Human health considerations in urban green space planning

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Front page image adapted from Greenfield (2013) and Pixabay (2012).

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Abstract

Within this thesis was explored which human health considerations are incorporated in the green space planning of Amsterdam, Milan and Copenhagen. Five different ways are described in which green space can be related to health: physical activity, mental health, social interaction and cohesion, reduce air pollution, and reduce the urban heat island effect. Almost a third (280 per 100 pages) of the health considerations that were documented consists of terms related to physical activity. Mental health and air pollution are considered less than 20 times per 100 pages. The urban heat island effect is documented relatively often in Copenhagen. The municipalities of Amsterdam and Copenhagen formally document the health considerations most often. Moreover, the municipalities are not very clear in the type of green space that is used. This all indicates that there is still a gap to be bridged between science and practice on the incorporation of health considerations in green space planning.

Keywords: Green space planning, green space, health, wellbeing, quantitative content analysis

Summary

Introduction

Green space has been developed over centuries for many reasons. In the last decades, new forms of green space are appearing as well. At the same time, it becomes more clear that the environment has an impact on human health. When trying to improve the health of citizens, it is thus important to take environmental influences into consideration. Green space is also related to human health and a lot of research has been done on this relation. However, it is unknown to what extent this knowledge is also incorporated in the green space planning of cities. Therefore, the objective of this research is to explore which improvements can be made in the incorporation of human health considerations in the urban green space planning of Milan, Copenhagen and Amsterdam. The following research question was answered: Which elements related to human health are incorporated in the urban green space planning of Milan, Copenhagen and Amsterdam?

Theoretical framework

There are many different ways in which green space can be planned, leading to a large amount of green space planning models. For this research, the garden city and space related models are most important. Ebenezer Howard came up with the concept of the garden city to provide healthy living circumstances, as the industrializing cities of England in the nineteenth century caused a lot of problems. Newly built cities in the countryside would consist of several rings with a lot of green space and a central park. Many of the shape related models, such as the greenbelt, were inspired by this concept of the garden city. However, these were often applied to existing cities and on larger scales. A greenbelt was often used as a boundary and stop urban growth. Green fingers were used to let large blocks of green space enter the city. In this way it becomes more accessible as the average distance from homes to large areas of green space decreases.

From the literature the five most important ways were found, in which green space is related to health. Firstly, access to green space seems to encourage physical activity. Secondly, many studies show that people living in greener neighbourhoods have a better mental health. Thirdly, green space can provide a space for people to meet and thereby improve social interaction and cohesion in the neighbourhood. Fourthly, some studies show that green space can help to reduce air pollution, as the microstructure of the leaves and branches can capture pollutants. However, many studies show only a marginal improvement of the air quality. Lastly, green space can help reducing the Urban Heat Island effect. The temperature in cities can be several degrees higher than in surrounding areas and lead to heat-related health issues and even deaths. The shade of trees, the process of evapotranspiration and the changing movement of air because of the green space, can cool the air reduce the urban heat island effect. The aforementioned green space planning models

can exist of different types of green space (such as parks, play areas or green roofs) and it depends on the type of green space whether the health effects can occur or not.

Methodology

The overall methodological design of this study is a quantitative content analysis with three cases. Milan, Copenhagen and Amsterdam are the three cases that were studied. The new main green space plan (Piano del Verde) of Milan was developed in 2003 and was based on the earlier developed 'green ray strategy'. Eight green rays enter the city from the rural surroundings. The main green planning of Copenhagen was done shortly after WWII in the Finger Plan. Five 'fingers' of urban development were planned along new or existing railway lines and in between the fingers was space for 'green wedges'. In 1934 the Algemeen Uitbreidingsplan of Amsterdam was developed, guiding the expansion of the city. In between wedges of built space, green space and recreational areas were planned.

For each case, several documents were studied. The researcher looked for elements within the text and counted how often the elements appear. The documents that were studied were all documents that describe a vision or concrete plan to develop or conserve green spaces in the city. Documents were collected on three different scale levels: region, city and district level. All documents were characterised regarding their role in the green space planning of the city. Next to this, they were characterised as strategic, operational or hybrid. All documents were coded with help of a coding scheme that was developed on the basis of the theoretical framework. This consisted of codes related to the different health considerations and different types of green space.

Next to the quantitative content analysis, two extra interviews were conducted with two people working at the municipality of Amsterdam. The first part of the interviews consisted of questions about their ideas on the considerations in the development of green space. Secondly, the first results were shown and the interviewees were asked in what way they recognized the findings.

Results

In the quantitative content analysis of the documents of Amsterdam 341 pages of green space planning documents were analysed. 921 words were coded with a code relating to health, of which over two thirds is related to physical activity. The words that were used for this code are mostly relating to sports, cycling and hiking.

218 pages of Milanese green space planning documents were coded. Within these documents, 159 terms were coded with a health code, which is the least of the three cities. The largest parts of these codes was related to physical activity, but social interaction was also coded relatively often.

In the case of Copenhagen, 276 pages of green space planning documents were coded. 672 words were health coded in total, of which 414 was physical activity. The Urban Heat Island effect was coded relatively often as well.

For the codes related to the Urban Heat Island effect is visible that many of the words are related to the climate and climate change. This means that this has not only to do with heat, but other topics, such as rain, can be important as well.

In general, most health codes were found on the district and city level. On the regional level, not many health words appeared. In total, there is not much difference in the amount of health codes in strategic or operational documents and documents with a large, medium or small role in green space planning.

Green space in general co-occurred most often with all health themes. Parks and gardens occurred often together with mental health and social interaction. Small scale green space and green roofs and façades occurred often together with the Urban Heat Island effect.

After double coding, 84% of the original codings appeared again in the second round.

The interviews with employees of the municipality of Amsterdam resemble the results of the quantitative content analysis. Physical activity is seen as an important theme, as green space can help stimulate people to exercise more. However, one of the respondents also mentions the importance of social cohesion, but this is not visible in the results of the quantitative content analysis. Mental health and air pollution are no important topics in the green space planning. It is expected that the Urban Heat Island effect will become more important in the coming years.

Discussion
Until now, it was unknown to what extent the positive health effects of green space were incorporated in policymaking. However, linking green space and health is becoming more important, making it important to know that what professionals are planning is really working.

However, it seems that mainly physical activity is discussed in the green space planning documents. Although there is a lot of literature on mental health and green space, it is not often included in the documents. This is even more surprising, as mental health issues, such as burnout, are increasingly more common. The Urban Heat Island effect was not mentioned very often either. This is especially unexpected for the city of Milan, where temperatures can become very high. Terms related to social interaction and air pollution did not appear very often either. This is not surprising for air quality, as air quality improvement are found to be marginal. All these findings together seem to indicate a gap between science and practice.

The municipalities are often not very concrete in the type of green space they use while improving human health. Green space in general was mentioned most often. This is surprising as it was expected that, especially in operational documents, the measures are often very concrete. This therefore also indicates a gap between science and practice.

However, there are some limitations to this study. The most important is that this study comprises an analysis of policy documents. It cannot conclude on the way these documents are executed or the effects of green space on human health.

Conclusion
The goal of this study was to explore which improvements can be made in the incorporation of human health considerations in the urban green space planning of Milan, Copenhagen and Amsterdam.

It was found that mainly physical activity is mentioned in the green space planning documents and that other health considerations are overlooked. Secondly, the types of green space that are mentioned in the documents are not very concrete, though this could help in finding the possibilities of each type of green space to improve human health.

It is thus recommended to incorporate other health considerations than physical activity in the green space planning as well. Secondly, it is important to be clear in what type of green space is used. And lastly, measures to bridge the gap between science and practice are necessary, as it seems that this gap is still existent.

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1. Introduction

1. Introduction

Over time and within several cities, green space has been developed for several reasons. At the end of the nineteenth century, Ebenezer Howard developed the concept of the Garden City with a lot of green space. This concept impacted planning policies and led for example to the development of the Dutch garden villages (Amati, 2008; Kruize, Bont, van Dale, Wendel-Vos, & den Hertog, 2015). In the twentieth century the modernist planning tradition provided assumptions that strict divisions between different land uses should be made. Green belts provided planners with a tool to set boundaries to the growth of the city (Amati, 2008). Although there have always been opponents and critics on the green space as well, green space remains important at the end of the twentieth and the beginning of twenty-first century. A lot of the old green space remains, but also new forms appear, such as green roofs and urban agriculture.

Next to changes in ideas about green space, there is a growing concern about the influences of the environment on health. The World Health Organization (WHO) estimates that in western Europe 14% of the burden of disease is caused by the environment (Prüss-Üstun and Corvalán, 2006 according to Roels et al., 2014). There are several ways in which the environment is related to health. For example insomnia is linked to noise exposure and lower respiratory infections are associated with indoor and outdoor air pollution (Prüss-Üstun & Corvalán, 2006). Moreover, it is noted that more than half of the global population does not get sufficient physical activity to protect against risks caused by several diseases. This can cause for instance death, chronic morbidity and disability. The environment can also play a role in this as "inactivity levels could be reduced by designing environments that are more conducive to physical activity in the workplace, at home, in transport and in leisure time" (Prüss-Üstun and Corvalán, 2006, p.55). Certain environments can encourage walking and cycling and in this way facilitate more active lifestyles. When trying to improve the health of citizens, it seems thus necessary to take environmental influences into account.

The aforementioned green space can also influence the health of the users of the location. For example, green environments can reduce the urban heat island effect and have a positive effect on the mental health by reducing stress (Kaplan, 1995).

Problem description and research questions

There is knowledge about the relation between health and a green environment. This relation will be described extensively in the next chapter 'Theoretical framework'. However, it is not known in what way health is taken into account while planning or designing the green space of a city.

It is possible that this provides a mismatch between the planned green space and the possible health effects. In some situations the designers could have done things differently and it would have been better for our health. Therefore, the objective of this study is to explore which improvements can be made in the incorporation of human health considerations in the urban green space planning of Milan, Copenhagen and Amsterdam. The objective of the study can be translated into the following main research question:

Which elements related to human health are incorporated in the urban green space planning of Milan, Copenhagen and Amsterdam?

To answer this main question, the following sub questions were formulated:

1. Which human health considerations are (not) incorporated in planning documents concerning the development or conservation of urban green space in Milan, Copenhagen and Amsterdam does this differ per city or per type of document?

2. Which types of green space are (not) discussed together with human health considerations in planning documents concerning the development or conservation of urban green space in Milan, Copenhagen and Amsterdam and does this differ per city or per type of document?

3. Is there a relation between the appearance of a health consideration and the appearance of a type of green space in planning documents concerning the development or conservation of urban green space in Milan, Copenhagen and Amsterdam?

2. THEORETICAL FRAMEWORK

2. Theoretical framework

Within this chapter, two different topics will be described. Firstly will be described what is seen as green space in this study and how it has been planned. Secondly will be described how green space can be related to health.

2.1 Green space planning

Several terms concerning the green part of the urban environment are used in (scientific and non-scientific) literature. Green environment, infrastructure, green space, and many more. Within this study, the term green space is used.

For the definition of green space, we turn to Swanwick, Dunnett and Wooley (2003). Within urban areas, a distinction can be made between the built environment and the external environment in between the buildings. This external environment can be divided in two types of space: 'grey space' and 'green space'. "Grey space is land that consists of predominantly sealed, impermeable, 'hard' surfaces such as concrete or tarmac. Green space land, whether publicly or privately owned, consists of predominantly unsealed, permeable, 'soft' surfaces such as soil, grass, shrubs, trees and water" (Swanwick, Dunnett & Wooley, 2003 according to James et al., 2009).

