

Reconsidering restorative environments for older adults

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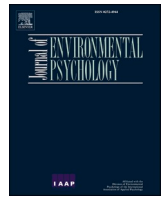
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Reconsidering restorative environments for older adults: How the social context shapes restorative experiences

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ABSTRACT

In this rapidly ageing world, restorative experiences of older adults appear to be a relatively understudied yet critical area of research. Earlier studies showed that age-related changes in physical abilities, sensitivity to environmental stressors, and attention fatigue can impact restorative experiences. In this study, we argue that changing social needs may also play a pivotal role in shaping restorative experiences for older adults. Therefore, a convergent mixed-method study was conducted in the Netherlands to explore the role of the social context in older adults' restorative experiences, focusing on three factors of the social context: the presence of others, the role of social interactions and accompaniment.

Forty semi-structured interviews and questionnaires ($M^{\text{age}} = 79,9$ years) were conducted to gather insights into older adults' restorative experiences within their preferred restorative environment. Findings indicate that older adults predominantly choose social environments that support social interaction for restorative experiences, challenging the idea that restorative experiences are a solitary activity. Furthermore, the results suggest that environments with a few others present enhance feelings of safety and increase compatibility and fascination in the environment, enhancing restorative experiences. Lastly, while accompaniment to restorative environments is not typically required for practical reasons, engaging in tranquil activities with a close companion can enhance the restorative experience for older adults.

These findings underline the importance of the social context in restorative experiences of older adults and call for a refinement of the conventional restoration narrative. Results demonstrate that restorative experiences are not solely determined by an individual's interaction with the environment; they occur within a broader social context. Incorporating the social context in future restoration research will allow for a more comprehensive understanding of restorative experiences. These insights can inform future research, policy making and urban design, promoting the development of inclusive, health-promoting environments that support the mental health of older adults.

1. Introduction

Society is witnessing a rapid increase in the ageing population. In 2050, the global population of individuals aged 60 and older is expected to double to nearly 2.1 billion (WHO, 2022). This demographic shift exerts pressure on social policies, healthcare facilities and how we organise our cities (van Hees, 2017; van Helder et al., 2020). As individuals age, they experience changes in their physical abilities, social needs, and mental health, all of which impact their overall well-being (Garin et al., 2014; Hooymann & Kiyak, 2014). For example, the ageing process alters social relationships, emotional dynamics, and personal

goals, influencing older adults' social health (Carstensen et al., 2003; Nyqvist et al., 2013; Ten Bruggencate et al., 2018). Additionally, older adults are more susceptible to environmental stressors (Evans, 2003) and attention fatigue (Fumagalli et al., 2020; Jansen, 1997). To design healthy living environments for older adults, age-related changes must be considered, and strategies should prioritise their mental, social and overall health through thoughtful environmental design (Aneshensel et al., 2016; Moore et al., 2020; Norstrand et al., 2012; Oswald & Wahl, 2004).

Psychological restoration research could offer valuable insights to address this issue of designing healthy living environments, guided by

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two major theories: Attention Restoration Theory (ART) (Kaplan & Kaplan, 1989) and Stress Reduction Theory (SRT) (Ulrich, 1984; Ulrich et al., 1991). These theories propose that certain environments and environmental configurations, known as restorative environments, can trigger specific psychological and/or physiological recovery processes, also known as restorative experiences (Hartig, 2004; Kaplan & Kaplan, 1989; Staats, 2012; Ulrich et al., 1991). Attention Restoration Theory focuses on cognitive processes suggesting that individuals can restore attention by being in environments that are compatible, fascinating, extensive and allow them to be away to another world (Kaplan, 1995; Kaplan & Kaplan, 1989; Staats, 2012). Stress Reduction Theory focuses on more affective processes, suggesting that natural environmental configurations can reduce stress and negative moods (Ulrich, 1984; Ulrich et al., 1991). Despite these differences, both theories are often used simultaneously to examine mental health effects of restorative environments (Hartig, 2021; Staats, 2012). Together, both theories are referred to as the conventional restoration narrative (Hartig, 2021).

However, to date, psychological restoration research has predominantly involved young adults (Roe & Roe, 2018; Weber & Trojan, 2018, Grave, Neven, & Mohammadi, 2023). Only recently has a small body of research emerged focusing more on older adults' restorative experiences (e.g., Lu et al., 2022; Qiu et al., 2021; Roe & Roe, 2018; Grave et al., 2023). These studies suggest that restorative experiences take place under different conditions for older adults than would be expected from the conventional restoration narrative outlined by ART and SRT (Chen & Yuan, 2020; Roe & Roe, 2018; Scopelliti & Giuliani, 2004, 2006). For example, Jang and Son (2020) found that the factor *fascination* is of extra importance for older adults when judging restorative environments, while younger individuals focus more on *legibility* and *coherence* (e.g., structure and orientation). Furthermore, Scopelliti and Giuliani (2004, 2006) and Fumagalli et al., 2020 found that when the factor *compatibility* is lacking, the restorative potential of an environment dramatically decreases for older adults. Roe and Roe (2018) hypothesise that the factor *being-away* could have a different meaning for older adults; instead of feeling physically away from home, it could be more oriented to being in a similar environment but experiencing something new every time.

Other authors even suggest that factors are missing in the conventional restoration narrative that affect older adults' restorative experiences (Chen & Yuan, 2020; Jansen, 2005; Lu et al., 2022; Roe & Roe, 2018; Scopelliti & Giuliani, 2004, 2006). One such factor is familiarity and emotional attachment to specific places, as suggested by the theory of favourite places (Korpela, 2001; Korpela & Hartig, 1996). In addition to familiarity, other authors suggest that social factors also play a crucial role in shaping restorative experiences. Recent studies by Chen and Yuan (2020) and Lu & colleagues (2022) suggest that the social context could influence psychological restoration in older adults due to the changing social needs. Other research fields also emphasise the growing importance of social connections in later life (Antonucci, 2001; Carstensen et al., 2003; Nyqvist et al., 2013; Ten Bruggencate et al., 2018). According to Socioemotional Selectivity Theory (SST) (Carstensen et al., 2003), as people age, they prioritise emotionally meaningful interactions over exploratory or novelty-seeking experiences. This shift explains why older adults seek out familiar and socially engaging environments for restoration rather than solitary spaces. Fulfilling these social needs enables older adults to live independently for longer, positively influencing mental health, and contribute to healthy ageing (Antonucci, 2001; Ten Bruggencate et al., 2018). In the context of the conventional restoration narrative, we can imagine that a solitary walk in nature may not always be stress-reducing for older adults due to diminished physical abilities, increased fall risk, decreased feelings of safety and feelings of loneliness. The presence of others might positively impact the restoration process of older adults (Hartig, 2021; Staats & Hartig, 2004). This contradicts current restorative research, which indicates that the presence of others often has a negative effect on restorative experiences (Hartig, 2021; Korpela & Staats, 2021). In the conventional restoration narrative, the presence of others is considered a

