



## Exploring how the urban neighborhood environment influences mental well-being using walking interviews

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### ARTICLE INFO

#### Keywords:

Mental well-being  
Urban neighborhood environment  
Qualitative method  
Walking interview  
Socioecological approach

### ABSTRACT

Mental well-being in cities is being challenged worldwide and a more detailed understanding of how urban environments influence mental well-being is needed. This qualitative study explores neighborhood factors and their interactions in relation to mental well-being. Individual semi-structured walking interviews were conducted with 28 adults living in the Brussels-Capital Region. This paper provides a detailed description of physical neighborhood factors (green-blue spaces, services, design and maintenance, traffic, cellphone towers) and social neighborhood factors (neighbor ties, neighbor diversity, social security) that link to mental well-being. A socio-ecological framework is presented to explain interactions among those neighborhood factors, and personal and institutional factors, in relation to mental well-being. The findings are linked to existing concepts and theories to better understand the mechanisms underlying the associations between the urban neighborhood environment and mental well-being. Finally, implications of the walking interview method are discussed.

### 1. Introduction

This qualitative paper explores lived experiences of the urban neighborhood environment in relation to mental well-being among residents in the Brussels-Capital Region. The incidence of mental illness is increasing worldwide (World Health Organization, 2018) and growing evidence indicates a higher prevalence in urban environments in comparison to rural environments (Gruebner et al., 2017; Okkels et al., 2018; Solmi et al., 2017). Hypothesized explanations include social risk factors, such as concentrations of low socio-economic status, low social capital, and social segregation (Gruebner et al., 2017; Okkels et al., 2018), and physical risk factors such as noise pollution, air pollution, and poor urban design (Buoli et al., 2018; Gruebner et al.,

2017; Ma et al., 2018; Mccay et al., 2019; Rautio et al., 2018). Recently, a growing body of evidence has corroborated positive effects of urban green-blue spaces on mental health (Beyer et al., 2014; Cox et al., 2017; Kabisch, 2019; Nutsford et al., 2013; South et al., 2018; Stigsdotter et al., 2010).

A recent review underlines that these mental health risk and protective factors also operate at the neighborhood level (Rautio et al., 2018). Feelings of community attachment and social cohesion are shown to improve mental health, where neighborhood disorder such as crime and violence worsen mental health (Chu et al., 2004; Clark et al., 2007; Dalgard and Tambs, 1997; Guite et al., 2006; Mair et al., 2008; Paczkowski and Galea, 2010; Toma et al., 2015). Neighborhood aesthetics and green space were shown to significantly associate with lower

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<https://doi.org/10.1016/j.healthplace.2020.102497>

Received 28 May 2020; Received in revised form 16 October 2020; Accepted 7 December 2020

Available online 19 December 2020

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depression, where the opposite effects were detected for neighborhood noise and deterioration (Rautio et al., 2018). Qualitative evidence has indicated the importance of access to and quality of neighborhood services, neighborhood aesthetics, public meeting places, sense of security, neighborhood cohesion, neighborhood affordability and access to natural environments to improve mental well-being (Bornioli et al., 2018; Francis et al., 2015; O'campo et al., 2009). Contrary, neighborhood insecurity caused by crime, vandalism, and violence and neighborhood abandonment in terms of trash accumulation, vacant lands, poor maintenance of houses and sidewalks are shown to negatively affect well-being (O'campo et al., 2009; Garvin et al., 2013; Mehdipanah et al., 2013).

Current evidence implies that the urban environment influences both mental illness (mental health disorder) and mental well-being (mental health). Mental well-being has been conceptualized as more than the absence of mental illness (Doré and Caron 2017), and encompasses hedonic (happiness, life satisfaction, and affect) and eudaimonic (positive functioning, sense of purpose, and self-acceptance) wellbeing (Huppert 2005; Tennant et al., 2007). While mental illness and mental well-being may be related, they are not necessarily distinct ends of a continuum, but rather two separate continua (Westerhof and Keyes, 2010). Most previous studies on neighborhood effects have focused on mental illness, rather than mental well-being (Diez Roux and Mair, 2010; Whitley and Prince, 2005). The study presented in this paper focused primarily on mental wellbeing, informed by participants' own experiences of wellbeing in place.

Although, current studies already pay attention to both social and physical effects, in-depth knowledge on interactions among those factors and the underlying mechanisms in their associations with mental well-being remain scarce (Cattell et al., 2008; Dinnie et al., 2013; O'campo et al., 2009). A socioecological approach, originally stemming from Bronfenbrenner's ecological model of human development, offers a way to simultaneously investigate individual and environmental factors and the dynamic interplay between both factors in determining their influence on mental well-being (Eriksson et al., 2018; Sreetheran and Van Den Bosch, 2014). Several studies rely on socio-ecological frameworks to detect and recognize complex relationships, for example to describe personal, social, and physical attributes to fear of crime in urban green spaces (Sreetheran and Van Den Bosch, 2014) or to explain associations between public space and mental health (Francis, 2010).

Existing concepts and theories from environmental psychology already help to understand how environments can contribute to mental well-being. The concept of 'sense of place' refers to the feelings evoked among people as a result of the experiences and memories they associate with a place and the symbolism they attach to that place (Shamai, 2018). Associated concepts are place attachment (bonding that occurs between individuals and their meaningful environments, containing emotional components, cognitive elements and practices), place dependence (how a place can be important because of its functional value), and place identity (part of our identity that relates to place) (Wartmann et al., 2018). Environments can also be restorative by offering opportunities for self-regulation (self-altering its own responses or inner states) through environmental (involve the use of places), physical (involve physical activity), or social strategies (involve contacting others) (Baumeister et al., 2007; Korpela et al., 2001). Both sense of place and higher capacities of self-regulation were shown to improve mental well-being (Baumeister et al., 2007; Cattell et al., 2008; Kienast et al., 2018; Scannell and Gifford, 2017). Both concepts also imply an inherent connection between personal, physical, and social factors.