This green space can take many forms and be developed for different reasons. Maruani and Amit-Cohen (2007) describe two different approaches to what they call open space. On the one hand an approach that focuses on the services that the open space provides, such as recreation. On the other hand, a more conservationist approach stems from the intrinsic value of nature and tries to protect natural values. These different approaches lead to different types of green space and different open space planning models. Maruani and Amit-Cohen (2007) describe among others: space standards, park systems, green belts, green heart, green fingers, green ways, protected landscapes and biosphere reserves. However, there are even more types possible, as James et al. (2009) mention urban forests, green infrastructure, ecological networks and frameworks as well. The models can differ on various aspects, as they can have different sizes and can be planned on different scale levels. The different characteristics of the various green space planning models are summarised in table 2.1. Not all the models are important for this research. Only the shape related model and garden city will be discussed more extensively, as they will appear in the case studies mentioned in the next chapter.

Table 2.1 Characteristics of green space planning models

Model type	Sub type	Main characteristics
Opportunistic		Green space that is not systematically planned, but the result of "opportunities that pop-up". Opportunities can take many forms, such as land that is left over after other functions are allocated, land donated to the citizens by rich families in the 19th century or space that appears after clearing up environmental problems. This can result in irregular, small amounts of green space, but examples of large parks exist as well (Maruani & Amit-Cohen, 2007).
Space standards – a quantitative model		The required amount of green space can be calculated, as a certain amount of it is required to fulfil the needs of a given population. In some cases more criteria are incorporated, such as the size and type of the green space (Maruani & Amit-Cohen, 2007).
Park systems		A set of parks and gardens that are interrelated, sometimes physically interconnected. It may be arranged hierarchically, in different sizes according to the range of service (Maruani & Amit-Cohen, 2007).
Garden city		Open space as an integral part of development. The developer of the model, Ebenezer Howard, wanted to reform society through urban planning. Socioeconomic, environmental and structural principles played a role here. The garden city forms the base of the shape related models (Maruani & Amit-Cohen, 2007).
Shape related		Shape related models can be used on themselves or in combination with other green space planning models.
	Greenbelt	Agricultural and natural areas in a circle around the city as a way to control urban growth. The belt could be used as an amenity and recreation zone. However, the green belt did not prevent urban growth in practice, though it is useful to conserve nearby open space within a city (Maruani & Amit-Cohen, 2007).
	Green heart	The opposite of the greenbelt: an open space with a built environment around it. The open space can consist of agricultural area (Maruani & Amit-Cohen, 2007).
	Green fingers (or wedges)	"Radial strips of open space that penetrate the built-up area" (Maruani and Amit-Cohen, 2007, p. 7). This improves the accessibility to the open space from the inner city (Maruani & Amit-Cohen, 2007).

	Greenways	Green space in a linear shape. It often follows existing linear elements in the landscape, such as roads, railways, streams or ridges. They can appear on different scale levels (Maruani & Amit-Cohen, 2007).
Landscape related	Landscape features	Planning model to conserve highly valued aspects of a landscape, such as mountains, ridges, rivers or streams (Maruani & Amit-Cohen, 2007).
	Cultural landscapes	Planning model that sees certain types of (rural-agricultural) landscapes as cultural heritage. The model is used to conserve these landscapes (Maruani & Amit-Cohen, 2007).
Ecological determinism		Ecological considerations can identify sites that are of high value for conservation. These lands can then be used for open space, while the rest of the land can be built (Maruani & Amit-Cohen, 2007).
Protected landscapes		Conservation of outstanding, unique or endangered landscapes by legal measures. The first protected landscapes were mostly wilderness landscapes, far away from built environments. The level of conservation and intervention by humans may vary from strict nature conservation to multifunctional areas, where human-related land use is allowed (Maruani & Amit-Cohen, 2007).
Biosphere reserves		Model to conserve open space with three concentric zones. The core area is the protected open space. A buffer zone surrounds the core and can include natural and agricultural areas. The peripheral transition zone is the outer zone which can have various uses, small settlements as well (Maruani & Amit-Cohen, 2007).

2.1.1 Garden city

The garden city movement appeared at the end of the nineteenth century in England. At that moment, industrialisation attracted a lot of people to the city. However, there were not enough houses, which led high rents for houses with bad, unhealthy living circumstances. Families did not have enough money to buy food anymore and child mortality was very high. Ebenezer Howard came up with a spatial model to solve these problems. He described this idea in *To-morrow, a Peaceful Path to Real Reform* (1898), which was reprinted in 1902 as *Garden Cities of To-morrow*. The ideal was to house people in the countryside in cities of about 30 000 inhabitants. In his book Howard provides a diagram of the layout of a garden city (figure 2.1) and describes extensively how it would look in reality. The main goal of the garden city was to provide healthy living circumstances for everyone. The best parts of the countryside and the best aspects of the city would come together here. These garden cities would be autonomous and self-sufficient. The land is owned by the municipality and within a cooperation of inhabitants is decided how the land is used. The population should

be representative of the whole society, with workers from different grades (Korthals Altes, 2004).

Within his model, Howard describes different types of green space. The city consists of several rings with different functions. In the centre of the city is a garden with public buildings around it. Behind these buildings lays the central park, which should be accessible for everyone. The next rings consist of houses and gardens and behind it is the 'grand avenue', which forms a 130 meter wide belt of green space. Howard calls this an additional park. Behind it lay more houses and gardens and lastly, factories, workshops and markets. Outside of the city is a green belt of about 2000 ha with place for agricultural activities, such as cow pastures, fruit farms and forests. The ideal ratio between city and green outer areas was 1:5 (Korthals Altes, 2004).
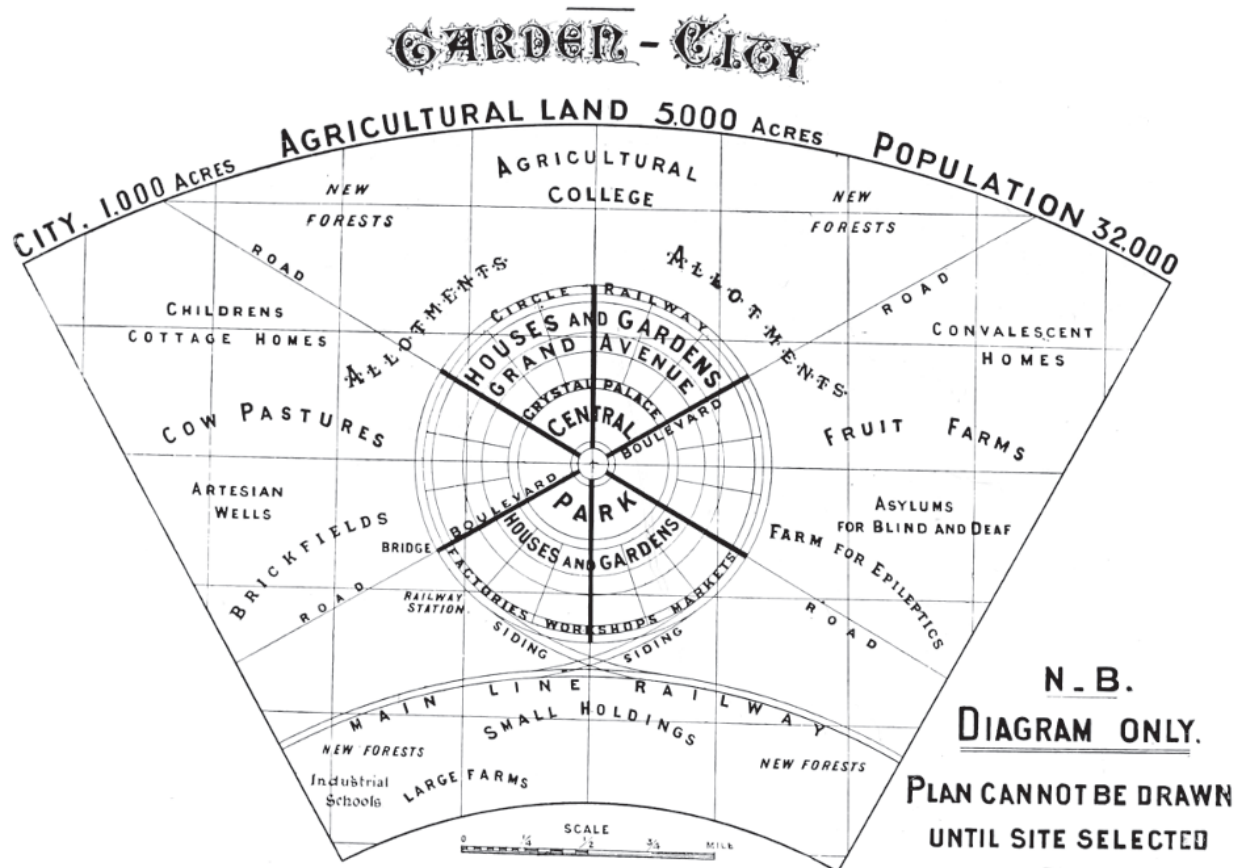

Figure 2.1 Howard's diagram of the Garden City (Korthals Altes, 2004)

The model got famous all over the world and in a lot of countries several garden villages were built with this concept in mind, though a lot of concessions were made in each case. The amount of green space was often less than the ideal and more garden villages than garden cities were built. However, the Howard played an important role in the consideration of green space in urban planning. Not all green parts of cities are called garden city or garden village, but his ideas influenced nearly all other green space planning models. Especially the shape related models, which will be described below are very much influenced by Howards ideas.

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2.1.2 Shape related models

There are several green space planning models that have a particular shape. The greenbelt, green heart, green fingers and greenways will be discussed below.

The **greenbelt** model consists of a green area surrounding a built area. The model was developed around the same time as the garden city concept. In the garden city concept, a greenbelt appears as well. However, the greenbelt concept was applied on bigger scales than the garden city concept. It was developed to control the growth of cities, as they were expanding because of the earlier mentioned industrialisation. City walls were broken down in the same period and the areas were the wall once was were used as green space. These greenbelts provided a new boundary between the big city and the smaller satellite cities around it. The green space can be used for several purposes, such as agriculture, forests or recreation areas. In some cities the green belt was seen as a 'stopper' of urban growth, while in others it was merely an over-spill element. The greenbelt concept was also applied later in time. Since the 19070s environmental issues gained importance, leading to ecological arguments for the development of green belts. Nature conservation areas were part of these new greenbelts (Amati, 2008; Kühn, 2003).

The green heart is the opposite of the greenbelt, as built areas are surrounding a green area. According to Kühn (2003) this notion uses the vocabulary of 'organism planning', a planning concept that saw the city as an organism with blood vessels, lungs, cells and a heart. The role of open space was to connect different communities. Howard also placed a central green space in the centre of his Garden City, as a centre of the community. However, other types of green space can also appear in a green heart, depending on the scale. E.g. the Green Heart in the Dutch Randstad area consist mainly of agricultural areas and covers an area of about 1500 km^2 (Kühn, 2003).

