work. For Daniel, participation in the food forest facilitated “a stress-free environment but also a place where we can practice in a setting similar to that of a paid job.”

Some characteristics of initiatives were regarded as unique, where people could do or find something that they could not elsewhere. For example, Alina said: “I have an upstairs apartment so I cannot go outside in my own garden. [...] To work with plants, with my hands in the dirt and to meet people from the neighbourhood, that is what I come here for.” Others highlighted the area of land available, which enabled them to “experiment and try new things and combinations of crops” (Kirsten). Some respondents noted that, when they started participating in the initiative, they were specifically looking for a place that could help satisfy their needs, such as “being outside in nature where I would feel safe” (Emilia) and “learning about gardening and the [Dutch] language” (Amir).

3.2.4. Broader societal meanings

For many respondents, the initiative also provided meaning on a broader societal level, extending beyond outcomes related to the sense of place framework. Gardens in the middle of urban neighbourhoods were perceived as “great added value to the neighbourhood” (Yvette), with Alina explaining: “This is a mixed neighbourhood where a lot happens, also things that are not so good and that is where the focus quickly comes to lie. So it is also very nice to notice that with this garden there are so many positives in return.” Respondents mentioned feeling fortunate to be able to make a meaningful contribution to their neighbourhood through participation in the initiative. Tom commented that “the garden is for the whole neighbourhood, not only for the volunteers.” Additionally, several respondents emphasised the important contributions that the initiative makes to society. Examples mentioned were providing a place for marginalised groups (e.g. asylum seekers or people with disabilities), engaging in sustainable and organic ways of growing food, and engaging children in learning experiences about where food comes from. Respondents felt proud in being part of the initiative, as Linda said: “I like the idea of real good food, unsprayed, innovative gardening, providing a facility for local residents to eat together in community centres. I think it is amazing that we provide

food for that.”

3.3. Mixed methods triangulation

We observed a strong sense of place in the overall sample. Interviewees predominantly expressed positive meanings, which is consistent with the high scores in the survey. In both survey and interview results, the place attachment dimension was most strongly articulated. In the interviews, respondents further elaborated on the environmental and social nature of these feelings of attachment. Generally, being around nature made respondents feel grounded and relaxed, and social interaction made respondents feel appreciated, respected and belonging to a group. When we stratified the statistical analysis by performance of green or non-green activities, we observed that respondents who performed green activities had a significantly stronger sense of place compared to respondents who did not. In the interviews, however, respondents did not seem to attach greater importance to green when asked about meanings of the initiative. Several different meanings were mentioned and given importance, related to green activities but also related to social interactions or personal development.

Regarding place identity, in both survey and interview results respondents mentioned being able to be themselves and that participating in the initiative says something about who they are. In the interviews, respondents could illustrate how their identity or character traits, such as “being a gardener” or “being eager to learn”, matched the initiative. Regarding place dependence, survey respondents attributed a relatively low score to the item ‘*For the things I enjoy doing most, no other place can compare to the initiative.*’ In the interviews, respondents explained that they enjoy activities at several different places, which helped explain the survey results.

Overall, the interview results revealed that the diverse range of meanings attributed to green citizen initiatives aligns with the three dimensions of sense of place, as addressed in the survey, but also extends beyond these dimensions. Interviewees clearly expressed broader societal meanings, for example related to neighbourhood perception and education. The variety of meaningful experiences shared in the interviews further unravelled the strong relationship between *meaningful experiences* and sense of place from the survey results.

4. Discussion

4.1. Discussion of main findings

The aim of this mixed methods study was to explore sense of place among participants in green citizen initiatives and how this related to external factors. We found that sense of place was both scored and experienced as highly positive among Dutch participants in green citizen initiatives. The sense of place score of 3.9 out of 5 in this study is relatively high but comparable to the study by Nanzer (2004), who found a sense of place score of 4 out of 5 among Michigan’s residents regarding the state and the Great Lakes. Studies that investigated sense of place by using the same scale in Europe and in comparable settings as green citizen initiatives were not found.

The strength of sense of place in our study was found to be significantly predicted by the factors *meaningful experiences*, *sense of safety within the initiative* and *length of involvement*. That *meaningful experiences* was found to be the strongest predictor for sense of place reaffirms that meaningfulness forms the basis of sense of place (Masterson et al., 2017). The found importance of *sense of safety within the initiative* is substantiated by interviewees who explained that feeling safe was a necessary precondition for them to participate in the initiative. That *length of involvement* positively predicted sense of place highlights that longer involvement allows participants to attribute stronger meanings (Tuan, 1977). We found that the other factors (*social ties within the initiative*, *length of stay*, *frequency of involvement*) did not predict sense of

place. However, when differentiating between the dimensions of sense of place, we did observe that these factors (except *frequency of involvement*) were also significant predictors. These survey results complement the review by Lewicka (2011), in which the relationship of factors was mostly examined with place attachment as outcome measure.