Regarding nature's restorative benefits to mental well-being, two leading theories are Ulrich's Stress Recovery Theory (SRT) and Kaplan and Kaplan's Attention Restoration Theory (ART) (Kaplan and Kaplan, 1989). SRT states that natural environments can reduce stress due to the innate inclination of humans towards nature, which is their evolutionary habitat (Bornioli et al., 2018; Ulrich, 1983). According to ART, natural environments can support recovery from mental fatigue in presence of

several restorative properties, including being away (being mentally away from routine or demanding activities), soft fascination (a necessary but not sufficient condition for restoration: being engaged without attentional effort), compatibility (providing a good fit with one's activities or inclinations), and extent (an environment that is coherent, ordered, and of substantial scope) (Kaplan and Kaplan, 1989; Bornioli et al., 2018).

In this study we applied a socioecological approach to answer the following research question: what factors play a role in how the neighborhood environment influences mental well-being and how do these factors interrelate with each other? Additionally, we link our results to existing concepts and theories to better understand underlying mechanisms explaining links between the neighborhood environment and mental well-being.

## 2. Methods

This study reports on qualitative research undertaken as part of the Nature Impact on Mental Health Distribution (NAMED) project that applies a mixed method approach to investigate associations between urban environment characteristics and mental illness and well-being in the Brussels-Capital Region (Lauwers et al., 2020). By walking interviews, also called go-along or walk-along interviews, we gathered detailed insights into the meanings and practices people associate with their living environment (Carpiano, 2009; Kusenbach, 2003), i.e. neighborhood factors, in relation to their mental well-being.

### 2.1. Sampling strategy

The study was conducted in the Brussels-Capital Region. Five study areas representing a diversity in urban fabric (Guyot et al., 2021), population density, access to green and median income were defined. In each area, we contacted a diverse set of local organizations involved in either environmental, socio-cultural, or health-related activities. Next, we visited the organizations with interest to discuss the recruitment of the participants. Based on the experience and culture of the organization in working with their target population, we developed an individual recruitment plan. Posters and folders with information on the project were left at the organization (Appendix I). The recruitment strategy intended to reach a varied sample in terms of age, gender, education level, employment status and cultural background. However, the large geographical scale and time limitation of the study led to a convenience sampling, based on the willingness of the people we met in the organizations. Knowing the mixed use of language in the Brussels-Capital Region (most spoken: French, English, and Dutch), only participants skilled in Dutch, French, or English with a minimum age of 18 years were included.

### 2.2. Sample

We conducted 28 interviews, of which two were a sit-down interview upon request of the participant. Participants' age ranged from 23 to 87 years, with the majority being between 50 and 70 years ( $n = 9$ ) and older than 70 years ( $n = 10$ ). The participant group consisted of 17 women vs 11 men; 9 non-natives vs 19 natives; 12 with non-native parents vs 16 with native parents; 18 with vs 10 without a post-secondary degree; 7 unemployed vs 12 employed vs 9 retired. Ideally the sample should have included more variation in age, however, the results will show that this sample was accurate to get a richly textured understanding on our research question.

### 2.3. Data collection

Data were collected by conducting walking semi-structured interviews during the period March–June 2019. The lead author (LL) conducted most interviews ( $n = 16$ ), for the native-French speaking

participants she was supported by the two French-speaking co-authors (MG, IP). At the beginning of the interview the participants were asked to guide the walk along a self-selected route in the neighborhood that allowed the discovery of places and characteristics that were experienced important in relation to their mental well-being. We further clarified the purpose of the walk by asking about neighborhood aspects provoking positive or negative feelings. We did not provide any definitions of mental well-being as we were rather interested in how the participants expressed links between their neighborhood environment and mental well-being in their own words. The semi-structured interviews consisted of an open discussion following a list of topics to be explored (Green and Thorogood, 2018) (Appendix II). The interviews lasted on average 1,5 h and were transcribed verbatim. Pictures were taken during the walk by the participant or by the interviewer in case the participant preferred so. In March 2020, we invited the participants for a workshop with the purpose to thank them for their participation, and to present and reflect on intermediary project results. 16 out of the 28 participants participated to the workshop. The qualitative themes were presented in subgroups and coupled to a member check validation by asking them to provide input on whether the themes accurately reflected their experiences. No disagreements occurred, but some important additions of themes or links between themes were made. Additionally, they were asked to reflect more in-depth on how these themes affected their mental well-being. The aim of the member reflections was to explore any gaps in the results and to assure a shared interpretation of the findings (Koelsch, 2013). All additional data collected during this workshop are included in the results.