When a green space is planned using **green fingers** or **green wedges**, this means that large blocks of green space enter the city (Beatley, 2000). A lot of European cities used this strategy, but there are different reasons for doing so. Jim and Chen (2003) describe the positive effects of the city meeting the green space in the countryside. Especially for ecological considerations, such as habitat and species diversity, it is good to enhance this 'edge effect'. To maximize it, the green space should enter the city. With green fingers going into the city, there is as much edge as possible (figure 2.2). Another benefit of green fingers is the accessibility. As the green space reaches further into the city, the average distance
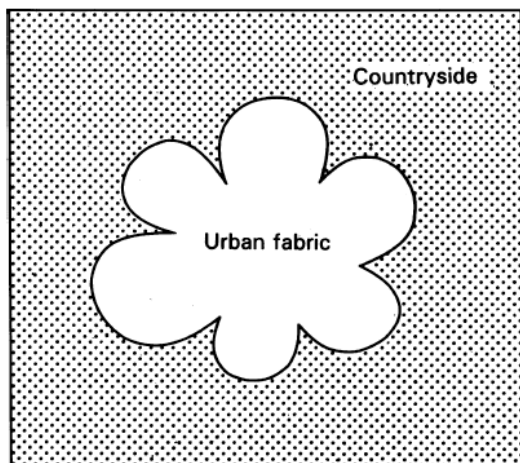

Figure 2.2 Green fingers entering the city provide a long boundary between city and countryside (Jim & Chen, 2003).

from homes to large areas of green space decreases (Beatley, 2000).

The term **greenways** emerged the in the 1950s and is thus the last one appearing from the shape related models. However, the development of the idea started already earlier. According to Hellmund and Somers Smith (2006), landscape architect Frederick Law Olmsted saw the potential of linear green space firstly. He designed tree lined carriageways to provide better access to city parks, to link several parks together and to extend the benefits of the parks into the neighbourhoods. However, these linear green spaces were called parkways. The term greenways is also one of the most vague of the earlier mentioned models. It is used in many different contexts and for many different purposes. Some consider other types of green space also greenways, e.g. a green belt as a type of greenway. The many uses have one thing in common: greenways consist of linear green spaces. Next to that, it is often assumed that they have been designed for movement of humans and wildlife (Hellmund & Somers Smith, 2006; Jim & Chen 2003). How does the green space in these models contribute to human health?

2.2 Mediators between green space and health

There are several studies that find associations between green space and health. Van Herzele and De Vries (2012) report several studies in which neighbourhood access or availability of green space was linked to different indicators of health, such as perceived general health, mortality, stress, obesity and happiness (Van Herzele and De Vries, 2012). Maas et al. (2006) report that people living in a greener environment have a better self-perceived general health. The relation between indicators of health and green space can be mediated in several ways.

Firstly, it is possible that access to green space **encourages physical activity**. De Vries et al. (2011) conducted a review of literature concerning the relation between natural environments and physical activity. For this literature review, they looked at different types of outdoor activity, among others: physical activity in general, walking and cycling for transport and recreation and outdoor physical activity by children. "The overall pattern and the majority of correlations between green elements and levels of physical activity speak in favour of the hypothesis of a connection between green elements and physical activity" (De Vries et al., 2011). However, there are also studies that do not confirm the relationship between green space and increase in physical activity. This may be due to the different types of green space that are measured. Street trees may have other impacts than parks. It may also be due to the different kinds of activities that are measured. Walking and cycling for transport have other requirements than playing outside by children (De Vries et al., 2011). Within the literature review, several studies report correlations between availability and accessibility of parks and physical activity. This relation appears in studies investigating physical activity in general, but also for walking for recreation and for children playing outside (De Vries et al., 2011). For example Giles-Corti et al. (2005) found that "access to proximate and large POS [(Public Open Space)] with attributes that make them attractive appears to encourage higher levels of walking" (Giles-Corti et al., 2005).

According to De Vries, van Dillen, Groenewegen and Spreeuwenberg (2013) some studies report an increase in several types of physical activity when the streetscape is more attractive and green. The quality of the green space is in this case more important that the quantity

(De Vries et al., 2013). However, the quantity of green space plays a role as well. A study by Ellaway, Macintyre and Bonnefoy (2005) found that "for respondents whose residential environment contains high levels of greenery, the likelihood of being more physically active is more than three times as high". For this research, the quantity of green space was measured by trained surveyors with an inspection sheet.

Walking and cycling for transport seems to require other types of green space than physical activity and walking for recreation require. Some studies found that aesthetically pleasing environments, including green elements, can stimulate active transport (De Vries et al., 2011). Cervero and Kockelman (1997) explain that the design of a neighbourhood can play a role in the attractiveness for walking. Planting trees along cycling and walking paths can make physical activity more attractive. De Vries et al. (2011) report a study in Bielefeld (Germany) in which the "accessibility of green areas is essential in people deciding to use them as an alternate route of active transport" (De Vries et al., 2011). However, it was not reported why the residents used these as an alternative route. Other studies showed negative relations between the amount of green space and cycling or walking for transport. Maas et al. (2008) report that "no significant relations were found between the percentage of green space in the living environment and whether or not people meet the Dutch public health recommendations for physical activity, sports and walking for commuting purpose" (Maas et al., 2008). This may be due to the fact that locations with lots of green space, often agricultural areas, may be located on the outskirts of the city. Within these locations, often less facilities are available and more parking space than in the city centre. These influence the chosen mode of transportation as well (Maas et al., 2008).

Secondly, there are several studies that confirm that people living in green environments have a better **mental health**. Kaplan (1995) uses Attention Restoration Theory to explain this relation. When one has been focused on something for a long time, this can lead to directed attention fatigue. To rest the directed attention, a restorative experience can be undertaken. Kaplan (1995) argues that natural environments are rich in the characteristics that are important for an environment to be restorative (Kaplan, 1995). Next to this theory, there are more and more studies that confirm the relation between a natural environment and mental health. Less stress is experienced by people that spend time in green environments or have a private garden or green areas nearby their homes (De Vries et al., 2013; Van Herzele & De Vries, 2012). People that use a forest or woods on a regular basis for their physical activity are at half the risk of poor mental health of people that use other environments (Mitchell, 2013). The amount of green space can contribute to the level of neighbourhood satisfaction of the inhabitants. People that dislike several aspects of their neighbourhood seem to be more likely to report poor mental health (Van Herzele & De Vries, 2012).

Thirdly, green space could **improve social interaction and cohesion**. Especially for children and youth, urban green areas play a role in friendships, as children like to play there. Moreover, they are important places to make new friends (Seeland, Dübendorfer & Hansmann, 2009; Van Herzele & De Vries, 2012). For cross-cultural friendships between children, urban green space is important as well. "Meeting and communicating in open spaces [...] can be a platform for breaking up social segregation, and therefore public places are indispensable for meeting and establishing contacts" (Seeland et al., 2009). However, to make sure the place does indeed foster cross-cultural interactions, the place should reflect green space architecture from different cultures, making all children feel 'at home'. To facilitate this, the different cultural groups should participate in the planning process. This

could already start the process of social inclusion (Seeland et al., 2009).

A research by Maas et al. (2009) showed that people living in greener environments feel less lonely or short of social support. Both partially mediated the relationship between green space and health. However, these people did not have more contact with neighbours of neighbouring friends, so other processes such as a strengthened sense of community may play a role here. Within this research, all types of green space which were dominant in 25 m x 25 m grid cells were taken into account. Small-scale green spaces were not included and no differentiation was made between different types and quality of the green space. This may have influenced the results (Maas et al., 2009). However, Kuo et al. (1998) did examine small-scale green space, as they compared neighbourhood social tie levels for buildings with common spaces with different amounts of vegetation. The level of vegetation seemed to influence the use of the common space and thereby provide opportunities for informal interaction between neighbours. Consequently, a higher level of vegetation was related to a higher neighbourhood social tie level (Kuo et al., 1998).

Fourthly, some studies state that green space can help to **reduce air pollution**. The microstructure of the leaves and branches of several types of trees contain hairs and sticky substances, which make it ideal to capture pollutants form the air. It depends on the type of pollutants in what way the green space can improve the air quality. Gaseous pollutants, such as ozone, oxides of nitrogen (NOx) and oxides of sulphur, can be absorbed by the stomata in the leaves of the trees. "Once inside the leaf, gases diffuse into intercellular spaces and may be absorbed by water films to form acids or react with inner-leaf surfaces" (Nowak, Crane & Stevens, 2006). Other pollutants, such as particulate matter, do not enter the leaves, but can be captured from the air and stick to the plant surface (Beckett, Freer-Smith & Taylor, 2000; Hartig, Mitchell, De Vries & Frumkin, 2014; Nowak et al., 2006).

There are several studies that investigated this process. Yang, Yu and Gong (2008) propose that green roofs can improve the air quality. The study in Chicago showed that in one year almost 20 ha of green roofs removed 1675 kg of air pollutants, with an average of 85 kg air pollutants per ha per year (Yang et al., 2008). Another study by Nowak, Crane and Stevens (2006) estimated that annually 711 000 metric tons of air pollution is removed by urban trees in the United States of America. However, the average air quality improvement was less than 1 percent (Nowak et al., 2006). In a literature review, Hartig et al. (2014) also found that other studies, empirical and modelling studies, show often only marginal improvement of the air quality. Several factors, such as "the density, species composition, and age of the tree canopy, the concentration of air pollutants, and the length of the in-leaf season influence the extent of pollutant removal" (Hartig et al., 2014). However, planting trees can also have negative effects on air quality. Hartig et al. (2014) stress that trees may also reduce the movement of the air and thereby hinder the dispersion of pollutants. Moreover, several trees and grasses can release pollen. These can cause allergic reactions or asthma in susceptible people (Hartig et al., 2014).

Lastly, green space can also help **reduce the Urban Heat Island effect**. The air temperature in cities can be several degrees higher than in the surrounding rural areas. Gill et al. (2007) stress that temperatures can become even higher due to climate change and that this will cause health effects. High temperatures can place stress on the thermoregulatory system of the body, with possibly thermal exhaustion, cardiovascular stress or even heat stroke as a result. This can cause a lot of heat-related deaths, especially in cities (Kleerekoper, van Esch & Salcedo, 2012). However, there are possibilities to reduce the urban heat island effect

and providing more green space can be one of them (Gill et al., 2007). Bowler et al. (2012) describe three processes through which green space can affect the temperature of the air. Firstly, trees can provide shade and thereby prevent the solar radiation from warming up the air and other surfaces below the tree. In this way, the temperature can be decreased. Secondly, the process of evapotranspiration plays a role. "Evapotranspiration consumes energy from solar radiation and increases latent rather than sensible heat, cooling the leaf and the temperature of the air surrounding the leaf [...] This contrasts with the effect of impervious urban materials such as asphalt and concrete, which do not retain water for evaporation and quickly absorb and retain heat when exposed to solar radiation" (Bowler et al., 2010). Lastly, green space can change the movement of the air and thereby exchange of heat with nearby surfaces. The type of green space influences this process. Hot air can be 'stuck' below a tree canopy and stay therefore warmer during the night. However, grass areas can cool quicker, as the air can flow more freely (Bowler et al., 2010).