cause of resource depletion because social interaction demands attention and can enhance stress, negatively affecting restoration (Von Lindern et al., 2022). By contrast, solitude can provide opportunities for reflection, to clear one's mind and to be separate from immediate social demands (Korpela & Staats, 2021; Wohlwill, 1983), leading to positive effects that reduce stress and attention fatigue through psychological restoration (Hartig et al., 2014; Korpela & Staats, 2021). Restorative environment literature emphasises that environments are particularly effective in offering psychological restoration when individuals are in the restorative environment alone (Hartig, 2021; Von Lindern et al., 2022). Consequently, much of the current research on psychological restoration has focused on this individual context with limited exploration of the social context (Hartig, 2021). However, it is important to recognise that people are social beings who find themselves frequently in spaces where others are present, especially in our rapidly urbanising world.

In recent years, there has been growing recognition of this potential role of the social context in restorative experiences (e.g., Bornioli et al., 2025; Korpela & Staats, 2021; Reece et al., 2024; Staats & Hartig, 2004; Thwaites et al., 2011). Notably, Staats and Hartig have explored in different works the role of social context within restorative experiences (Hartig, 2021; Staats et al., 2010; Staats & Hartig, 2004), contributing to an emerging body of literature that examines how the presence of others impacts the psychological restoration process. Several studies indicate that the presence of non-threatening individuals (e.g., friends or family) without overcrowding can enhance restoration through increased perceived safety (Hooyberg et al., 2022; Korpela & Staats, 2021; Neale et al., 2021; Nordh et al., 2011; Staats & Hartig, 2004). However, these studies have primarily involved younger adults, leaving a gap in understanding how social context influences the restorative experiences of older adults. To our knowledge, no studies have specifically addressed this topic in the ageing population, though it is plausible that the social context plays a significant role in older adults' restorative experiences (Chen & Yuan, 2020; Lu et al., 2022).

Therefore, we conducted a mixed-methods study to answer the research question: What is the role of the social context in restorative experiences of older adults? The social context refers to situational conditions or circumstances in people's social environment. These conditions, directly or indirectly, influence an individual's processes (Bronfenbrenner, 1979; Saxena, 2021). We understand that the notion 'social context' is broad; therefore, in this study, we align with the definition provided by Staats, Jahncke, Herzog, and Hartig (2016) and focus on three key aspects: presence of other individuals, social interaction, and accompaniment. To answer the research question, we formulated three sub-questions based on this definition of social context: 1) To what extent does the presence of other individuals influence older adults' choice of restorative environments? 2) Under what conditions does social interaction influence the restorative experiences of older adults? 3) To what extent does the presence or absence of accompaniment affect older adults' motivation or ability to visit restorative environments? Addressing these sub-questions provides a deeper understanding of the role of the social context and how it facilitates and enhances psychological restoration for older adults. This knowledge is essential for refining psychological restoration theory and developing effective policies and design guidelines to create age-inclusive neighbourhoods that align with older adults' capabilities and health requirements, including their social and mental health.

2. Method

2.1. Study design

A convergent mixed-methods study was conducted to provide a comprehensive understanding of the role of the social context in older adults' restorative experiences. This approach integrates qualitative and quantitative data (Creswell, 2009, 2021), allowing for a nuanced

exploration of individual experiences while supporting broader generalisability. Semi-structured interviews captured personal narratives, while survey data provided quantifiable insights into patterns of social engagement and restorative preferences. The combination of these methods enhances the depth and validity of the findings by triangulating qualitative themes with statistical analysis. Detailed descriptions of the methods are provided in the following sections, following Creswell's guidelines for mixed-methods studies (Creswell, 2021) and the reporting standards set by the American Psychological Association (Levitt et al., 2018).

2.1.1. Semi-structured interviews

Forty semi-structured interviews were conducted with older adults living independently (aged 70 and above) in the Netherlands. The interview method allowed older participants the freedom to share their restorative experiences without being confined to a predefined set of environments or characteristics assumed to be restorative. The approach helped build rapport between the researcher and older participants, allowing the researcher to gain a rich understanding of older adults' restorative experiences (Hennink et al., 2020; Phoenix, 2018). The interviews were conducted and recorded with the permission of the ethics board of the Eindhoven University of Technology and after obtaining written consent. In the preparation and execution of the research, special attention was paid to interviewing potentially vulnerable participants.

Older adults (aged 70 and above) living independently in the neighbouring municipalities of Waalre and Veldhoven (Table 1) were invited to participate via newsletters from a housing association and a care organisation.

The sample was extended using the snowballing method until saturation was met (Hennink et al., 2020; Martin & Hanington, 2012). Ultimately, saturation was reached with forty participants. There was a good mix of personal characteristics and living situations (Table 2). All participants reported good cognitive health and said they were socially active. The sample size is comparable to similar studies such as Fumagalli et al., 2020 (2020; N = 26), Nordh and colleagues (2017; N = 59) and Scopelliti and Giuliani (2004, 2006; N = 67, 48). Interviews were conducted between March and June 2023 by the first author and lasted 41–120 min (M = 61 min). All interviews were conducted at

Table 2

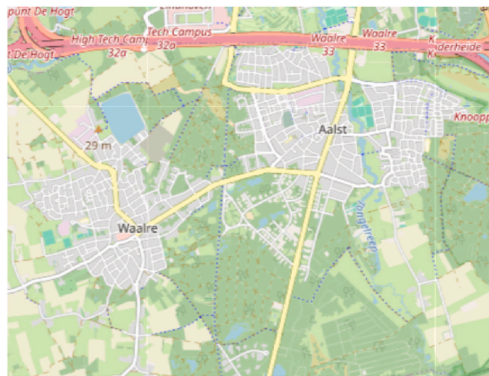
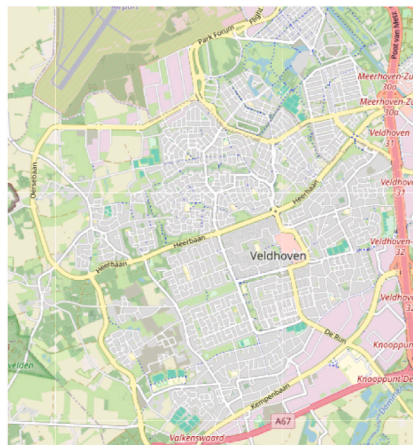
Socio-demographic profile of the participants. There was a good mix of personal characteristics and living situations. Furthermore, there was a wide variation in age, mobility, and frailty among participants.