#### 2.4. Data analysis

The data analysis was conducted by LL and followed the Braun & Clarke's guide for doing a thematic analysis (Braun and Clarke, 2006), using Nvivo v12. As a first step, the transcripts were read several times to gain an overall understanding. In a second step initial codes were generated in an iterative process of inductive open coding. For the first interviews the process of open coding and interpreting the quotes was done by a second independent reviewer (HB, HK, ML, RR) to enhance the reliability of the analysis. In the following steps the codes were organized in themes and sub-themes. In a final step, we investigated how the themes related to each other. Coding and theme development were discussed with the other authors. The different backgrounds of the authors (ecology, geography, epidemiology, psychology, social and political sciences, environmental health, primary health care) brought the advantage of gaining diverse perspectives on the results. Following a descriptive qualitative approach, the themes were analyzed with first emphasis on a literal description and then on a more in-depth understanding of the themes through interpretation. The study design, analysis and reporting of the results was co-guided by a theoretical framework that started from the two concepts 'sense of place' (Shamai, 2018) and 'self-regulation' (Baumeister et al., 2007), and two theories ART (Kaplan and Kaplan, 1989) and SRT (Ulrich, 1983). The framework expanded throughout the study with additional concepts and theories as covered in the Discussion. Three experts from the international interdisciplinary expert group on impacts of urban natural spaces on mental well-being, called EKLIPSE, helped to build this framework.

#### 2.5. Ethical issues

The study was approved by the ethical committee from the University Hospital of Antwerp (Alternative Ethical Review board of the University of Antwerp) (November 26, 2018, reference number 18/44/503). The participants gave informed consent in written form at the beginning of the interview (Appendix III) and the workshop.

### 3. Results

#### 3.1. Description of neighborhood factors in relation to mental well-being

##### 3.1.1. Physical factors

**3.1.1.1. Green-blue spaces.** The most common response of the participants regarding green-blue spaces was the feeling of escaping from the city hustle and to take a break from daily routines – reflecting ART's concept of 'being away' (Kaplan and Kaplan, 1989) and relating to SRT (Ulrich, 1983). Other responses to mental well-being in relation to green-blue spaces involved: connecting to nature, exploring nature, getting fresh air, relaxing, rebuilding energy – relating to SRT (Ulrich, 1983). Some participants mentioned the importance of green-blue spaces to maintain their physical activities, and as such contributing to mental well-being.

participant A, 60 yr: *"There is one absolutely magical place, there's nothing similar to that, it is a park that really draws a lot of people from the neighborhood. It's a place where you can get connected to nature. As soon as you get there, you feel away from the city. There are birds, flowers, and something to look at, and a community garden where you can rent a garden space and trees and a bit of sculpture, just a chill place to go for a walk."*

As indicated by this participant, also structural diversity in terms of the presence of artistic features, flowers, big trees and fountains was mentioned to enhance park experiences – providing an image of ART's concept of 'soft fascination' (Kaplan and Kaplan, 1989). For some participants large parks and for others enclosed intimate parks strengthened the feeling of being away – complementing ART's concept of 'extent' (Kaplan and Kaplan, 1989). Contrary, car disturbance, dog fouling, and trash accumulation led to negative park experiences.

participant B, 46 yr: *"There is one park, where I have been with my four children, but not with the last one. Because it is overcrowded and dirty. It's impossible to go to the playground. Also a question of hygiene, it is too dirty. The sand is no more sand. There is glass, tiles, wood."*

**3.1.1.2. Neighborhood services.** We distinguish between functional services and recreational services. Most important functional services mentioned were public transport, commercial (grocery stores, bars, restaurants), and welfare services (pharmacies, medical houses, and schools). Especially the proximity of these services related to positive responses in relation to mental well-being as participants were able to meet their needs on walking distance. It further contributed to a sense of security – relating to the concept of 'place dependence' as part of sense of place (Wartman and Purves, 2018).

participant B, 46 yr: *"The proximity to shops is a very strong point, because you can run out of food or drinks in the middle of the night and there is always a night shop that is open. We are also surrounded by 5 pharmacies, it is important, that is to say if we fall ill during the night, we always have a pharmacy on duty near the house."*

Among recreational services, participants mentioned cultural activities, community centers, sport and play facilities. Sport facilities supported physical activity, and was by some participants mentioned as a strategy to cope with negative feelings – indicating the restorative potential of these environments (Baumeister et al., 2007; Korpela et al., 2001). Several participants were annoyed by the lack of play facilities for children. Educational and art-related activities were linked to feelings of personal enrichment.

participant C, 74 yr: *"We are both city people. The luxury of going to theater, to music, to performances. For me, art is a real enrichment, a way*

*of seeing how people are doing things in different ways, creating something. I can enjoy that.”*

**3.1.1.3. Neighborhood design and maintenance.** Regarding the neighborhood design, historic architecture, openness, light incidence, and natural elements (Fig. 1) were mentioned across the participant group and seemed to contribute positively to mental well-being through feelings of fascination and relaxation – adding to ART’s concept of ‘soft fascination’ and SRT (Kaplan and Kaplan, 1989).

participant D, 37 yr: *“Sometimes I come here to sit in the sun, because we live in shady streets and I live in a house where we do not see much of the sun. I come and sit here, it feels good. With the fountain. Sometimes I come here and sit down for the sound of the water. As I have some health problems, I like the sound of the water. It calms me down.”* (Fig. 1)

Several participants related central neighborhood squares with a village-like character to feelings of being away from the city – extending ART’s concept of ‘being away’ (Kaplan and Kaplan, 1989). Historical elements further made the neighborhood conducive for discovery and contributed to the pleasure of walking.

participant E, 70 yr: *“And here there are beautiful houses. I am such a person who goes into neighborhoods, always to look at the houses. As someone else goes to a forest for trees, to me it’s the houses. The facades, the architecture, and so on, I sometimes wonder how it can remain standing.”*

The participants from different neighborhoods experienced great difference in maintenance. Where some were pleased with the well-maintained sidewalks and houses, others were confronted with trash accumulation and housing abandonment. The continued presence of clandestine garbage dumps caused negative feelings of frustration and despair among some participants (Fig. 2).

participant F, 37 yr: *“I do not like walking around in the neighborhood because it is so dirty and because it strikes me and annoys me very much. Emotionally I attach a lot of importance to that which is terrible because it is something very typical for this neighborhood. It seems like an unsolvable problem.”*



Fig. 1. Urban design can offer relaxation and fascination.