The different types of green space can also have different effects on the urban heat island effect. Trees play an important role in providing shade, while lower types of vegetation mostly cool the air via evapotranspiration. This lower vegetation can be placed on the ground, but also on green roof tops or façades. Moreover, green roofs can also help in regulating the indoor temperature because of its high insulation value (Kleerekoper et al., 2012). Bowler et al. (2010) did a literature review and discovered that a lot of the research has been done on the effect of urban parks. They found that the air temperature in urban parks was on average about 1°C lower than in the surrounding areas. Kleerekoper, van Esch and Salcedo (2012) describe studies with larger effects, with up to 6°C temperature reduction in summer. Studies that investigated several parks found that the reduction in temperature increased often with the size of the park. Moreover, not only the park itself had a lower temperature, but particularly for large parks the effect could be measured until 500 m to 1 km from the boundary of the park. However, it is stressed that only few studies have been performed on the boundary effects of parks and that more research is necessary to confirm this relation. Moreover, several climatological circumstances in the area play a role, such as airflow (Bowler et al., 2010; Kleerekoper et al., 2012). The positive effect of street trees is stressed by Kleerekoper, van Esch and Salcedo (2012), as one tree may have a cooling power comparable to 10 air-conditioning units because of the evapotranspiration. Especially when there are many trees, the effect can be great (Kleerekoper et al., 2012).

2.3 Linking types of green space with health considerations

Whether or not studies found associations between green space and the aforementioned mediators seems to depend on the different types of green space. Some studies focus on specific types of green (Mitchell, 2013), others only make the distinction between quality or quantity of the green space (De Vries et al., 2013).

In table 2.2 is tried to make the connection between different types of green space and the different health mediators. Swanwick, Dunnett and Wooley (2003) developed a green space typology, which also has been the main guide in the development of the theoretical framework about green spaces. Some adaptations have been made to make the typology fit better with the research. E.g. it does not make sense to look for 'other incidental space' within the documents, therefore this has been left out. It is visible that some types of green space can contribute in different ways to human health, while others only in one or two. However, it is important to note that these are findings are not conclusive on these

subjects. The findings in the table are a summary of what is written in the theoretical framework. Other relations may exist as well, but may have not been thoroughly studied. Moreover, there can still be great differences in the appearance of the types of green space. E.g. the used plants in every type of green space can vary in species, which can influence the outcomes.

	Physical activity	Mental health	Social interaction and cohesion	Air pollution	Urban Heat Island effect
Agricultural land	Provide space for recreation.	Help reduce stress.			Cool the air through evapotranspiration.
Burial grounds		Help reduce stress.		May capture air pollutants.	Provide shade and cool the air, also in surrounding areas.
Forest/more closed parks	Provide space for sports, play and recreation.	Help reduce stress.		May capture air pollutants.	Provide shade and cool the air, also in surrounding areas.
Green roofs and façades		Help reduce stress.		May capture air pollutants.	Cool the air through evapotranspiration.
Open nature	Provide space for sports, play and recreation.	Help reduce stress.		May capture air pollutants.	Cool the air through evapotranspiration.
Outdoor sports areas	Provide space for sports and recreation.	Help reduce stress.	Provide places to meet people and make friends.	May capture air pollutants.	Provide shade and cooling effect due to evapotranspiration.
Urban parks and gardens	Provide space for sports, play and recreation.	Help reduce stress.	Provide places to meet people and make friends.	May capture air pollutants.	Provide shade and cool the air, also in surrounding areas.
Play areas	Provide space for play for children.	Help reduce stress.	Provide places for children to make friends.	May capture air pollutants.	
Private green space		Help reduce stress.		May capture air pollutants.	Can provide shade and cool the air.
Recreational areas	Provide space for sports and recreation.	Help reduce stress.	Provide places to meet people and make friends.	May capture air pollutants.	Provide shade and cooling effect due to evapotranspiration.
Small scale green space, street trees	Can increase the attractivity of cycling and walking routes.	Help reduce stress.	Provide nearby places to meet people and make friends.	May capture air pollutants, but may also hinder movement of air.	Provide shade and cooling effect due to evapotranspiration.
Urban agriculture	Provide space for gardening.	Help reduce stress.	Provide places to meet people and make friends.		Cool the air through evapotranspiration.

3. Methodology

3. Methodology

In this chapter is described what methods were used to answer the main research question. Firstly, the overall methodological design, a case study, is discussed and afterwards is elaborated upon the methods for data collection and analysis. Lastly, the position of the researcher within this study is explained.

3.1 Methodological design

In order to answer the research question, a quantitative content analysis was performed. "Content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Krippendorff, 2013). A content analysis can be done in a qualitative or quantitative way, within this study the texts were analysed in a quantitative way. In short, this means that within several documents was looked for several elements. The researcher counted how many times the different elements appear in the texts and performed several analyses with these quantifications. According to Boréus and Bergström (2017) a content analysis can be useful when trying to find changes over time. It is suitable to find patterns in large bodies of texts and to compare different bodies of text. Within this specific study, a content analysis can show differences between the different cities and it can also help show relations between different elements of the text. Another advantage of quantitative text analysis is that it is a very systematic method. The use of a good coding scheme, coding instruction or dictionary increases the reliability. Therefore, it should be possible for other researchers to find the same outcomes while analysing the same texts (Boréus & Bergström, 2017)

As will be explained later, this study consists of three case studies. For each case, several documents were studied using the aforementioned quantitative content analysis. One of the cases was studied more thoroughly with interviews with people involved in the green space planning of Amsterdam. Due to time and money constraints, these interviews were only conducted for the case of Amsterdam and not for Milan and Copenhagen. After the interviews were conducted, a connection with the results of the content analysis was made. This made it possible to place the results of the analysis in a larger context. Moreover, the interviews helped to increase the validity of the study, as not all data was gathered using one method.

3.2 Case studies

The content analysis contains three cases. The main units of analysis are the urban green space planning documents of each of the cities as a whole. However, there will also be looked upon documents concerning a specific site or area in the city.

The three cases were selected with the intention to get a maximum variation in the type of cases. This was done, because the study is in some way aiming to generalise the findings to the theoretical framework. Each case study is unique and has its own characteristics and complexity, which makes each on its own hard to generalise. However, by studying three different cases, it is possible to "remove the single voice of omniscience and to relativize it by including multiple voices within the research project" (Gergen and Gergen, 2003, p.4). This is the reason that aiming for different types of cases, improves the validity of the study.

The main criterion in selecting cases was the appearance of planned green space. The variation in cases was obtained by selecting cases within different phases of this planning process. This led to the selection of Milan, Copenhagen and Amsterdam. In Copenhagen, a lot of the important green space planning was done shortly after WWII, while in Milan the overall strategy for the green space in the city has been developed in 2003. The green space in Amsterdam was planned in 1934 in the Algemeen Uitbreidings Plan (AUP).

3.2.1 Milan

Milan is the second largest city of Italy with 1,2 million inhabitants in the core city and 4,1 in the larger urban area in 2012. The city expanded greatly in the last century due to industrialisation and became Italy's most important financial market (Spanò, DeBellis, Sanesi, & Lafortezza, 2015). Due to this expansion, the amount of green space in the metropolitan decreased since 1954. Policymakers began to recognize this loss and policies were developed. The amount of agricultural areas continued to decrease, but the amount of forest and semi-natural land expanded again from 1980 onwards and is now higher than in the 1950's. This is mostly due to the development of some urban forests, such as the Parco Nord and Boscoincittà (Sanesi, Colangelo, Lafortezza, Calvo, & Davies, 2017). Recently, the municipality created a new Green Plan (Piano del Verde) together with landscape architecture firm LAND. The earlier developed 'green ray strategy' forms the basis for the Green Plan with eight green rays (figure 3.1) linking several green areas (partly existing, partly to develop) together in a system (Kipar, 2009).
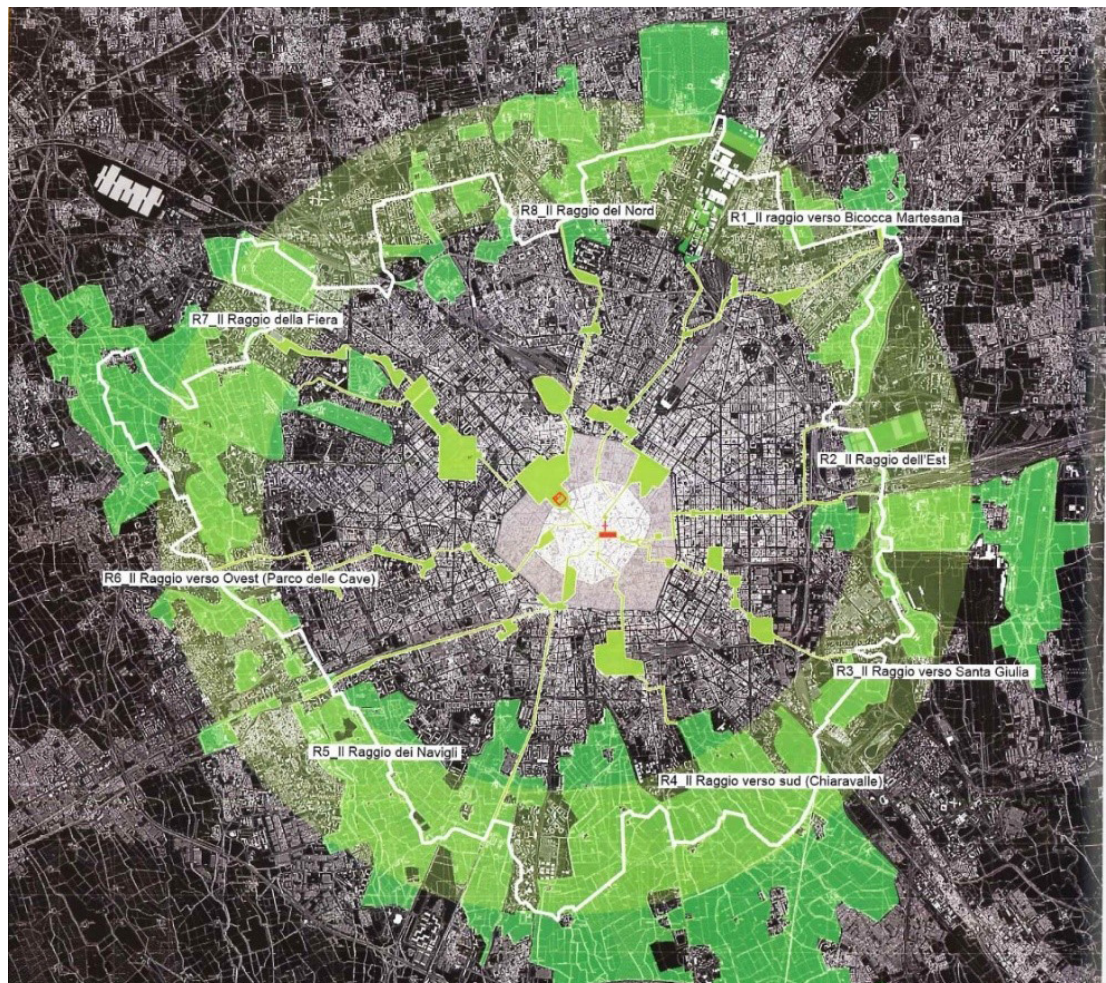
Figure *3.1* **Concept Scheme Raggi Verde, Milano** (Kipar, 2009)**.**