Demographics	(N = 40)	Frequency	Percentage
Sex	Female	25	62.5
	Male	15	37.5
Age (M _{age} = 79.9)	70–79 years	24	60
	80–89 years	14	35
	90+ years	2	5
Frailty score	Not frail	22	55
	Frail	18	45
Being stressed last month		21	52.5
Family composition	Living alone	15	37.5
	Living with spouse	25	62.5
Living situation	Apartment with no outdoor space	4	10
	Apartment with outdoor space	8	20
	Terraced house and/or semi-detached	17	42.5
	Free standing house	11	27.5
Socio-economic status	Low	13	32.5
	High	27	67.5
Average social activities per week	Less than 1 activity	3	7.5
	1-2 activities	4	10
	3-4 activities	14	35
	5-7 activities	13	32.5
Experience feelings of loneliness	More than 7 activities	6	15
		20	50
Urban-nature orientedness	Urban oriented	15	37.5
	Neutral	4	10
	Nature oriented	20	50
Mobility	Low mobility	14	35
	Moderate mobility	8	20
	High mobility	18	45
	Can drive car	22	55
	Can ride bike	18	45
Can walk without support	18	45	

participants' homes, allowing more vulnerable older adults to participate in the study.

Interview questions were developed based on existing literature (e.g. Nordh et al., 2017; Subiza-Pérez, Korpela, & Pasanen, 2021;

Table 1
Context on study locations of interviews and questionnaires.

Study locations	Waalre (Aalst-Waalre)	Veldhoven
		
Located	The Netherlands, North-Brabant, south of the city of Eindhoven	The Netherlands, North-Brabant, west of the city of Eindhoven
Number of inhabitants	17.894	47.604
Number of inhabitants (65+ years)	4425	10.583
Area	22,43 km ²	31,92 km ²
Percentage green area	55.6 %	42.4 %
Average gross annual income	€ 40.300	€ 36.100

Subiza-Pérez et al., 2021), objectives of the research and pilot interviews (N = 7) conducted in the summer of 2022. Eventually, an interview guide consisting of four parts was developed (Appendix A). The first part aimed to build rapport between the interviewer and participant and to gather information about the participant's hobbies, interests, and social connections. The second part focussed on the participant's current living situation, with questions such as, "Could you describe your neighbourhood?". After those questions were answered, the central part of the interview was conducted. Participants were asked to reminisce about a day when they were mentally depleted and felt stressed and were asked to choose a favourite environment outdoors where they would like to go to restore and recharge. This approach was chosen based on prior research suggesting a strong connection between restorative experiences and favoured places (Korpela, 2001; Korpela & Hartig, 1996; Purcell et al., 2001; Scopelliti & Giuliani, 2004). The researcher then used a tablet and Google Street View to access and display the chosen environment in 3D, allowing the participant and the interviewer to visualise the location. Participants were asked to reflect on their previous experiences in the environment, describing their feelings, emotions, smells, sounds, and memories associated with the place. For example, prompts included: "Can you describe how you feel when visiting this environment?". The interviewer also asked about visit frequency and accessibility. Lastly, the social context of the place was explored, with questions regarding whether participants visited the environment alone or with others and whether they interacted with other people during their visits.

2.1.2. Questionnaire

Following the interview, participants completed a questionnaire. The questionnaire consisted of nine parts (Table 3; Appendix A). The questionnaire was administered to complement qualitative interview data of the interviews, to obtain perceived restoration scores and the likelihood of restoration for the chosen environment, and to gather demographic characteristics (e.g., frailty index and age). The interviewer read the questions aloud to the participants and noted their responses on the answer sheet. Following this procedure, objective data were obtained and the reasons underlying participants' choices.

Table 3
Sections of the questionnaire. For the complete questionnaire, see Appendix A. Questions are translated from Dutch.

Section	Items	Scale	Derived from:	Sample question
Short perceived restoration scale	5	Likert 1-7	(Berto, 2005; Han, 2018; Hooyberg et al., 2022; Nordh et al., 2009)	This place is another world where I can move around at ease.
Perceived restoration	1	Likert 1-7	(Hooyberg et al., 2022; Nordh et al., 2009)	Here, I can relax, regain strength and energy.
Perceived safety	2	Likert 1-7	Haans and de Kort (2012)	I feel safe in this environment.
Preference	3	Likert 1-7	(Hartig and Staats, 2006b)	This place is beautiful.
Urban/nature orientedness	9	Likert 1-7	(Ojala et al., 2019; Subiza-Pérez et al., 2021)	I like being in the city.
Perceived health	1	Scale 1-10	Zhang et al. (2020)	How would you rate your health in general?
Frailty index	16	Yes-No	Gobbens et al. (2010)	Do you have any problems in daily life due to poor hearing?
Did you feel prolonged stress in the last month	1	Yes-No	–	Have you felt tense or stressed in the past month?
Demographics (age, gender)	2	Open-ended	–	What is your age?

2.1.3. Typology research

The interviews resulted in forty restorative environments preferred by older participants. A typology analysis was conducted to investigate how these environments foster restoration. Typology analysis seeks object constancy within a variable context (De Jong & Van Der Voordt, 2002). The analysis revealed common characteristics, exceptions, and potential links to the social context in older adults' restorative experiences.

Given the global distribution of the environments, in-situ analysis was not feasible. Therefore, a photo analysis was conducted. The first author visited and photographed all environments (N = 20) located in the municipalities where the interviews were conducted, using a 360-degree Ricoh Theta camera. For the remaining environments (N = 20), 360-degree images were sourced from Google Street View. All environments were digitally accessible through a 360-degree image viewer (Ricoh Theta viewer), allowing the research team to explore and analyse them virtually.