Fig. 2. Trash can cause frustration and despair.

**3.1.1.4. Traffic.** A lack of traffic safety, more precisely bike and pedestrian safety, was linked to feeling insecure, but also to annoyance and confusion by the lack of good infrastructure. Some participants expressed their concerns about traffic-related air pollution and avoided therefore busy streets. Traffic noise caused annoyance, impeded to relax and disturbed bird sounds. In one specific neighborhood, several participants mentioned suffering from the noise from airplanes, sometimes causing sleeping disturbance.

participant G, 48 yr: *“You see a lot of planes landing there. It’s very noisy, and especially of course you suffer in summer, when you’re more outside, I suffer in early morning, especially when it’s summer, because they don’t respect the EU regulation to stop night flights or to reduce dramatically night flights between 23h and 7h, here they actually start at 6, and sometimes even earlier. It has happened to me regularly to be really woken up by the noise. So I think noise is also important in the concept of environment, and here there is a margin for improvement.”*

Contrary, several participants mentioned how they appreciated the calmness in different contexts: silent places, calm streets, calm neighborhoods. The absence of noise was also associated with taking a break from the city hustle – broadening ART’s concept of ‘being away’ (Kaplan and Kaplan, 1989).

**3.1.1.5. Cellphone towers.** Cellphone towers were an unexpected problem mentioned by several participants. Except for one that directly linked personal fatigue to the radiation from cellphone towers, the other participants were mainly concerned about potential health effects because they were being informed upon the risks.

participant H, 75 yr: *“It’s more because I know, it’s more because I’ve been informed. I am careful, I try to put out everything that can be harmful for the night, but despite everything it’s still a nuisance I think. And this is something secret actually, the radiation from cellphone towers.”*

### 3.1.2. Social factors

**3.1.2.1. Neighbor ties.** Some experienced great mutual support among neighbors which contributed to feeling secure in their neighborhood. Several participants mentioned the importance of having a sense of community with the relating outcomes of feeling part of a bigger community, not being isolated, mutual understanding and support. Good neighbor ties made several participants feel at home and attached to their neighborhood – underpinning the concept of ‘place attachment’ (Wartman and Purves, 2018).

participant C, 74 yr: *“I think the type of contact is of paramount importance, that you have such contact with people that you feel at home, and that was in the neighborhood, I felt at home there because of the substantive contacts and the interesting people.”*

Contrary, two participants mentioned to have suffered from neighbor conflicts. Others expressed the importance of remaining some anonymity in relation to their mental well-being.

participant I, 70 yr: *“Here it is too much, as now I know you, I must know your girlfriend, I have to know your boyfriend, or I have to know your boyfriend’s friend. Here, I have too many connections. Less connections, that’s what I’m looking for. Too much stress here, too much stress.”*

**3.1.2.2. Neighborhood diversity.** Most participants indicated to welcome or embrace neighborhood diversity in all its forms (cultural, age, economic diversity). Cultural diversity contributed positively to mental well-being as some participants felt enriched by contact with other cultures because of the opportunity to learn and to broaden personal views. Some participants experienced more tolerance and solidarity among neighbors and an ease to connect. The mix of different cultural and age groups was also mentioned to bring liveliness to the neighborhood and supported a sense of security as more people were present on the streets.

participant J, 65 yr: *“In this neighborhood people accept that there is a diversity, and in the end it no longer matters what origin you come from, but you see that people manage to get along and I find that very cool, I find that so enriching. Diversity in the sense of not concentrating people, not in houses, not in neighborhoods, not in streets, but trying to have a good mix and that is the best way to live together in a peaceful way, I think this neighborhood really bears witness to that, even though there are very beautiful mansions, it is not a white neighborhood, it is a mixed neighborhood and I feel very comfortable with that.”*

Although most participants cheered on diversity, some participants also declared to experience difficulties to cope with different mentalities and to connect with some groups due to language barriers. A lack of good neighbor ties between diverse groups was a prerequisite for intolerance, and even racism. Some participants also mentioned that the concentration of specific groups of residences (e.g. expats, ethnic groups, refugees, homeless people) decreased the sense of community, and affected in some cases the sense of security in the neighborhood. Furthermore, confrontations with severe poverty evoked feelings of injustice and incomprehension.

**3.1.2.3. Neighborhood security.** Regarding neighborhood security, participants referred to problems with loitering, vandalism, squatters, drugs dealing, substance use, and burglary. A lack of neighborhood security negatively affected mental well-being in the sense that some participants were blocked in their daily activities as they were scared to go out at night, or to pass by some specific places. One participant encountered a severe lack of security, causing sleeping disturbance. Contrary to others who highlighted the comfort of feeling safe walking by night through their neighborhood.

participant K, 54 yr: *“The neighborhood, I find it less secure now. Now I would less dare to go out at night than before. Because we have a lot of people who have arrived from countries at war in fact in the neighborhood. Here we do not feel safe because our cars are vandalized, the young people are entering the hallway, we had squatters in the building who slept there. These are people who have arrived and who have no papers. So it’s not so much security.”*

### 3.2. Social, physical, personal, and institutional factors: a socioecological approach

Taking a socioecological approach, a conceptual framework was designed to illustrate the interactions between the personal, social, physical, and institutional factors of the neighborhood’s influences on mental well-being (Fig. 3). These interactions are explained in following paragraphs.