3.2.2 Copenhagen

In Copenhagen, the capital of Denmark, live 1,25 million inhabitants and the greater Copenhagen area houses 2,0 million people (Danish Ministry of the Environment, 2015). Just like Milan and other European cities, the population of Copenhagen increased and the city expanded after World War II. To plan the growth of the city, the Finger Plan was developed. This plan is one of the first and famous examples of Transit Oriented Development, meaning that the development of a city is focused around train stations with high quality intra-urban rail services. In Copenhagen, five 'fingers' of urban development were planned along new or existing railway lines (figure 3.2). In between the fingers, space was reserved for 'green wedges' with agricultural and recreational areas. These areas were actually already earlier defined in the Green Area Plan from 1936. Although the Fingerplan of 1947 was never formally approved and depended on cooperation of many different bodies, it still had big influences on the development of the Greater Copenhagen area. Moreover, it was constantly challenged by new developments, such as high ways. Nowadays, it is still a leading principle in the development of spatial plans (Danish Ministry of the Environment, 2015; Knowles, 2012).
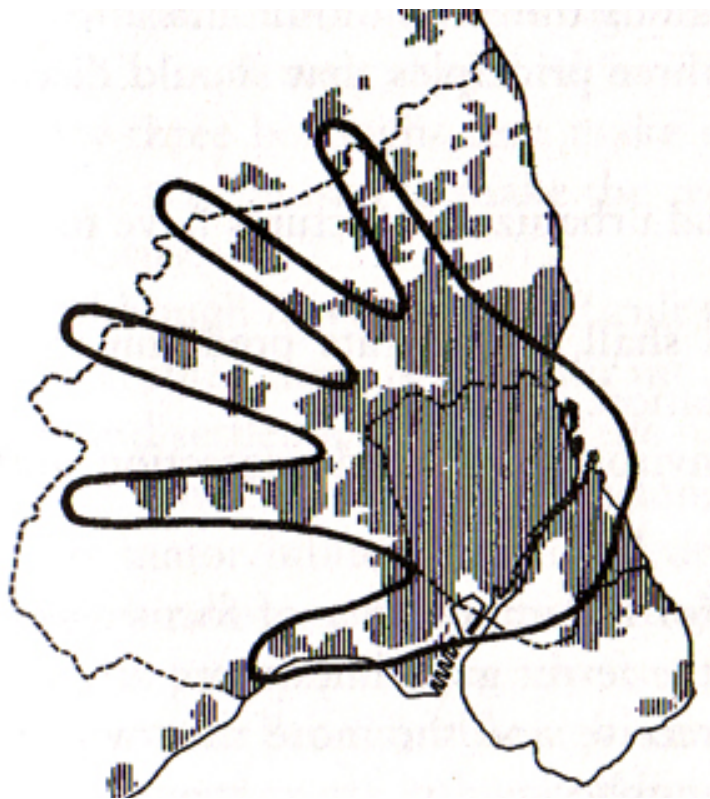
Figure 3.2 Sketch from the first Finger Plan created by the Regional Planning Office in 1947 (Danish Ministry of the Environment, 2015).

3.2.3 Amsterdam

Amsterdam is the capital of the Netherlands and also the largest city with over 800 000 inhabitants. In 1934 the Algemeen Uitbreidingsplan of Amsterdam was developed (figure 3.3). This plan guided the expansion of the city with several neighbourhoods, among which some garden villages, inspired by Ebenezer Howards garden city. These garden villages are located in Watergraafsmeer, Nieuwendam, Buiksloot, de Buiksloterham and near Oostzaan.

In between the wedges of built space, green space and recreational areas were planned. This gave Amsterdam its so called 'scheggenstructuur'. The biggest green space of the city containts an urban forest: the Amsterdam Forest. It was created to not only provide a natural landscape to look at, but to really use the place as well (Gemeente Amsterdam, n.d.). Another urban forest, the Vliegenbos, is located the north of the city and was developed in the beginning of the twentieth century. Lastly, the city of Amsterdam contains a lot of urban parks, such as the Vondelpark, Sloterpark, Westerpark and Gaasterpark. The municipality of Amsterdam tries to incorporate enough green in the city with the 'Hoofdgroenstructuur' (main green structure). In 1996 this structure was mentioned for the first time in the 'structuurplan' of the city though, the development of green space started earlier (Amsterdam Stadsarchief Gemeente, n.d.; Gemeente Amsterdam, n.d.).

Figure 3.3 Algemeen Uitbreidingsplan voor Amsterdam from 1935 (Amsterdam Stadsarchief Gemeente, n.d.).

3.3 Data collection

As mentioned earlier, the main units of analysis are the documents concerning the urban green space planning of the cities. Therefore, the biggest part of the data collections consists of the collection of documents. This is described firstly. Secondly, the collection of interview data is described.

3.3.1 Documents

Within the case study, naturally occurring materials were studied. While analysing existing documents, it is important to take into account that the documents were not constructed

especially for this research. This is different when using other types of sources, such as interviews that were conducted in a research. The naturally occurring data is constructed for a certain purpose and may therefore contain or lack elements that are important for the research. Some documents are written for a certain audience and therefore the content may differ, e.g. a document about the planting of trees looks different when written for the residents in the street where they will be planted than for the people that are going to plan them (Boréus & Bergström, 2017). The purpose, and therefore also the audience of a lot of the planning documents may be twofold. On the one hand, it may be a formally approved document which is leading in the real world. The audience in this case are the people that want to develop a spatial project. The document can tell them what is possible and what is not. On the other hand, the document is a public document that may inform the citizens the direction that the city is taking, without immediate consequences.

The data in this research consists of different types of documents. The documents for analysis must be documents that describe a vision or concrete plans to develop or conserve green spaces in the city. This strategy may be the main topic of the document, but it may also be part of a larger document, e.g. containing the development of an area in the city. The documents were mainly obtained via the websites of the municipalities or with the help of contact persons. Some documents mentioned other documents, which were obtained as well.

In this way is tried to capture the vision and plans of the municipalities on green space. As mentioned earlier, these documents will provide the basis for the outcome in the real world. However, the content analysis can only reveal the information found in the documents that were studied. This study can only make claims about intentions to include health considerations in the design of green space. Especially with long term visions, it is very well possible that changes will be made in the final design. Further research would be necessary to check whether the intentions have also been developed in the real world. Moreover, a positive effect on the health of the users of the green space is in no way guaranteed with this study.

Only documents that were published recently were studied to make sure that the current green space planning situation was analysed. All documents had to be published after the year 2000. Moreover, most of the analysed documents were no more than seven years old and comprise the most recent vision or plan on the topic.

Some of these documents may present a more beautiful future than realistic, while others may be very concrete in the steps that are going to be taken. To be able to compare the documents and the different types of documents per city, the character of the documents was described.

Firstly, the documents that were characterised as more strategic or operational. Strategic planning takes place on an abstract level and looks into the spatial development on the long term. Documents that discuss a vision on the future can be characterised as strategic documents. It is often still unclear where and when the developments will exactly take place. Operational plans can be seen as an elaboration of the strategic plans. The strategic plan can provide the basis for these plans. Operational plans are more concrete and more directed at the execution of the plan. Therefore, they provide more details, such as where the development will actually take place (Ligtenberg, Vullings, & Bulens, 2004; Neuvel & Jaarsma, 2015). Some documents contain strategic as well as operational parts. These were

than categorized as hybrid.

Secondly, all documents were characterised regarding their role in green space planning in the city. Some documents discuss nothing but the development of green space and the role of green space planning is thus large. In other documents, green space planning is only discussed in a part of the document or only one type of green space is considered. In these cases, the role of green space planning is considered medium. Lastly, the role of green space planning can be small, as it is only addressed indirectly.

Lastly, a few of the analysed documents were not written by the municipality. When this is the case, this is indicated.

3.3.2 Interviews

Within this study it was necessary to gather data about considerations in green space planning. To steer the data collection and make sure the needed data was collected, an interview protocol was used. The interviews with parties involved in the green space planning of Amsterdam consisted of two parts. The first part of the interview was guided by the theoretical framework and consisted of questions about the considerations in the development of green space in the city. However, not only health considerations could be mentioned, also other considerations could be mentioned. This helped in understanding the broader context of the development.

During the second part, the findings of the quantitative content analysis were discussed. The interviewees got the chance to express what they think of this analysis and whether they recognise these findings. This also increased the validity of the study, as the interviewees could point out if the right documents were studied. Moreover, they could express whether they recognize the results of the study or not.

The interviews was recorded in two ways. The voices were audio taped, but the researcher took notes as well. The quality of the audio tapes was good enough to transcribe all the interviews, therefore these were the main data source for the analysis.

3.4 Data analysis

3.4.1 Documents

As mentioned earlier, the biggest part of the data was analysed by a quantitative content analysis. After collecting the data, the coding scheme or coding instruction were developed. "The word 'code' has to do with elements in the texts, e.g. certain words, being recorded by means of a numerical code" (Boréus and Bergström, 2017, p.27). The coding instructions (Appendix I) exactly describe how the texts were be coded, which elements of text fit inside the same coding unit. The earlier presented theoretical framework was the basis for development of the coding instructions. However, the collected texts were quickly read as well, to ensure they indeed provide the correct information. After the coding instructions were developed, they were tested on a small part of the material to check whether modifications had to be made. The coding instructions were modified and tested again a few times, until it was clear that no modifications had to be made anymore.

The documents were not coded completely. If we would do so, this would result in bias, as chapters that do not discuss green space may discuss health related topics as well. Therefore, only the parts that discuss green space were be coded. Within these parts, only real content will be coded, meaning that for instance the table of contents and captions will not be coded.

The procedure in the coding instructions consists of two steps. Firstly, with the autocoding function of Atlas.ti was checked whether certain health related keywords were present in the original document and coded with the corresponding code. The sentences surrounding the keywords that the computer found were translated to English. The researcher then checked whether the codes were appropriate and if additions were necessary. Thus, for the documents in Dutch, Italian or Danish, the keywords of the coding instructions will be translated, so the documents can be analysed on keywords in the original language. After coding for health related words, the autocoding function was used for coding sentences related to green space. The green space codes that did not co-occur with a health coded were deleted. Afterwards, the researcher checked whether adjustments had to be made to the remaining green space codes.

There is a difference in the way the words about green space were coded an the words about health considerations are coded. For the health elements, related words are coded, e.g.: 124 words were related to health. For the green space, this was expanded to a sentence mentioning a certain type of green space, as this is necessary for analysing co-occurrences. The coding scheme has been developed with the theoretical framework in mind. The different codes represent the categories that are visible in table 2.2. The codes 'green space in general' and 'health in general' were added to that.

It is impossible to develop a list with all the words corresponding to the topics discussed. However, the researcher will translate sentences and may encounter other words that are also related to the topics. The relevant words may then also be coded in a certain way. For example, it is possible that in an urban park cycling, walking and horseback riding are promoted. Cycling and walking are in the word list, but horseback riding is not. However, the researcher can code this also under 'physical activity'.

In some cases, there may be an overlap in the words related to green space and health elements. For example 'sports park' can be coded with 'physical activity' and with 'sports area' and 'playground' can be coded with 'playground' or 'physical activity'. In these cases, it is not seen as an health element, but simply only referring to the type of green space. Therefore, these cases will only be coded with the type of green space and not with the health element.

A part of the material was coded twice, using the exact same procedure. In this way it is possible to show to what extent the coding scheme is reliable. The outcomes of the double coding are presented in the results section.