2.2. Data analysis

In this convergent mixed-methods study, data were obtained and analysed simultaneously. The first author transcribed the interview recordings verbatim using the transcription software Amberscript, followed by manual editing to ensure accuracy. Transcripts, field notes and questionnaire data were anonymised. The analytic software ATLAS.ti was used to code, sort and categorise the transcription data. A top-down thematic analysis (Braun & Clarke, 2006; Hennink et al., 2020) was conducted, focusing on the theme of social context, as the primary goal of this study was to learn more about the role of the social context in older adults' restorative experiences. The first stage involved familiarisation with the data, during which two researchers reread all transcripts to become deeply immersed in the data. While reading all transcripts, sentences or text sections describing the social context were highlighted, resulting in 182 initial codes. To ensure reliability, coding was conducted independently by the two researchers, with discrepancies resolved through discussion until consensus was reached. A subset of transcripts (25 %) was double-coded to assess interrater reliability. The first author was responsible for initial coding and theme identification, while co-authors reviewed and refined thematic structures. Final themes were agreed upon collectively in iterative discussions among all authors. These thematic groups were further analysed and discussed in relation to older adults' restorative experiences, leading to the study's findings.

Simultaneously, a typology analysis was performed to complement the interview data. Initially, all three authors (an architectural researcher, an environmental psychologist and a social gerontologist) and an urban designer examined the forty virtual image spheres portraying the chosen restorative environments to discover patterns, typologies and variations. Next, all four researchers came together to compare their findings and categorise the environment into different typologies. Additionally, spatial characteristics of the environment were listed that could complement the interview data.

Lastly, the questionnaire data were incorporated into the analysis. All paper-based questionnaires were digitised and imported into SPSS for analysis. Descriptive statistics were calculated, and outliers were identified when more than three standard deviations from the mean. Normality was assessed, and key measures such as central tendency, dispersion and frequency distributions were analysed to identify general trends and patterns. Particular attention was given to exploring whether individual characteristics (e.g., gender, frailty, mobility, urban/nature-orientedness, green in living environment, stress, and social scores) influenced participants' choices of restorative environments. This analysis aimed to further understand why older participants select particular restorative environments and whether the role of the social context is shaping these preferences.

3. Results

3.1. Social places as restorative environments for older adults

To explore the role of the social context in older adults' restorative experiences, we will first report the type of environments older adults described as restorative. Although we did not measure actual restoration using physiological factors (e.g. heart rate, skin conductance), the descriptions participants gave align with the definition of a restorative environment as a place to rest, relax and get away from home. For example, Wim and Roos (pseudonyms; as are all names mentioned in the results section) report that they can relax and feel as if they are away from daily life when describing their preferred restorative environment:

"Yes, it is really a place to clear your head, get away for a while" (Wim, 78 years).

"A place to get away from everyday worries" (Roos, 77 years).

These descriptions are supported by questionnaire data show that preferred restorative environments scored high on the Perceived Restoration Scale ($M = 5.85$; $SD = 0.88$) and Restoration Likelihood ($M = 6.20$; $SD = 1.32$). These results indicate that the environments chosen by participants are places where there is a high likelihood that restorative experiences occur. Furthermore, scores for perceived safety ($M = 6.41$; $SD = 0.85$) and preference ($M = 6.42$; $SD = 0.74$) were also high, confirming these places as preferred restorative environments.

Since restorative experiences appear highly likely in these environments, we report the results of the typology analysis. Six typologies were identified. The first three typologies include conventional restorative nature environments such as woodlands, seas and meadows (Figs. 1–3). Approximately half of the participants named these natural settings as preferred environments for restorative experiences, aligning with expectations derived from the conventional restoration narrative. However, it is remarkable that only one participant named a wild nature environment as a favourite place for restoration. Instead, the majority of natural environments selected were close to inhabited areas. For instance, participants preferred settings like council-owned woodlands on the village outskirts (Figs. 1 and 2) or a sea view with the harbour still in sight (Fig. 3). All chosen natural environments were within walking or cycling distance from populated areas, increasing the likelihood of encountering others during visits.

The other half of the participant group favoured (sub)urban environments such as terraces, town squares, or neighbourhood open spaces

(Figs. 4–6). While such locations might intuitively be linked to rest and relaxation, thereby facilitating restoration, they are often considered atypical restorative environments. For example, a shopping area devoid of green space (Fig. 4) or a park beneath a highway (Fig. 6) may not initially seem restorative. However, participants identified these spaces as restorative, citing reasons ranging from practicality to an appreciation of overlooked beauty. For example, Henk stated that he especially appreciates being able to walk underneath the highway (Fig. 6):

"Paths under the highway, they have made it pleasant to walk under it; it makes for a special experience" (Henk, 77 years).

Social factors were also frequently mentioned as contributing to the restorative quality of these environments. For example, An stated that she likes to visit town square to see other people (Fig. 4):

"I like to visit this bench [at the town square]. I always see people I know there. I like to be in a busy environment" (An, 88 years).

In line with An's statement, our analysis of preferred restorative environments shows that, regardless of whether participants selected natural or (sub)urban settings, most participants favoured social environments. Social environments are settings with a social function where people can meet, such as terraces, campsites, and beach cafes.

Given that older adults are the target group, one might assume their preference for social environments reflects older adults' heightened need for social interaction. One could speculate that the desire for social engagement outweighs the need for stress reduction (e.g., psychological restoration), leading participants to choose social environments as their preferred restorative settings. However, this connection does not seem to emerge in the interview data or questionnaire data. Questionnaire data show that individuals who prefer solitary environments show similar levels of social engagement ($M = 6.30$; $SD = 2.08$) compared to those who choose social settings ($M = 7.47$; $SD = 2.74$). Moreover, no correlation can be found between the need for restoration (feeling stressed) and the choice between a social environment and an isolated environment ($r(38) = 0.103$ $p > .05$). These findings suggest that neither the need for psychological restoration nor social needs influence older adults' selection of their preferred restorative environment. Additionally, analysis of the questionnaire data revealed no associations between personal characteristics (e.g., gender, frailty, mobility, urban/nature-orientedness, amount of greenery in the living environment) and the preference for social environments.

We found that the preferred restorative environments selected by participants were generally situated near their homes. Although



Fig. 1. Preferred restorative environment participant 23, public woodland (own picture).



Fig. 2. Preferred restorative environment participant 21, meadow (own picture).