Our results largely fit into Jorgensen and Stedman’s (2001) sense of place framework with its three dimensions of place attachment (i.e. emotional connection to place), place identity (i.e. beliefs about the relationship between self-identity and place) and place dependence (i.e. degree to which a place is perceived to underpin behaviour in relation to alternative places). In the current study, place attachment was expressed most strongly, both in the survey and the interviews.

Participants’ emotional connection to the initiative was rooted in a natural and social mechanism. First, connection with nature featured as a source of meaning. Performing activities in and with nature strengthens one’s sense of place, our survey results revealed. Next to that, happy feelings were expressed because of having one’s hands in the dirt and being surrounded by biodiversity and the beauty of nature. Many participants referred to the initiative as grounded in a place where they could express and practice their love for nature. This is consistent with Lin et al. (2018), who claim that love for nature through urban gardening reflects humans’ innate affiliation with nature. Additionally, the natural character of the initiatives was appreciated for providing a restorative environment where participants could escape from their worries and stress but also from urban pressures. This space for restoring in urban community gardens has been well documented in the literature (Bailey & Kingsley, 2020; Clatworthy et al., 2017; Hawkins et al., 2013; Pitt, 2014).

Second, the social contact and sense of community also provided meaning for participants. A sense of belonging to a group of people, an environment that is welcoming and accepting, and sharing knowledge, skills and experiences with each other made the participants feel part of the initiative. Initiatives were noted to be embedded in places where people of both like-minded and diverse backgrounds and interests came together. Participants mentioned that helping each other and working together as a group felt as if they made a collective impact, on community inclusion, food sharing and greening the neighbourhood, for example. This supports existing literature that states that community gardening and community engagement in general increase social capital and social cohesion (Veen et al., 2016; Jennings & Bamkole, 2019; Van Dam et al., 2019; Wentink et al., 2019). However, several authors question whether social connections extend beyond the garden context (Neo & Chua, 2017; Cumbers et al., 2018). Some claim that garden communities are closed and can have an exclusionary effect (Ghose & Pettygrove, 2014), while others claim that garden communities reflect inclusivity and help build social cohesion within the neighbourhood (Firth et al., 2011). Further research is needed to explore green citizen initiatives as inclusive or exclusive settings.

Our results also indicate that participation in green citizen initiatives has implications for place identity. As in the study by Kingsley et al. (2019), participants derived part of their sense of self from the initiatives and their green and social characters. For some, participation awakened earlier, or even childhood memories of gardening and community activities that have shaped their identity throughout life. This aligns with Manzo (2008), who described that places could serve as ‘bridges to the past’. At the same time, the initiative sites appeared to serve as ‘gateways to the future’. Participation fostered further development by supporting people to get to know themselves, their qualities and interests. Ong et al. (2019) also found that sharing knowledge, skills and resources in a garden setting enhances learning, personal growth and self-confidence. Since gaining confidence is linked to building identity (Christiansen, 1999), it is valuable to understand how green citizen initiative settings act as learning environments that shape meanings for identity.

Furthermore, participation in green citizen initiatives can give people a purpose and orientation in life. Some participants depend on this

more than others. This was influenced by their interest, life and employment situation, and activities at other places. Specifically, participants who did not have a regular job, were retired or faced mental health difficulties highlighted the value of the initiatives in providing structure and stability in their daily lives. This supports the notion in the existing literature that green community activities support people in finding and reflecting on their direction in life, and enable participation in society (Kingsley et al., 2019; McGuire et al., 2022). The initiatives provided opportunities for people to do or find things that they were searching for or longing for. Examples were social engagement within a community or a nearby place in nature where there was space for personal development and learning about gardening. This resonates with Dolley's (2020) discussion of community gardens and comparable green community spaces as 'third places': places outside the home and work/school where people spend their time, feel at home and find meaning. In the absence of a work setting for some of our study participants, the initiative setting was even a 'second place.'

While the focus of this study was on participants and the meanings they attributed to green citizen initiatives, the implications of sense of place transcend these boundaries. It was apparent from the interviews that what provides meaning in the initiatives was not only confined to these initiatives. This is the "meaning spill over" (Dunlap et al., 2013). Numerous interviewees described participation in the initiative as meaningful for the neighbourhood or for broader society, for example by contributing to sustainability, education and inclusion. This supports the study by McVey et al. (2018), which stated that community gardening can be a vehicle to addressing issues on a wider societal scale.