3.4.2 Interviews

A small part of the data analysis contains the analysis of the interview data. The interviews were transcribed and the data was analysed using the approach that Kumar (2014) describes. Firstly the main themes were identified. The researcher went carefully through the responses of the interviewees and distinguished themes that were discussed. This was partially done with the theoretical framework in mind. Secondly, the responses were classified under the main themes. Lastly, the themes and responses were integrated into the text of the report.

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4. RESULTS

4. Results

4.1 Content analysis

For each case, the results of the content analysis are described separately. Firstly, a short description of the city and choice of documents is provided. Secondly is described which codes related to health are appearing in the documents, differing per scale level and type of document. The type of words that are used in the documents are discussed as well. Thirdly, the co-occurrence of health codes with green space codes is described. Lastly, the results of the double coding are presented.

4.1.1 Amsterdam

In table 4.1 is visible which documents that are related to the green space planning of Amsterdam were analysed. Many planning documents concerning the municipality of Amsterdam exist. However, in this study only documents about green space planning and documents with a general vision for the whole city but with chapters about green space are used. Documents with other topics related to green space exist as well, but these are not reviewed. An example is Amsterdam Rainproof, that describes the strategies of the city to protect itself against an increasing amount of heavy rain. Green space plays an important role here, but this document is not included in the analysis. In these kind of documents it is probable that only the relation of green space with the specific topic (such as rain) will be explained, but not green space in relation with human health.

Figure 4.1 Location of Nieuw-West in Amsterdam (adapted from Microsoft, n.d.).

In the Netherlands, the vision for the spatial development of the area is usually described in a structural vision. The visions created by the province of Noord-Holland and the municipality of Amsterdam are therefore very important for the development of Amsterdam. These visions are elaborated in several other documents. For green space planning, the Agenda Green is very important and earlier the Additional Testing Framework provided the

Table 4.1 Analysed documents related to the green space planning of Amsterdam

Scale	Plan	Original name	Year of publication	Type*	Role of green space*	Amount of coded pages
Region						
	Structural Concept Noord-Holland 2040	Structuurvisie Noord-Holland 2040	2010	Strategic	Small	2
	Agenda Green Province	Agenda Groen Provincie	2013	Strategic	Large	33
	Provincial Multiannual Programme	Provinciaal Meerjarenprogramma Groen 2017 - 2021	2016	Operational	Large	40
City						
	Structure plan Amsterdam: Choosing Urbanity	Structuurplan Amsterdam: Kiezen voor Stedelijkheid	2003	Strategic	Small	14
	Additional Testing Framework Main Green Structure: The Main Green Structure Arranged	Aanvullend Toetsingskader Hoofdgroenstructuur (ATK): De Hoofdgroenstructuur geordend	2002	Operational	Large	32
	Structural Concept Amsterdam 2040: Economically strong and sustainable	Structuurvisie Amsterdam 2040: Economisch sterk en duurzaam	2011	Strategic	Small	30
	Agenda Green	Agenda Groen	2015	Strategic	Large	43
	Vision Public Space	Visie Openbare Ruimte	2017	Strategic	Medium	8
District						
	Direction Park City 2015	Richting Parkstad 2015	2001	Hybrid	Small	2
	Program Requirements Gardens of West	Programma van Eisen Tuinen van West	2008	Operational	Medium	78
	City-image plan Gardens of West	Beeldkwaliteitplan Tuinen van West	2007	Hybrid	Medium	54
	Future Vision New-West 2040	Toekomstvisie Nieuw-West 2040	2013	Strategic	Small	5

* The process of categorizing the type of the document (strategic, operational or hybrid) and the size of the role of green space (large, medium or small) is described in chapter 3 Methodology.

guidelines for what is possible in certain green spaces and what is not. The development of the districts of Amsterdam is guided by several other documents. Within this study is chosen to investigate the development of the district Nieuw-West (figure 4.1). As this part of the city contains many of the garden villages of Amsterdam. The gebiedsplan (translated: area plan) is important in providing guidelines for the spatial development of the area, but did not provide any clues about green space planning. Therefore, it is not included in the analysis. However, several other documents have been written, as a lot of development has taken place in this area. Richting Parkstad 2015 describes the development of the city as housing in the old garden villages in Amsterdam had to be replaced. Next to that, several documents concerning the development of the Tuinen van West exist. Lastly, the Toekomstvisie Nieuw-West 2040 has been written in relation with the other visions that have been written for Amsterdam in 2040.

4.1.1.1 Appearance of codes relating to health

In table 4.2 is visible how often the words were coded with a code relating to health in the green space planning documents of Amsterdam. 921 words were coded in total. Over two third of these words (681 in total) were coded as relating to physical activity.

Table 4.2 Code counts in green space planning documents of Amsterdam

	District	Municipality	Region	Total
Health	17	46	6	69
Air Pollution	20	8	0	28
Mental Health	16	31	5	52
Physical Activity	272	325	84	681
Social Interaction	13	18	0	31
UHI effect	3	53	4	60
Total	341	481	99	921
# coded pages	139	127	75	341

The amount of pages that has been analysed is different for documents relating to the region of Amsterdam, the municipality as a whole and the district Nieuw-West. To be able to compare these with each other, the average code count per 100 pages was calculated (figure 4.2). For all scale levels, physical activity is mentioned most often per 100 pages. For almost all codes related to health, the documents related to the municipality as a whole have the most codes related to health per 100 pages. Only the documents related to district Nieuw-West mention air pollution more often on average. The documents related to the regional level contain on average the least codes related to health.
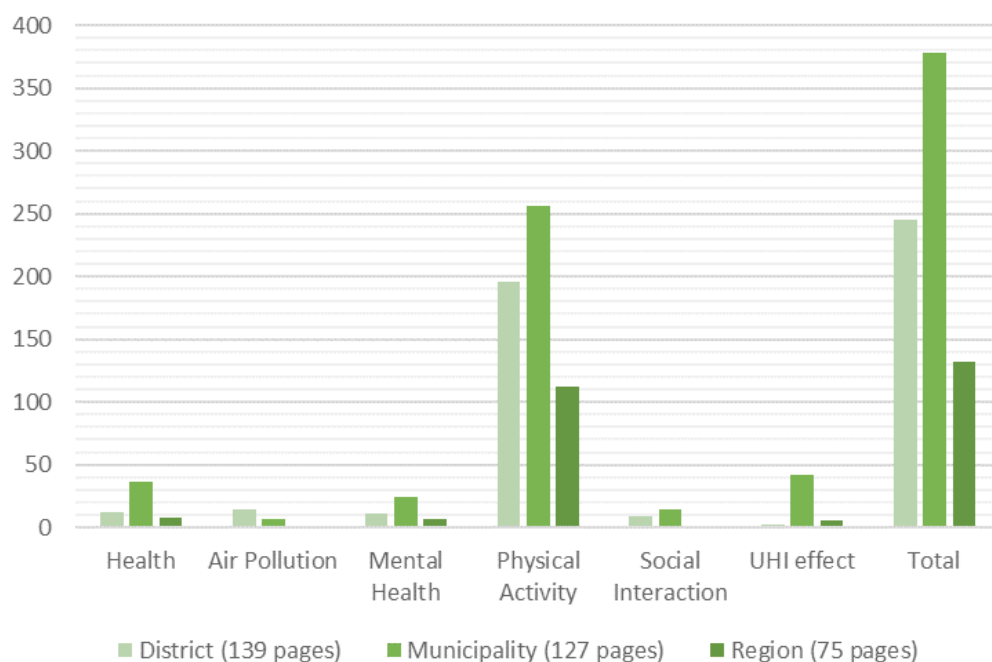
Figure 4.2 Average amount of occurrences of health related coded words per 100 pages for documents related to the district Nieuw-West, the municipality of Amsterdam and the region of the municipality.

The amount of pages that has been analysed is also different for strategic, operational and hybrid documents. To be able to compare these with each other, the average code count per 100 pages was calculated (figure 4.3). Almost all health related codes are mentioned more often in strategic documents than in operational documents. The hybrid documents only mention words related to mental health and physical activity. The urban heat island effect is only mentioned in the strategic documents.
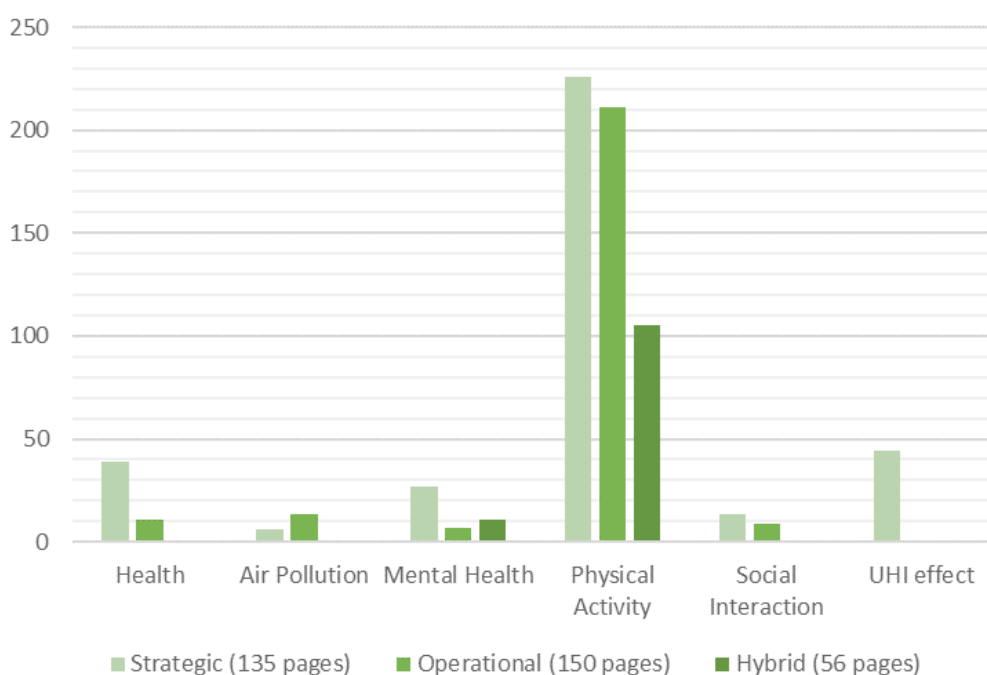
Figure 4.3 Average amount of occurrences of health related coded words per 100 pages for strategic, operational and hybrid green space planning documents of Amsterdam