#### 3.2.1. Social – physical interactions

Several physical neighborhood factors were mentioned to strengthen neighbor ties among diverse neighbors. Neighborhood parks, commercial, recreational, and community services provided opportunities to spontaneously meet a diversity of neighbors. Especially, services that have been present for a longer time contributed to trustworthy relationships with the owner and to regular meetings with neighbors. Also the presence of schools was mentioned to be important for community building. Several participants referred to citizen-based neighborhood initiatives in public space (urban gardening, neighbor parties, neighbor committees) as important catalysts of neighbor bonding and enhancing a sense of community (Fig. 4).

participant L, 51 yr: *“The communal composting brought a total change. Thanks to that I met everyone. I was able to identify them too, which is always good. That’s the end of putting people in a certain context. Getting to know people I never spoke to, to whom sometimes I had prejudices. It allowed me to say hello and talk to people in the street, it’s a lot nicer. It contributes a lot. Here I felt much safer, saying “here it is home”.”*

The participants provided as well good examples of how physical factors could inhibit neighbor contact, such as broad-trafficked lanes due to the related traffic noise and wideness of the street.

#### 3.2.2. Social – physical – institutional interactions

Contrary, institutional planning for convivial neighborhood squares could enhance community building as explained by following participant:

participant G, 48 yr: *“What I experience is that the two main squares nearby have become even more convivial. So actually the municipality invested in making these squares more nicer and really like gathering places. I mean real squares not parking spots. I’ve seen across in society, at least in Belgium, that there is an increasing need for community. For bringing people together. And I think the municipality authorities are listening to this. So they’re indeed creating spaces where people can meet and personally I think this is increasingly important.”*

This example covers another important institutional factor that was appreciated by several participants, namely the responsiveness of the local municipality to personal requests or local needs. Several participants referred to the importance of the municipality to respond supportive to the growing amount of initiatives based on citizen engagement, however, without the risk of escaping their own responsibility as explained by this woman:

participant F, 37 yr: *“What I think is problematic, is that they don’t look with the district itself to see how this trash issue can be solved. Their answer was “you are going to solve it by putting artworks here”. When I*

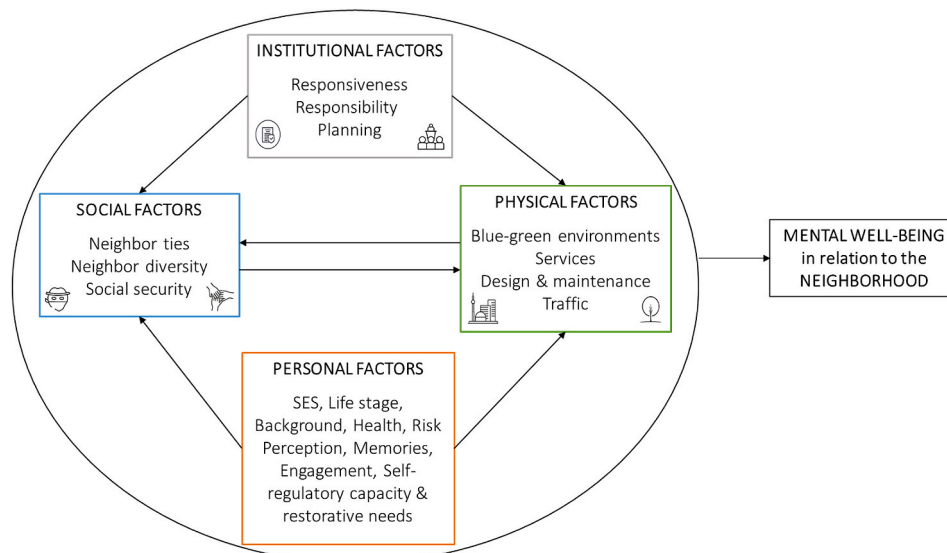


Fig. 3. Socio-ecological framework illustrating the interactions between personal, social, physical, institutional factors describing the influences of the neighborhood environment on mental well-being.



Fig. 4. Neighbor-initiated gardening project.

asked “we are going to put those things, but how are we going to solve that?”, they answered “that will happen automatically” (Fig. 2).”

Most participants were in favor of participatory planning involving local residents to adapt plans to local needs as some felt that current planning was still dominated by private interests of developers. Regarding this participatory planning they emphasized the importance of bringing together diverse neighbors as this would help to strengthen neighbor ties, create a better mutual understanding and a broader consensus for changes in the neighborhood. Current ‘participation’ seemed to be mostly induced by neighbors themselves (e.g. neighborhood committees, action groups or petitions) with difficulties to reach diverse groups in the community.

participant C, 74 yr: “I think the neighborhood committees are important, at least that is how I experienced it, because you can put pressure on

the municipality ... but what I can assess less well is how that evolution is within the Moroccan, Turkish community ... I feel that they are so isolated, more like on their own.”