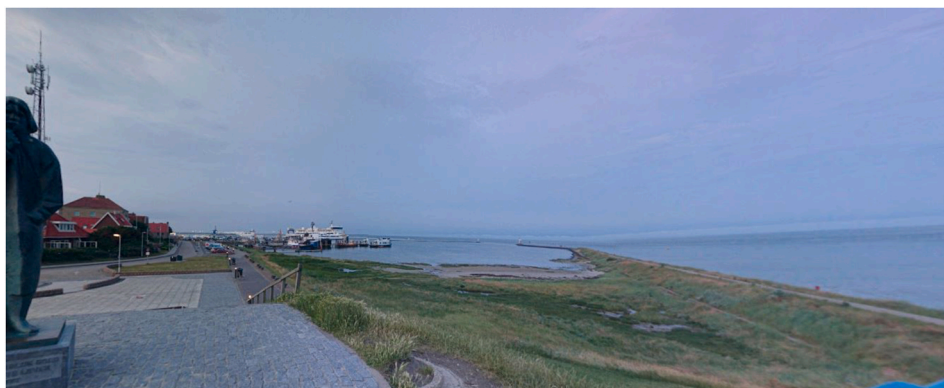


Fig. 3. Preferred restorative environment participant 7, a viewpoint at the harbour (Google Maps).



Fig. 4. Preferred restorative environment participant 2, a bench at the town square (own picture).



Fig. 5. Preferred restorative environment participant 22, a terrace (own picture).



Fig. 6. Preferred restorative environment participant 20, a park and river situated below the highway (own picture).

participants could choose locations anywhere in the world, half selected an environment within 20 km of their home, with the majority favouring locations within 1 km. Only three participants chose a place outside the Netherlands. It might be assumed that proximity preferences reflect mobility or frailty constraints; however, questionnaire data did not show any association between participants' mobility or frailty levels and the proximity of chosen restorative environments to their homes (Figs. 7 and 8). Furthermore, no associations were found between proximity to home and other individual characteristics (e.g., gender, urban/nature orientation, amount of greenery in the living environment).

In conclusion, the data show that many older participants choose

(sub)urban or natural environments with social functions close to their homes as their preferred restorative environments independent of mobility or age factors. These findings will be further explored in the subsequent sections.

3.2. Presence of (un)known others

Data shows that older adults chose social environments for restorative experiences. What is the role of the social context in these experiences? To explore this role, we aim to answer three sub-questions. The first is whether the presence of other individuals influences older adults'

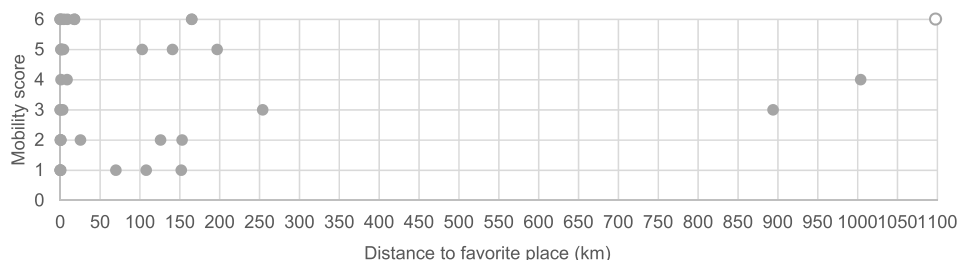


Fig. 7. Mobility score and distance of the preferred restorative place to the home. (○ - outlier distance to place 7800 km).

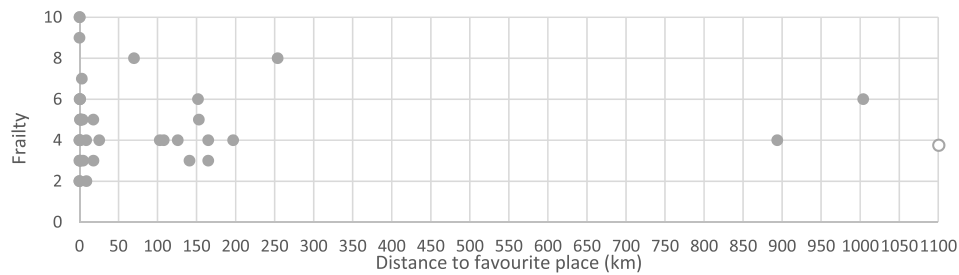


Fig. 8. Frailty and distance of the preferred restorative place to the home. A person with a score of 5 or higher (○ - outlier distance to place 7800 km) is categorised as frail.

choice of restorative environments.

Data show that all but three participants preferred others to be present in their chosen restorative environment (Fig. 9). Most participants preferred the presence of a few others.

The participants gave several reasons why they liked having others present in restorative environments. First, it seems related to a heightened sense of safety. Several interviewees, including Annie, speak about how the presence of others increases their feelings of safety:

“I am not going into the forest alone. I am afraid of falling, and it is nice if there is somebody to help if you fall” Annie, 83 years).

The story of being afraid of falling and having nobody there to help came back several times in Inge’s account:

“I do not always feel safe. It is so quiet on the street that sometimes I do not meet another person for over an hour. Then I think, yes, if something happens to me here or if I fall, I am here all alone (Inge, 84 years).”

In Inge’s story, it also becomes clear that besides fear of falling, there are other concerns, such as encountering harassment. Other participants also expressed these concerns, which can hinder their experiences of rest and relaxation. The presence of others has been found to positively influence older adults’ feelings of safety, thereby promoting more effective restorative experiences.

Not only are feelings of safety mentioned by interviewees as a reason why they prefer to have other individuals present in the restorative environments, but Kitty, for example, explains that she chooses a specific environment because she can watch children play, which has a positive and relaxing effect:

“An enjoyable place [playground] to visit and relax. ... There is a lot to see. You can see children playing ... that is always fun to see” (Kitty, 83 years).

Also, other environments like terraces or town squares are often chosen as restorative environments partly because they are suitable places to watch other people, which offers fascination. Other people hold attention, and you do not get bored watching them, as Teresa describes:

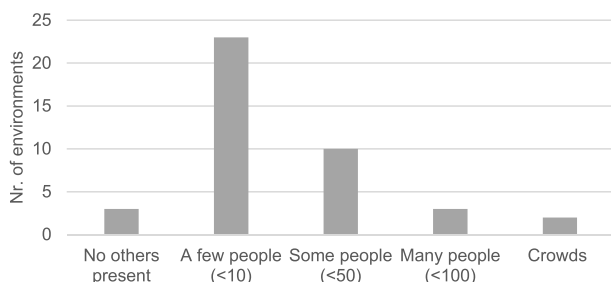


Fig. 9. Presence of others in the preferred restorative environments.