Figure 4.4 shows the differences between the importance of the document for the green space planning of the city. The documents with a small role mention far more health related themes than the other documents.
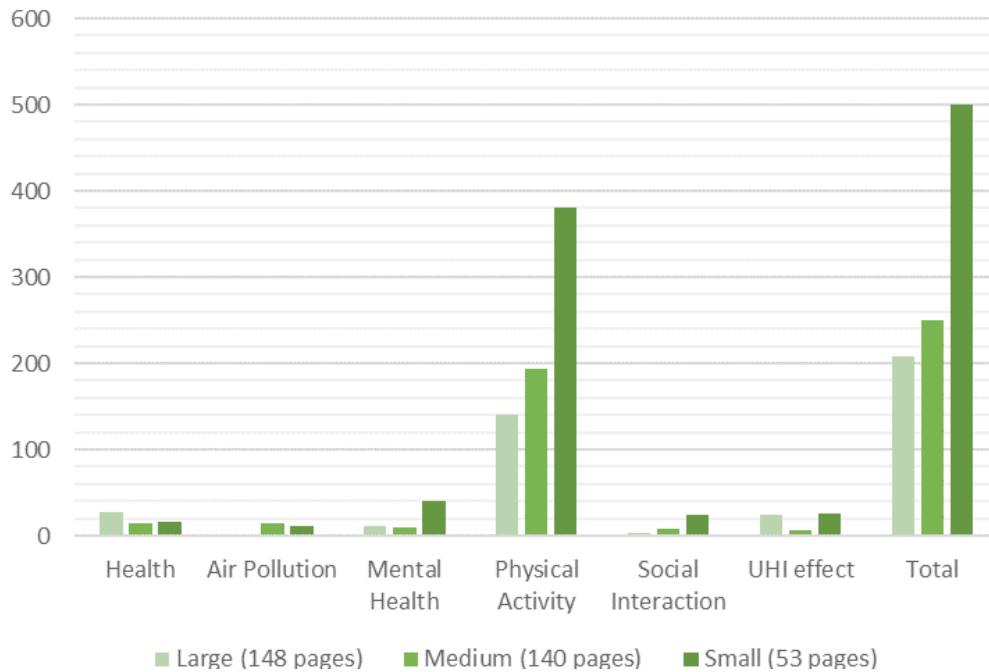
Figure 4.4 Average amount of occurrences of health related coded words per 100 pages for documents that have a large, medium or small role for the green space planning of Amsterdam

4.1.1.2 Terms that were coded

Figure 4.5 shows a wordcloud with all 52 concepts that were coded 'mental health'. The terms that appear larger were coded more often than the terms that appear small. It is visible that Amsterdam's documents focus on the qualities of green spaces, such as peace and quiet. Words related to the negative mental situations of people are hardly mentioned. 'Stress' or 'fatigue' are not mentioned at all, 'burn out' was mentioned once. A positive word 'happier' was mentioned twice.
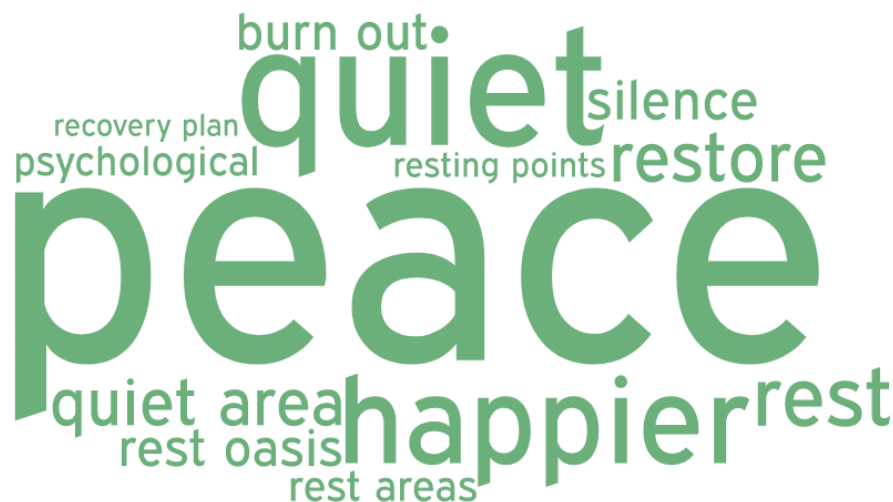
Figure 4.5 Terms that were coded 'mental health'

60 terms were coded as relating to the urban heat island effect, the wordcloud of these terms is visible in figure 4.6. It is visible that more different terms were used than for mental health. Many of the terms relate to climate (change), although this can also include other aspects of climate adaptation, such as water retention. However, other more heat-related terms are mentioned as well, such as 'temperatures', 'cooling' and 'heat resistant'.
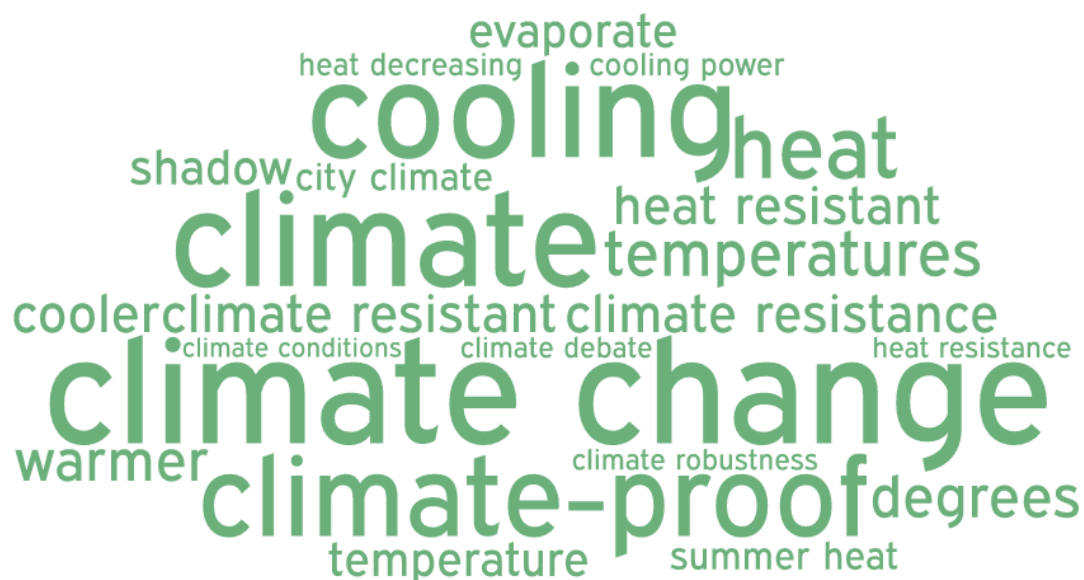
Figure 4.6 Terms that were coded 'Urban Heat Island effect'

Figure 4.7 shows the 681 terms that were coded for physical activity. It is visible that the municipality is very focused on sports, cycling and hiking. Other types of physical activity are mentioned less often. Not only the types of exercise are discussed, also the facilities needed are mentioned, such as cycle paths and hiking trails.

Figure 4.7 Terms that were coded 'physical activity'

The wordclouds for air pollution and social interaction can be found in the appendix.

Table 4.3 shows how often a green space code co-occurred with a health code in the green space planning documents of Amsterdam. To do a chi-square analysis, all categories in the table have to be mutually exclusive. This is not the case within this study, as the general 'green space' can consist of all the other types of green space that are mentioned. Moreover, a health code can co-occur with more than one green space code at the same time. Therefore, we analysed this table using the percentage of the times that a health code co-occurred with a green space code. For example, in table 4.3 is visible that 'physical activity' co-occurs with 'parks and gardens' in 9% of the cases that 'physical activity' is coded.

From table 4.3 we can conclude that all health codes co-occur most often with the general term 'green space', ranging from 18 to 29 percent of the cases. After that, parks and gardens is also mentioned often, though not together with air pollution or general health related terms. Urban agriculture is mentioned in 10% of the cases that general health is coded and 13% of the cases that social interaction is coded. Small scale green space is often coded together with the urban heat island effect. Private green space, recreational areas, open nature areas and forest are coded maximal three times.

Table 4.3 Amount of co-occurrences of health codes and green space codes

	Health	Air Pollution	Mental Health	Physical Activity	Social Interaction	UHI effect
	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)
Green space	20 (29%)	5 (18%)	15 (29%)	101 (15%)	5 (16%)	14 (23%)
Agriculture						
Burial grounds	1 (1%)	1 (1%)	1 (2%)	3 (0%)		
Forest			1 (2%)	2 (0%)		
Green roofs and façades		1 (4%)	1 (2%)			3 (5%)
Open nature	1 (1%)			2 (0%)		
Outdoor sports areas	2 (3%)			33 (5%)	3 (10%)	
Parks and gardens		8 (15%)	58 (9%)	4 (13%)	1 (2%)	
Play areas	1 (1%)		1 (2%)	3 (0%)		
Private green space			1 (2%)			
Recreational areas				2 (0%)		
Small scale green space	2 (3%)		3 (6%)	4 (1%)	1 (3%)	13 (22%)
Urban agriculture	7 (10%)			23 (3%)	4 (13%)	

4.1.2 Milan

In table 4.4 is visible which documents that are related to the green space planning of Milan are analysed. However, the researcher was not able to get hold on many documents for this city, although she spent of the three cities most time to Milan.

There are several administrative levels in Italy. For Milan, a distinction can be made between the region of Lombardy, the Metropolitan City Milan and the municipality of Milan. The Metropolitan City of Milan replaced the Province of Milan in 2015. According to Spanò,

DeBellis, Sanesi, & Lafortezza (2015) this provides several advantages, such as a decrease in bureaucracy. Within this study, documents written by Region, the Province as well as the Metropolitan City were analysed to study the green space planning on a regional level. The Piano Territoriale Regione Lombardia also seems important for this study, but it could not be automatically translated by Google. Therefore, this document was left out of the analysis.

On municipal level, the Documento di Piano Relazione Generale e norme di attuazione (PGT) is one of the most important documents in spatial planning. Next to the PGT, several other documents have been approved by the *Giunta*, such as the strategic documents on the future landscapes of Milan. However, the documents are not always easily accessible. Some earlier documents and websites mention the Piano del Verde (Green Plan) of the city, but it remains unclear whether this is a separate document or part of the PGT of the city. The PGT does not contain a chapter with this name or so. The researcher was unable to find the Piano del Verde online and the contact person at the municipality did not respond to e-mails either. It is probable that within the Piano del Verde the main idea of the green rays is explained and elaborated upon. However, this is also explained in the PGT, though it is possible that a separate document is more extensive. The Piano del Verde was developed in cooperation with the company LAND srl, who developed the concept of the green rays. After some e-mail communication, this company did send some other background information about the green rays, which was therefore analysed instead of the Piano del Verde.

With the start of this thesis, the case of Porto di Mare was already decided upon. The Politecnico di Milano is helping to develop this small area on the edge of the city in Municipio 4 into a new eco-district (Tadi, Biraghi & Zadeh, 2017). The earlier project of the Green Rays seemed to be located near this area (figure 4.8). However, as the study proceeded, it turned out the municipality does not seem to have a very clear ambition for the area. Moreover, the green ray, appeared to be in a different zone of the city. This is the reason that on district level not only text concerning Municipio 4 was analysed, but also some text concerning other parts of the city. The implications of this change are discussed more elaborately in the discussion.

Figure 4.8 Location of Municipio 4, Porto di Mare and the green rays (adapted from LAND Srl, n.d.).