Several participants felt a lack of institutional responsiveness to the increased number of homeless people, and reacted with incomprehension when confronted with social injustice. However, during the walks several participants were pleased with the presence of social organizations as important mediators of social inclusion (Fig. 5). The example of churches as being catalysts of social inclusion of vulnerable groups in society was brought up on several occasions.

participant M, 75 yr: “I lived for 9 months on the street in Brussels. I had no money. I will never forget the moment I ended up in this church, there was a pastor preaching and after the mass he says: “you are new for sure”. I say “yes”. “Come,” he says, “let’s have a cup of coffee and eat a



Fig. 5. Social organization for homeless people.

cake.” And that is how I got there and ended up living here. That is getting chances in Brussels, that is important.”

### 3.2.3. Social – physical – personal interactions

Participant M is an extreme example of how your SES defines your way of living and interaction with external factors, but also other participants addressed financial constraints to their choice of living and ended up living in neighborhoods characterized by low economic profiles, and an accumulation of social and physical problems. For example, trash accumulation was mentioned to cause conflicts and more intolerance between neighbors. Overpopulation and substance use were reasons for some participants to avoid specific places in the neighborhood. These neighborhoods were in strong contrast to neighborhoods dominated by high SES profiles where participants mentioned to feel privileged, reflecting existing environmental inequalities.

participant D, 37 yr: “Nature is missing here! ... If I would have the means, I would leave to seek tranquility, in a calm house, with a garden. Because it’s true that it’s very noisy here.”

Some participants illustrated that both positive as negative social interactions in the neighborhood were sometimes shaped by personal background such as religion.

participant B, 46 yr: “Previously, there was not this controversy that we have today where people are labelled as the Poles, the Belgians, or the Moroccans. We lived in harmony so everyone lived together and there was no hatred or difference. It changed because of terrorism in neighboring countries or even in our country. I am of the Muslim religion, I am veiled and it scares a lot of people, it scares us too because we are still targeted in the first rank.”

While negative social experiences resulted for some participants in the detachment from given places, most participants felt attached to their neighborhood or specific places in their neighborhood based on positive memories.

participant N, 73 yr: “The fact that I now live here makes me think of the time when I was sixteen years old. I have good memories of that time. That was my childhood neighborhood. And that is also the pleasant part of that neighborhood, it’s in the middle of the city, and close to the neighborhood where I live. So now I am an old man, and then I was a young bastard, the two are so close together, that’s why those walks are always so pleasant.”

Although place attachment occurred mostly among participants that have been living for a longer period in the neighborhood, some participants that were personally engaged in the neighborhood over a shorter period showed attachment based on their social encounters.

participant O, 23 yr: “Here already from the start, I have been actively looking for ways to connect with people. It happened that I went door to door to announce events or to give fruits and vegetables that we had in excess.”

Related to one’s life stage, some participants referred to some important age adaptations in blue-green spaces that enhanced their experiences, such as benches and flat soils for elderly, and secured playgrounds and toilets for children – relating to ART’s concept of ‘compatibility (Kaplan and Kaplan, 1989) (Fig. 6). A person’s life stage might also influence the importance of the neighborhood environment. Some participants explained that having children or reaching higher ages made them more depending on the neighborhood environment – relating to the concept of ‘place dependence’ associated with sense of place (Wartman and Purves, 2018).

participant F, 37 yr: “I am constantly in my environment, when I did not have my child then I was in my cocoon and the contacts we had back then were from work, that was my environment. Now my environment has become much more my home and that is just as important.”



Fig. 6. Presence of a toilet in a park.



Fig. 7. Engaging in neighborhood by planting flowers.

The capacity for self-regulation differed among the participant group. Some expressed a real sense of powerlessness regarding trash accumulation, while one participant responded as follow to the presence of trash “My well-being tells me to “avoid anything negative” you see?” (man F, 70 yr). Others turned their frustrations into actions leaving them with a positive feeling.

participant D, 37 yr: “For example to make our neighborhood more pleasant, I planted roses here. I made flower boxes to make it a little prettier. Cleaner. I find boxes, I put one there, one there and people throw their trash in it and everyone is happy.” (Fig. 7)

Several participants indicated the restorative potential of green-blue spaces as it offered the possibility for self-regulation of negative feelings (Baumeister et al., 2007; Korpela et al., 2001), but self-regulatory needs might differ depending on personal difficulties, such as health issues or difficult life time events.

participant E, 70 yr: “There, I went when I was a bit annoyed or something, then I would sit next to that tree of life, that is a fountain and then all those worries of you would flow with the water away. It’s great, that’s a philosophical garden. An oasis of peace in the full noise. There you are locked between four walls. When my husband died, I have often been crying in this park.”

## 4. Discussion

This qualitative study aimed to enhance understanding on how

citizens experience and perceive the urban neighborhood environment in relation to their mental well-being. To address this aim, walking interviews were conducted with 28 adults living in the Brussels-Capital Region. From the interviews we learn that to improve mental well-being, a neighborhood should be: safe and secure; social and diverse; calm and lively; blue and green; walkable and multifunctional; clean and attractive; and adapted to local needs and demands. Our results, however, show that influences of the urban neighborhood environment are rather complex due to a broad range of personal, social, physical, and institutional factors and a constant interplay between those factors (Fig. 3).

#### 4.1. Results in the context of existing concepts and theories

To better understand underlying mechanisms explaining links between the neighborhood environment and mental well-being, we further discuss our results within the context of existing concepts and theories.