“I always tell my husband to put me on a terrace so I can sit there for hours. Hours of watching people. I love that and am not bored at all” (Teresa, 80 years).

Participants indicated that even when visiting the same place repeatedly, it remains different and fascinating because others are present. For example, An stated:

“Yes, it is a fascinating environment because many people come by, and then it is different every time, different people to watch each time” (An, 88 years).

From the favourite place descriptions, it seems that the presence of others adds fascination to an environment, adding to restorative feelings.

Thus, results indicate that for older adults, the presence of a few unknown others in an environment can improve the restorative potential of these environments by enhancing a sense of safety and offering fascination, thereby fostering restorative experiences.

3.3. Social interaction that takes place in preferred restorative environments

As shown in the previous section, older adults like to visit restorative places where others are present. However, do they also interact with these other people during restorative experiences? And if so, are these interactions conducive to restorative experiences of older adults?

Although the current results show that older adults prefer having others present during restorative experiences, most participants do not like interacting with them. Interviewees like Tonnie describe that they are trying to find rest and tranquillity in their preferred restorative environment. Tonnie looks for a place in nature to relax:

“It is nice to walk along the water. There is always life and movement; the sound of the water ... the peace and quiet are especially appreciated. The calmness, no noises, is what I find the best; I just sit by the water and look around. ... That relaxes me the best, forests and water” (Tonnie, 76 years).

Also, participants who prefer environments with a social function do not seek out social interaction, even though many others are present. For example, Stephannie explains that she finds rest at a busy Dutch campground:

“If I have a comfortable chair there [on camping] where you can sit laid back with

your feet up, then I can relax by myself ... then you do not notice that there are

others around you’ (Stephannie, 98 years).

Thus, most of the older participants like to have others around, but for their restorative experience, no social interaction needs to occur.

However, some participants consciously seek a place to engage in social interaction. For example, An goes to the town square because she knows she will always encounter familiar faces and have the opportunity

to relax – being in a different place than home. As she describes:

“I always meet people I know at this place and have a chat ... that is why I like to spend time there, no eating or drinking, just sitting and chatting with people, just for fun! ... Being out of the house for a moment ... leave daily worries behind” (An, 88 years).

Gerard also indicated that he can best relax on the terrace. He likes to chat with the one sitting next to him. It fascinates him to meet new people, makes him feel away from home and gives him an opportunity to restore resources:

“I find it fascinating to talk to others on the terrace, no matter whether they are young or old ... it gives a feeling that there is more in the world than my home” (Gerard, 75 years).

For these older adults, this small chat contributes to their restorative experience. This boost to restorative experiences could be because a small chat provides new information that adds variety and fascination to the environment. Analysis of the questionnaire data revealed that the benefits of social interaction in restorative experiences are not limited to highly social individuals. Participants who preferred social interaction had similar needs for socialisation ($M = 6.90$; $SD = 2.35$) as participants who preferred solitary environments ($M = 7.10$; $SD = 2.44$). These findings suggest that, under certain conditions, social interaction can enhance the restorative experiences of older adults, regardless of their baseline social tendencies. However, further research is needed to identify the specific factors that shape this effect.

3.4. Accompaniment

The last factor explored is accompaniment. At first glance, you could assume that older adults need others to accompany them to restorative environments because of mobility issues. The results show that this is true for some participants. For example, because they no longer drive and need someone to accompany them on trips further away, like Carla and Hennie:

“I do not have a car ... my boyfriend drives me everywhere by car. We often go to Venlo and surrounding areas or to Germany. We go for a walk there” (Carla, 74 years).

“I do not own a car; I walk or use a taxi bus, especially for older adults. That can be a hassle sometimes, but otherwise, I cannot come there [community centre] ... or I ride with someone I know, but then sometimes I need to walk back, and that is actually a bit too far for me” (Hennie, 82 years).

Some participants like Henk and Stephannie need support because of health issues:

“No, I will not go alone ... I need someone to guide me because of my sight problems” (Henk, 89 years).

“I prefer to go to the woods, but I cannot get that far alone anymore. Someone must come with me” (Stephannie, 89 years).

Also, age-related changes in capabilities can lead to feelings of insecurity, which may explain why some older adults prefer to be accompanied when visiting restorative environments. For example, Marijke always walks in nature with a walking companion. However, when her companion is injured, this creates limitations on her outings:

“Yeah, I walk with a walking buddy however, she is injured. I always call her walking buddy, but she is a good friend. But I am not going walking alone, I am getting worse too. And if something happens” (Marijke, 77 years)."

However, among most who prefer accompaniment when experiencing restoration, this preference for accompaniment is not necessarily due to mobility or health-related issues. Participants stated in the interviews that they like to visit the environment with a child, sibling or

their life partner with whom they share a strong bond. For example, Annie always goes into nature with her sister:

“Once a week, I go to my sister, and we go for a short walk [in the forest], and then we always sit on the terrace ... yes, I get along very well with my sister, and it is always very cosy. And they have a tasty cappuccino. ... When I sit there with my sister, I can really relax” (Annie, 81 years).

Going to a restorative environment in accompaniment of somebody else does not mean that the peace is disturbed. Participants described how they felt the calmness and tranquillity of the environment together. Mieke says, for example:

“We grabbed the bike and a packed lunch and went to the heather, sat at the frog pool, ate lunch, and it was wonderfully quiet, a quiet place to sit together” (Mieke, 76).

Also, Jacques's story illustrates how people seek peace together:

“You can put me on a dune, on the Dutch coast, with only the sea in front of me, and then you can leave me alone. And that also applies to my wife. You can leave us alone there, and we can just sit and watch the waves. I love that!” (Jacques, 75 years).

Jacques even describes it as:

“Feeling that you are together alone in the world ... being together gives an extra

sense of peace and calm to sitting together watching the waves. (Jacques, 75 years).

We see similar statements, especially among other participants who have been married for a long time. Participants like Kitty even indicate that the bond is so strong that it feels like they have become one with the other person:

“I have been married for 51 years, yes, that man has become a part of me” (Kitty, 83 years).

Kitty later explains that they do everything together also finding rest and relaxation. Also, Nettie describes a similar experience:

“I have been cycling through the polders there for years and years with my husband. Really a bit of wilder nature there, more beautiful than here ... There we came to rest together” (Nettie, 82 years).

Accompaniment, therefore, appears to enable and enhance restorative experiences of older adults.