This study shows the meaningfulness of green citizen initiatives at different levels. Previous research has recognised sense of place as vital for positive health experiences and outcomes (Eyles & Williams, 2008; Manzo, 2008). Meaningful participation in green citizen initiatives offers a unique avenue to health and wellbeing through, for example, involvement in activities that encourage physical activity, social connection, skills acquisition and relaxation. Green citizen initiatives can therefore be seen as promising health promoting settings. Contrary to expectations based on the review by Lewicka (2011), this study did not find *frequency of involvement* to be a significant predictor for sense of place. So, no matter how frequently you participate in the initiative, you will be able to find meaning and obtain health benefits. Nanzer (2004) explained that it is possible for unique places to evoke meaning after just a single experience.

4.2. Reflection on sense of place framework

The adopted sense of place framework (Jorgensen & Stedman, 2001; 2006) acknowledges sense of place as a multifaceted and holistic concept to study people-place relationships. Deconstructing sense of place into its three dimensions makes it possible to better operationalise and further unravel its complexity. Each dimension discloses diverse meanings attributed to green citizen initiatives, although strong interaction and overlap exist at the same time. We found place attachment to be particularly emphasised over place identity and place dependence, similar to Jorgensen and Stedman's (2001) findings. Part of the explanation could be that place identity and place dependence are more abstract dimensions that people are less consciously aware of (Pretty et al., 2003; Proshansky et al., 1983). Given that there is no commonly agreed standard to determine the strength of sense of place, it is suggested that this matter of difference should be considered in future research.

4.3. Strengths, limitations and recommendations for future research

A strength of this study is methodological triangulation. Converging the survey and interview data provided a rich understanding of sense of place. Further strengths of this study are the large number of respondents and the data collection in the Netherlands, as most previous research in comparable settings was performed in the United States

(Guitart et al., 2012; Kingsley et al., 2019). Additionally, our study shows that it is worthwhile to disaggregate data by participant group as sense of place differed between professionals, volunteers and visitors, respectively. A further strength is that these different groups of participants who performed different activities (e.g. gardening, cooking or eating in a community centre) were included in this study, while most studies include only one type of participant.

Despite these contributions, this study is not without limitations. First, this is a cross-sectional study, which is descriptive in nature and does not allow for conclusion about causality. Second, we did not collect any sociodemographic data that might also play a role in sense of place. Future research could take sociodemographic factors into account. Third, we acknowledge that the set of predictors we used to identify its relationship with sense of place could be further advanced. For example, *meaningful experiences* as a predictor is shaped by one's motivation to be involved in a place and one's personal values and background (Ong et al., 2019). A way for future research to consider such nuances is to use a sequential design in which insights from interviews can help build the survey. Besides, an alternative option to further explore deeper meaning and the experiences that contribute to that is to conduct longer in-depth interviews. Furthermore, we solely included participants who were involved in the initiative. We did not include people who were not involved, who dropped out or who may object to the initiative's presence close to where they live. Our respondents' views were predominantly positive, and it is possible that selection bias occurred. It would be interesting to investigate meanings ascribed to initiatives among those who no longer participate or those who object to green citizen initiatives. We also do not know if participants had pre-existing attachment, identity or dependence related to the initiative prior to their participation in them. Future research could explore the life history method to unravel narratives of human experiences and histories with places at the centre of inquiry, which has been seen as having potential in place-based research (Spooner, 2018). Finally, multiple participants discussed sense of place in the wider context of the neighbourhood. Future research could include the perspectives of non-participating residents to explore the meaning of initiatives in their living environment.

5. Conclusion

The natural places where activities and interactions between people unfold underpin sense of place in green citizen initiatives. They facilitate feelings of attachment, support the development of individual and collective identity, and encourage participants to achieve personal goals. Sense of place is a highly personal and context-dependent concept. Participants of ten different green citizen initiatives in the Netherlands demonstrated a strong sense of place, in which meaningful experiences, sense of safety within the initiative and length of involvement played an important role. Green citizen initiatives provide meaningful places for people, on an individual and societal level. With their bottom-up character, they can be a valuable part of the urban greening trend by effectively restoring the human-nature connection and promoting health and biodiversity. In addition to parks and street greenery, local governments need to broaden their conceptualisation of urban green space to include green citizen initiatives in urban planning and greening strategies.

Ethics statement

Ethical approval was obtained by the Social Sciences Ethics Committee of Wageningen University and Research. Informed consent was obtained from all participants who took part in this research.

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CRedit authorship contribution statement

Mellany N.C. van Bommel: Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Writing – review & editing. **Marthe L. Derkzen:** Writing – review & editing, Supervision, Conceptualization. **Lenneke Vaandrager:** Writing – review & editing, Project administration, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

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