The interviews covered a range of urban stressors such as noise, trash accumulation, air pollution, introducing the concept of urban overload (Geller, 1980). This concept states that high levels of urban stimulation overload the attentional system, have negative effects on the perception of the city, and might result in stress and mental fatigue (Berto et al., 2015; Geller, 1980). Our results showed that participants living in deprived neighborhoods were more confronted with this urban overload. The accumulation of physical stressors such as garbage dumps together with social stressors such as insecurity is a phenomenon explained by the broken window theory (Teixeira, 2016). This theory suggests that a lack of response to minor incivilities such as a broken window triggers a spiral of decay that lead to a breakdown of social order, and eventually invites criminal activities (Teixeira, 2016). Senses of powerlessness, helplessness, insecurity, lost control, distrust, and fatalism have been put forward as mechanisms underlying the negative effects of neighborhood disorder on mental well-being (Teixeira, 2016; Geis and Ross, 1998). Neighborhood disorder has been further described to be psychologically distressing with the possibility to lead in the short term to feelings of fear and anxiety, and over a longer period to depression (Hill and Angel, 2005).

Many participants referred to this urban sensory overload in their need to escape from the city. Green-blue spaces served here as an important source of stress recovery (Ulrich, 1983) and attention restoration (O'Brien et al., 2014; Cheesbrough et al., 2019). Similar to previous research that has indicated the importance of nearby nature to take a break from workloads, several participants, also unemployed, visited natural environments to break their daily routines (Degenhardt and Buchecker, 2012). Additionally, half of the participants referred to natural environments as being their favorite place, which itself is known to carry restorative effects (Korpela and Ylén, 2009).

The finding that a park not necessarily needs to be large to be restorative as stated in the concept of 'extent', is in accordance with existing evidence (Nordh et al., 2009). Besides size, also enclosure, intimacy, and structural diversity of blue-green spaces strengthened restorative experiences (Nordh et al., 2009; Grahn and Stigsdotter, 2010). Especially, structural diversity in terms of the presence of water elements, flowers, big trees, and art features, evoked feelings of relaxation and fascination. These findings answer to some extent the question on how soft fascination looks like (Joye and Dewitte, 2018). Additionally, the concept of 'compatibility' in terms of age adaptations illustrated the importance of person-related green space qualities to improve urban nature experiences. Our study therefore supports the growing amount of evidence on the importance of green space qualities in relation to mental health outcomes (Van Dillen et al., 2012; Grahn and Stigsdotter, 2010). The interview results add to the review findings of qualitative evidence on park characteristics influencing park use. The review provides an extensive overview of perceived qualities and could serve as a good starting point for future research (McCormack et al., 2010).

Our study results support the existing evidence stating that the

restorative potential does not limit to natural environments (Bornioli et al., 2018). The participants illustrated that the general absence of noise, and the neighborhood design in terms of village-like neighborhood squares, natural elements, light incidence, openness and historical architecture also offered a mental break from the city. Additionally, some participants referred to positive sounds in relation to their mental well-being, such as water or bird sounds. These findings are supported by existing qualitative evidence on the restorative effects of bird and water sounds (Ratcliffe et al., 2013; Völker and Kistemann, 2013). Generally, the interviews emphasized the importance of having enough opportunities to find peace in the middle of the city hustle, and that both auditory and visual features of natural and non-natural environments can contribute to this.

Despite the need to escape from the city hustle, this study confirms that urban stimulation might as well contribute positively to mental well-being (Geller, 1980). While all participants appreciated calmness, several also enjoyed submerging themselves in vibrant places, often characterized by cultural diversity. Similar to other qualitative evidence (Cattell et al., 2008), feeling close to the social activity going on, and not necessarily social encounters, contributed to these positive experiences. It would be interesting to further investigate when urban stimulation becomes an overload and when it becomes a pleasure.

The concept of social capital as "the sum total of positive relationships including families and neighbors that serve as buffers to the negative influences within one's immediate environment" might partly explain how citizens weigh up positive and negative neighborhood experiences (Almedom, 2005). Informal neighbor ties are described as important buffers against the negative effects of neighborhood disorder (Geis and Ross, 1998). In our study, participants emphasized the importance of good community ties for mental well-being. Among several interviews, strong neighbor ties or social memories in the neighborhood contributed to feeling attached to the neighborhood or specific places in the neighborhood. Contrary, some participants became detached from a meaningful place due to social conflicts in the neighborhood. Place detachment is defined as "to distance themselves from a place as a result of negative experiences, events, or memories" (Shamai, 2018). These findings confirm that based on different social experiences, people might attribute different values to places in relation to their mental well-being (Rollero and De Piccoli, 2010).

Consistent with the findings of Cattell et al. (2008), stable neighborhood services were mentioned to stimulate community ties. Participants referred to trustworthy relationships with the owner or casual encounters with neighbors. Such weak ties are known to contribute to mental well-being in terms of 'feeling of home', 'security', 'practical as well as social support', and 'a sense of belongingness' (Forrest and Kearns, 2001; Kawachi and Berkman, 2001). Where supporting evidence exist for our findings on the social qualities of public meeting spaces ('Yotti'kingsley and Townsend, 2006), we could not identify studies investigating the role of stable neighborhood services on social capital. In contrast to most current evidence on social capital, one participant illustrated how social capital could also lead to mental distress. One study found a similar result where the obligations of time and energy required of an active resident in a deprived neighborhood served as an extra source of stress (Mitchell and Lagory, 2002). However, little attention seemed to have gone to negative effects of social capital on mental well-being.

Another way in which neighborhood services improved the mental well-being of our participants can be explained by the Person-Environment Fit-theory. This theory posits that congruence between personal preferences or needs and environmental presses fosters environmental satisfaction and psychological well-being (Kahana et al., 2003). Where this theory held for almost all participants, several older participants confirmed that this theory even becomes more relevant with age because of a higher dependency on local facilities (Kahana et al., 2003).