Overall, the findings of this study suggest that social context plays a role in restorative experiences of older adults. Firstly, it is noteworthy that older adults tend to choose social environments for restoration regardless of health, mobility or social needs. Secondly, the results show that environments with few others present enhance a sense of safety and increase fascination with the environment, thereby promoting restoration. Furthermore, results indicate that brief social interaction, such as a casual chat, can enhance restoration in certain situations. Lastly, while accompaniment to a restorative environment is typically unnecessary for practical reasons, engaging in a calm activity with a close companion can enhance the restorative experience for older adults. These results highlight the importance of the social context in restorative experiences of older adults and underscore the necessity of integrating this factor into the design of restorative environments.

4. Discussion

Results from this study show that the social context plays a role in older adults' restorative experiences. The results suggest that older adults' restorative experiences occur in both solitary and social contexts. These findings challenge the assumption that restoration must occur only in solitude. We acknowledge that social context is a broad term, and in this study, we specifically focused on three components of the social

context: presence of others, social interaction and accompaniment. Recent evidence indicates that social interactions contribute to restorative experiences, yet few studies address these dynamics in older adults. Our study fills this gap by examining how presence, brief interactions and accompaniment shape restoration in this demographic.

First component: Presence of others

Results show that older adults select restorative environments where others are present. This finding contradicts the prevailing view that restoration requires solitude. Previous studies suggest that solitude may enhance perceived restorativeness of natural environments, and others can be seen as a distraction (Korpela & Staats, 2021; Staats & Hartig, 2004). Our interview and questionnaire data indicate a contrary preference among older adults. Two potential explanations emerge in the results:

- Increased safety: presence of others enhances feelings of safety which strengthens person-environment fit, thereby improving compatibility, a key component of ART which in turn facilitates restorative experiences (Scopelliti & Giuliani, 2006; Staats & Hartig, 2004).

- Enhanced fascination: another explanation is that the presence of others introduces novel stimuli that effortlessly captivate attention (fascination), restoring directed attention and facilitating restorative experiences (Kaplan, 1995; Staats, 2012). This effect seems especially pronounced among participants who visit the same environment regularly. The presence of people shopping, sitting on the terrace or playing with children enriches an otherwise familiar setting, offering fascination and thereby enhancing restorative experiences.

Importantly, these benefits vary by context and individual: social presence can become draining when it triggers obligations or distractions (Jansen, 2005; Scopelliti & Giuliani, 2004).

Second component: Social interaction

While results indicate that most older adults prefer the presence of others during restorative experiences, participants express disinterest in engaging with them directly. This finding aligns with the idea that restorative experiences are primarily solitary activities (Korpela & Staats, 2021; Staats & Hartig, 2004). Solitude can provide opportunities for reflection, clearing one's mind and distancing oneself from immediate social demands, thereby leading to a restorative experience (Korpela & Staats, 2014; Wohlwill, 1983). However, some of the participants consciously visit restorative environments with the intention of engaging in brief conversations with others. This finding contrasts with expectations. Participants indicated that such interactions contributed to restorative experiences by providing opportunities to acquire new information and evoking fascination. Interestingly, these interactions were not driven by feelings of loneliness or social needs. These results present an intriguing avenue for future research to explore the potential role of social interactions, particularly brief conversations with strangers, in promoting restorative experiences among older adults.

Third component: Accompaniment

Many participants reported visiting restorative environments with a companion. The results indicate that participants do not necessarily seek accompaniment due to mobility, health, or safety-related concerns. They often visit with a companion, particularly long-term spouses, with whom shared routines and activities are customary. Others indicated that they value the sense of companionship during their restorative experiences. These statements challenge the idea that restorative experiences are a solitary activity (Jansen, 2008; Korpela & Staats, 2021; Staats & Hartig, 2004), as visiting a restorative environment with a companion does not appear to hinder older adults' restorative experiences. This may have something to do with the bond participants have with their companions. Previous research suggests that sharing an

intimate and affective bond can lead to shared attention and shared experiences, amplifying the intensity of the restorative experience even in the absence of communication (Hartig, 2021). This statement aligns with a study by Jansen (2008), which showed that having a shared activity, even just sitting in a quiet environment, can positively contribute to older adults' restorative experiences. The present study supports this notion, suggesting that older adults do not necessarily need to visit a restorative environment alone to experience psychological restoration. In some instances, accompaniment may even enhance restorative outcomes for older adults.

Types of restorative environments

In addition to examining the three components of social context, this study also investigated the types of restorative environments selected by older adults for their restorative experiences. The data reveal that older adults choose places with a social function. This finding contrasts with expectations based on existing literature (Korpela & Staats, 2021; Scopelliti & Giuliani, 2004; Weber & Trojan, 2018). The current results show that older adults intentionally choose social environments, valuing the presence of others as it enhances restorative experiences through increased feelings of safety and fascination, as previously discussed. Another potential contributing factor is the role of familiarity. For example, the preferred social environments – such as terraces, campsites and shopping areas – are deeply embedded in Dutch leisure culture (Oosterman, 1993), making them easily recognisable as places for rest and relaxation for Dutch participants. Furthermore, most of the selected environments were close to participants' homes. The connection between familiarity, favourite places and restorative environments is well-documented in previous research and may have influenced older adults' choices (Korpela & Hartig, 1996; Korpela & Staats, 2021). However, interview findings also suggest that people deliberately selected social places, not only due to familiarity but also because the presence of others enhances feelings of safety and fascination. The interplay between these factors should be explored in future research.

Furthermore, it is interesting to see that half of the older participants chose urban environments as preferred environments for restorative experiences. Based on previous studies, it was expected that more participants would choose natural environments (Bornioli et al., 2025; Hartig et al., 2014; Korpela et al., 2008; Subiza-Pérez et al., 2021). These results highlight that certain urban environments can also offer positive restorative experiences to older adults and support statements by Hartig (2021) that restorative experiences can also take place in lively urban places. The current findings extend the growing literature on restorative experiences and wider psychological benefits of high-quality built environments (e.g., Barros et al., 2021; Bornioli et al., 2025; San-Juan et al., 2017; Subiza-Pérez, Subiza-Pérez, Korpela, et al., 2021).

Our findings demonstrate that social context (presence, brief interactions and accompaniment) enriches older adults' restoration, challenging the solitude-centric model and signalling the need for updated theoretical frameworks.

4.1. Study limitations and recommendations

Using a convergent mixed method model, we were able to collect different types of data, which allowed us to gain a more comprehensive understanding of the role of the social context in older adults' restorative experiences. The methodology allowed us to build rapport with forty older adults, allowing for in-depth discussion about their experiences and thereby including a seldom-heard population in psychological restoration research. This empathic approach allowed for more inclusive representation in psychological restoration research. However, a limitation of the convergent method, compared to a sequential approach, is the inability to anticipate results, as all data were collected simultaneously. Consequently, the questionnaire could not be adjusted based on the interview results, which left the questionnaire somewhat

underdeveloped. We are aware that while the sample size of forty participants is appropriate for qualitative research, it is relatively limited for quantitative analysis. Therefore, the quantitative data in this study were used primarily to support the integration of qualitative findings rather than serving as a basis for standalone statistical analysis. Future research would benefit from a larger sample to enable more robust quantitative insights.

Another limitation to discuss is that we only considered each participant's current mental fatigue levels using a one-item scale measure. Previous studies suggest that mentally fatigued individuals evaluate the presence of others less favourably than those who are not mentally fatigued (Scopelliti & Giuliani, 2004; Staats & Hartig, 2004). Future studies would do well to pay more attention to participants' mental fatigue levels to see if there is a connection between the need for restorative experiences and the social context.

A limitation of this study is that all participants were recruited from the Netherlands. Cultural differences may influence how social context impacts restorative experiences, which should be explored in future cross-cultural research.

The final limitation concerns the use of photo representations during the interviews rather than conducting real-life visits to the restorative environments. Due to safety concerns (e.g., fall risk) and geographic distribution of participants' locations (who could select any environment worldwide), virtual representations of the environment through Google Street View were used to conduct the interviews. While this method provided valuable insights, we acknowledge that virtual representations can differ from real-life dynamic experiences (Ellard, 2017; Zhao et al., 2020). To address this limitation, the interviews were designed to focus on senses beyond the visual, such as smells, sounds and feelings associated with the chosen environments. However, we recognise that these accounts were based on memory rather than direct, in-situ experiences. Future research could employ methods such as walking interviews to gain a deeper understanding of older adults' restorative experiences in real-world settings, which would be worthwhile.

To our knowledge, this study is the first to explore the relationship between the social context and older adults' restorative experiences. We would like to emphasise that this study was exploratory, and that future research is needed to gain a comprehensive understanding of the role of the social context in older adults' restorative experiences. This study focused on three components of the social context. However, future research could explore additional factors, such as the influence of family relationships, cultural influences or neighbourhood connectedness (Bronfenbrenner, 1979; Carstensen et al., 2003; Nyqvist et al., 2013; Ten Bruggencate et al., 2018) and how these factors influence restorative experiences of older adults.

These insights contribute to refining the conventional restoration narrative and expanding perspectives in restorative environment research. Future research is necessary to determine the specific adjustments required in the current theoretical frameworks. For example, future research can delve deeper into the restorative components of ART (Kaplan, 1995; Kaplan & Kaplan, 1989). The results of the current study suggest that the presence of others can enhance restorative experiences by promoting compatibility and fascination, two of the four factors of ART (Kaplan, 1995; Kaplan & Kaplan, 1989). Future research can explore whether the other factors of ART (extent and being away) also play a role in older adults' restorative experiences.

Given that many participants described their restorative experiences as socially embedded, our findings align with Hartig's proposed Relational Restoration Theory (Hartig, 2021), which explores how interactions between individuals contribute to restoration. Future research could further investigate the applicability of this framework to older adults' experiences. Exploring how this theory would work in older adults' restorative processes would be a valuable avenue for future research. As indicated by the current study's results, older adults often prefer to engage in restorative experiences in the company of others.

Rather than revising the conventional restoration narrative, it may be beneficial to develop complementary theories that more fully capture the nature of restorative experience for older adults.

Although there are several limitations to this study and numerous avenues for future research, the findings of this study suggest that social context plays a role in older adults' restorative experiences. Notably, this role deviates from the expectations set by the conventional restoration narrative, in which restorative experiences are traditionally conceptualised as solitary experiences. The current study suggests the importance of involving target groups other than younger adults and draws attention to the importance of restorative experiences for older individuals. Research on older adults often focuses on loneliness, physical health, or dementia, while mental health issues related to stress and attention fatigue receive less attention (Francis et al., 2012; Garin et al., 2014; Roe & Roe, 2018; Zhu et al., 2021). Health indices show that mental health issues related to stress and mental fatigue are a considerable strain on the ageing population and, thereby, on society as a whole (Moore et al., 2020; PAHO/WHO, 2021). Future research should, therefore, prioritise the study of older adults' restorative experiences rather than exclusively focusing on stressed university students or working professionals. By expanding the scope of psychological restoration research to include diverse methods and varied populations, we can more effectively design environments that promote mental health for all.

5. Conclusion

The findings of this study suggest the importance of the social context in restorative experiences of older adults. These findings challenge current ideas that restorative experiences are solitary experiences and call for broadening the scope of psychological restoration research. Based on the study's results, we propose several directions for future research. First, it is essential to involve a broader range of age groups in studies on restorative experiences, with a particular emphasis on older adults. This overlooked demographic group stands to benefit from environmental designs promoting mental health through restorative experiences. Second, we recommend placing greater emphasis on the role of the social context as a critical factor influencing restorative experiences. Adding the factor of social context to the conventional theoretical narrative can enrich theory and make it more applicable in the design of age-friendly environments. It is essential to recognise that restorative experiences are not solely determined by individual interaction with a specific type of environment but take place in a broader context. Restorative experiences are a complex dynamic human-environment transaction between psychological, physiological and social factors. By adopting a broader approach, researchers can more accurately capture the complexity of restorative experiences in everyday life across a diverse group of people. Future research should explore how the social context interacts with restorative experiences in diverse environments and populations, applying both qualitative and quantitative methods to gain deeper insights into long-term effects. With this knowledge, we can better inform future research, policymaking and urban design, fostering the creation of inclusive, health-promoting environments that support the mental health of older adults.

CRedit authorship contribution statement

Anne J.J. Grave: Conceptualisation, Methodology, Formal analysis, Visualization, Investigation, Writing – original draft. **Louis Neven:** Conceptualization, Writing – review and editing, Supervision. **Masi Mohammadi:** Conceptualization, Writing – review and editing, Supervision.

Ethics

This study is performed with permission of the Ethical Review Board

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Conflict of interest

The authors declare no conflict of interest.

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Appendix A. Supplementary data

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