#### 4.2. Limitations of the current study

The current study is not without limitations. First, the self-selection bias associated with voluntary participation must be acknowledged. Despite this limitation, our sampling strategy involving diverse local organizations allowed us to reach some level of diversity in our sample. Second, the bilingualism in the Brussels-Capital Region required multiple interviewers (with different professional backgrounds) for the semi-structured interviews. A training at the start and group reflections during the project raised awareness among the researchers on their own role and potential influence on the research. Third, our findings reflect the perceptions of participants on what environmental characteristics are important for their mental well-being, and thus their conscious feelings and knowledge on the topic. Therefore, our study design is insufficient to gather unconscious associations between the urban environment and mental well-being. Nevertheless, previous research has found that perceptions of environmental characteristics related to the local neighborhood may be important contributors to mental well-being (Leslie and Cerin, 2008; Permentier et al., 2011). Finally, our study limited to perceived influences of the urban environment on mental well-being and provided only one explicit example on neighborhood implications to mental illness. Environmental conditions improving mental well-being do not necessarily imply recovery from mental illness. This requires research focusing on environmental perceptions from participants suffering from a mental illness.

The walking interview method itself showed some strengths and weaknesses. This method provided a very comfortable way of interviewing for both the interviewer and the interviewee. However, this method should ideally not exclude participants that experience physical or social barriers regarding this method. To overcome this limitation, we discussed the walking interview method with our participants in advance and adapted it when requested. This method further challenged the interviewer and the interviewee to go deeper into some topics raised because along the walk both encountered continuously new elements to touch upon. Yet, it allowed the interviewees to add images to words and the interviewer to immerse truly in the neighborhood experiences of the participants. These findings are in accordance to Thompson and Reynolds (2019) who pointed out the added value of disruptions during go-alongs, but also the challenges related to the unanticipated detours (Thompson and Reynolds, 2019). Nevertheless, this method contributed to the strength of this study to shed light on the broad range and complex constellation of potential factors playing a role in how urban neighborhood environments might influence mental well-being.

#### 4.3. Recommendations

Although a broad range of quantitative research has found some trends in associations between urban environment characteristics and indicators for mental illness and well-being, conclusions are not unambiguous (Benita et al., 2019; Clark et al., 2007; Gascon et al., 2015; Moore et al., 2018; Rautio et al., 2018). The current qualitative study illustrates that this inconsistency between study results might be explained by the complex interactions that occur between personal, physical, social, and institutional factors in relation to mental well-being. Despite a general recognition of this complexity, most studies still tend to focus on either physical or social environmental factors, and ignore important interactions between those factors (Francis, 2010; Lorenc et al., 2012; Roux and Mair, 2010). The socio-ecological framework presented in this paper can guide future research to pay more attention to the variety of factors and interactions among those factors. Additionally, the theories and concepts we introduced in this section could strengthen future efforts to unravel the underlying mechanisms explaining influences of the neighborhood environment on mental well-being (Roux and Mair, 2010).

Participatory planning can offer the opportunity to detect and respond to complex interactions in the neighborhood environment.

Similar to previous research, most participants supported citizen involvement in neighborhood planning (Francis et al., 2015). Community participation itself can improve mental well-being by strengthening feelings of empowerment and the sense of community, especially in vulnerable neighborhoods (Francis et al., 2015; Teixeira, 2016; White et al., 2017). However, community representation in those participatory processes are still of great concern (Hutcheson Jr, 1984). Making participatory planning too formal risks to only consider opinions of engaged residents (Hutcheson Jr, 1984). Based on our experiences, we recommend approaching community organizations and medical centers as they have already built trustworthy relationships with groups that are more difficult to reach.

Regarding planning priorities, our results are in contrast with a previous study suggesting that, to improve mental well-being, priority should be given to tackle neighborhood problems (e.g. loitering, trash) instead of investing in positive attributes (e.g. sport facilities, blue-green infrastructure) (O'campo et al., 2009). Our study rather supports the "fixed window theory" (Teixeira, 2016) that already small environmental improvements such as a communal composting or flower pots can have a positive impact on neighborhood problems. Additionally, escaping to natural environments served as an important strategy to cope with neighborhood stressors, and were clearly missed by participants living in more deprived neighborhoods (Degenhardt and Buchecker, 2012). Therefore, we rather suggest an integrated planning approach.

With this study we aimed to highlight the complexity of factors influencing mental well-being in relation to the neighborhood environment and to inspire future research and planning practices. However, we are aware of the limits to what can be detected and considered in such a complex system. Therefore, we like to embrace Richard Sennett's saying, "the city is complex, full of contradictions and ambiguities. Complexity enriches the experience; brightness impairs that" (p. 15, Sennett, 2018).

#### Funding sources

This work was supported by the Belgian Federal Science Policy Office (BELSPO) [grant number BR/175/A3/NAMED].

#### Declaration of competing interest

None.

#### Acknowledgements

We express our gratitude to all members of the NAMED team and the follow up committee who provided relevant input on the method and the results of this study. We thank researchers Liz O'Brien, Sjerp De Vries, and Agnieszka O. Guizzo for their critical reflections on our study design. We thank journalist Priscille Caz to organize an introductory workshop in interviewing techniques. We are very grateful for the support provided by our contacts in the local organizations during the recruitment process. Finally, we especially thank all participants for the enriching walks and talks.

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