Table 4.4 Analysed documents related to the green space planning of Milan

Scale	Plan	Original name	Year of publication	Type*	Role of green space*	Coded pages
Region						
	Agricultural sector plan	Piano di settore agricolo	2007	Hybrid	Medium	9
	Regional Plan of Protected Areas Lombardy	Piano Regionale delle Aree Protette (PRARP) Lombardia	2012	Hybrid	Medium	38
	Territorial Plan coordinated by the Province: general report.	Piano Territoriale di Coordinamento Provinciale: relazione generale (PTCP).	2013	Strategy	Small	21
	Milan Real Metropolis, Possible Metropolis. Three-year strategic plan for metropolitan territory.	Milano Metropoli Reale, Metropoli Possible. Piano strategico triennale del territorio metropolitan (2016 – 2018)	2016	Strategy	Small	20
City						
		Milano: new landscape territories in urban design (In: Urban Growth without sprawl: A Way towards Sustainable Urbanization)	2009	Informal strategy	Large	10
		Green Rays in Milan (In: Topos European Landscape Magazine 77, p. 50 – 54)	2011	Informal strategy	Large	5
	Plan Report General Report and Implementation Rules	Documento di Piano Relazione Generale e norme di attuazione (PGT)	2012	Hybrid	Small	39
	Strategic guidelines for the reform of the green management of the city of Milan.	Linee di indirizzo strategico per la riforma della gestione del verde della città di Milano.	2013	Strategic	Large	4

Design and management guidelines, preparatory to the drafting of projects and subsequent maintenance, of public green space carried out by private operators.	Prescrizioni progettuale e di gestione, propedeutiche alla redazione di progetti e alla successive manutenzione, delle area verdi pubbliche realizzate a cura di operatori private.	2015	Operational	Large	9
Future landscapes:	Paesaggi Futuri: Milano: spazi aperti in una visione metropolitan. Documento d'indirizzo strategico	2016	Strategic	Large	17
District					
Territorial Plan coordinated by the South Agricultural Park Milan	Piano territoriale di Coordinamento del Parco Agricolo Sud Milano	2000	Hybrid	Medium	22
PGT Appendix 1 The level of over-municipal planning	PGT Allegato 1 il livello di pianificazione sovracomunale (Parco Agricolo Sud and Piani di Cintura Urbana)	2012	Strategic	Medium	12
PGT Appendix 3 "Land Use Direction Cards" and Quantitative Data Table	PGT Allegato 3 "Schede di Indirizzo per l'Assetto del Territorio" e Tabella Dati Quantitativi	2012	Hybrid	Small	12

* The process of categorizing the type of the document (strategic, operational or hybrid) and the size of the role of green space (large, medium or small) is described in chapter 3 Methodology.

4.1.2.1 Appearance of codes relating to health

In table 4.5 is visible how often the words were coded with a code relating to health in the green space planning documents of Amsterdam. 159 words were coded in total, which is much less than in the case of Amsterdam (921 codes). Physical activity was coded most often (61 in total), as about a third of the codes relates to it. Mental health and air pollution were mentioned only a few times.

Table 4.5 Appearances of health codes

Milan	District	Municipality	Region	Total
Health	1	13	8	22
Air Pollution	0	7	0	7
Mental Health	0	4	0	4
Physical Activity	26	22	13	61
Social Interaction	14	22	12	48
UHI effect	0	15	2	17
Total	41	83	35	159
# coded pages	46	84	88	218

To be able to compare the different scale levels with each other, the average code count per 100 pages was calculated (figure 4.9) for each document type. The documents on the level of the district mention only three out of the six possible health codes, but two of these codes – physical activity and social interaction – are coded most often on this district scale. For the other scale levels, physical activity and social interaction are mentioned the most. On the regional level, not any of the codes appears very often per 100 pages.
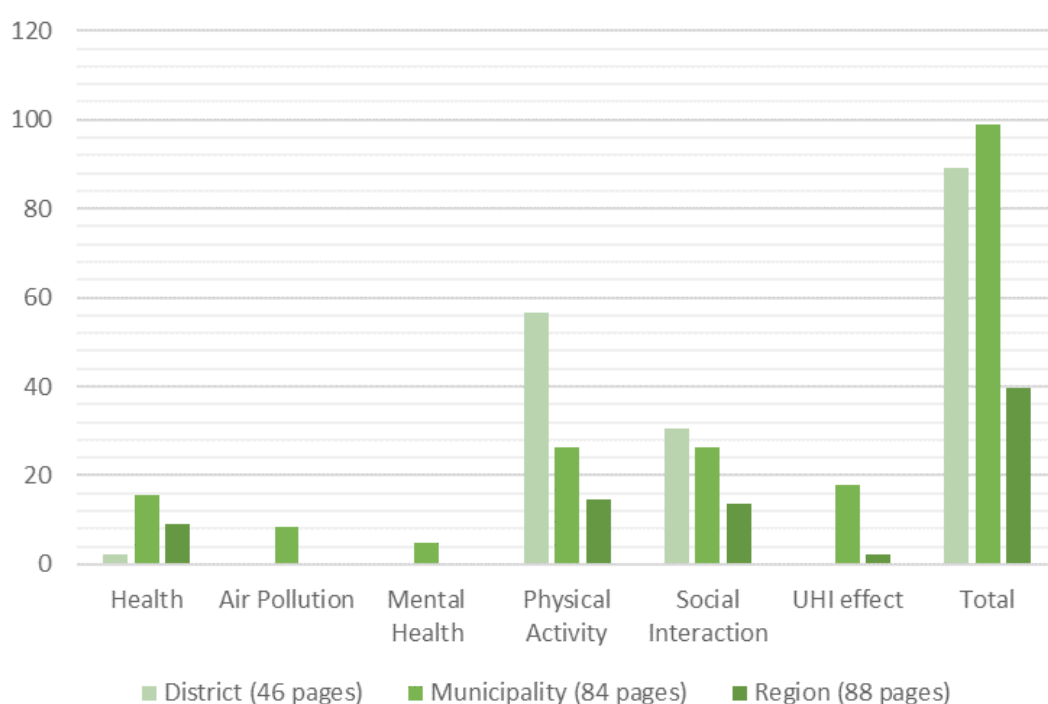
Figure 4.9 Codings district, municipality, region

For the city of Milan, the average code count per 100 pages was also calculated for the strategic, operational and hybrid documents (figure 4.10). Only nine pages of operational documents were analysed, which has resulted in very dispersed results, as it seems now as if the urban heat island effect is mentioned most often of all themes, though it is mentioned only six times in the operational documents. The results of the strategic and hybrid documents are quite comparable, though the strategic documents mention all themes-except for physical activity- more often.
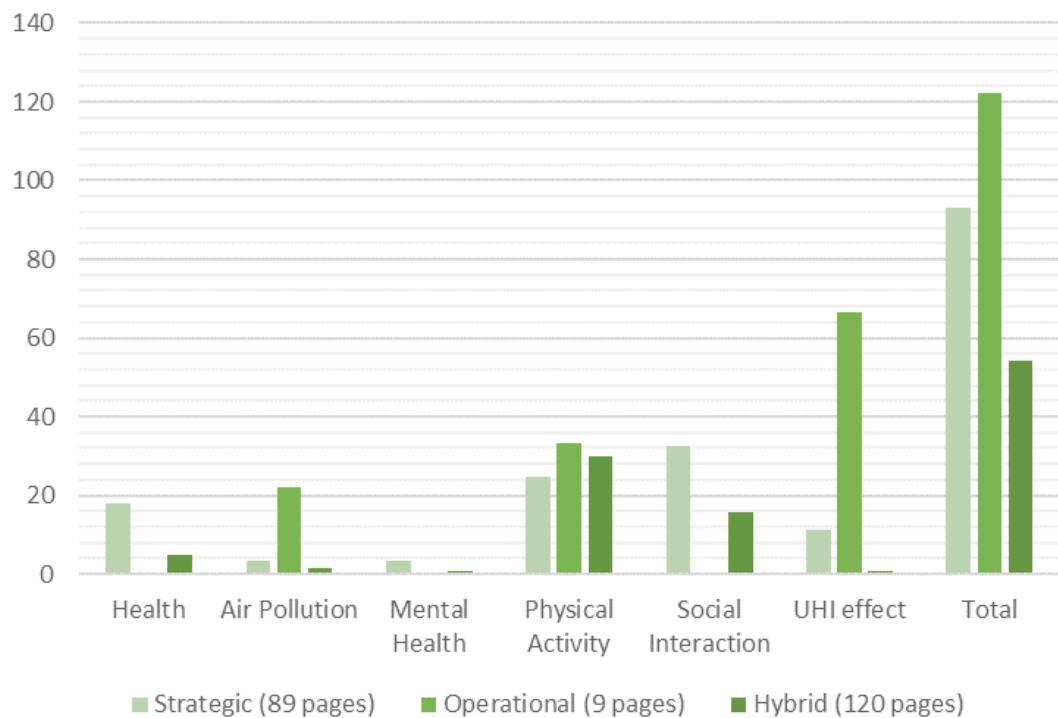
Figure 4.10 Codings strategic, operational, hybrid documents

Figure 4.11 shows the differences between the importance of the document for the green space planning of the city. The documents with a large role mention more health related words than the other documents for all the themes. Especially for the urban heat island effect, the difference is large. Air pollution, mental health and the urban heat island effect are not mentioned at all in the documents with a medium role.
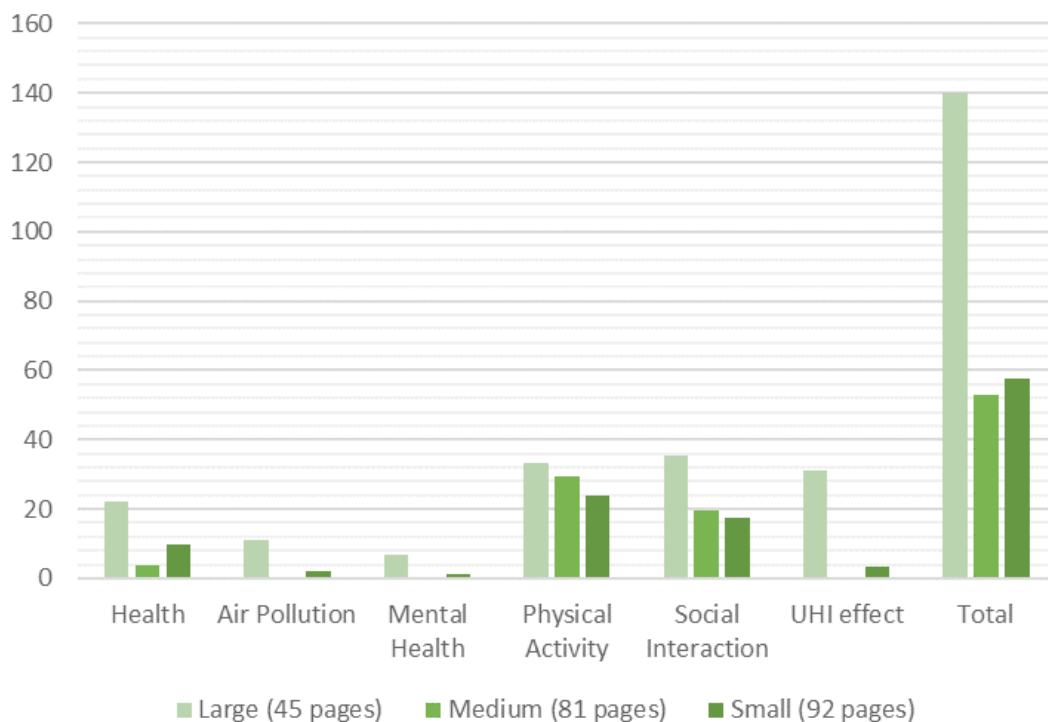
Figure 4.11 Codings large, medium or small role

Figure 4.12 shows the wordcloud of the mental health code of Milan. Although only four terms were coded, they were- unlike Amsterdam and Copenhagen- all related to stress and stress relieving factors.

Figure 4.12 Terms that were coded 'mental health'

Figure 4.13 Terms that were coded 'physical activity'

Figure 4.13 shows the 61 terms that were coded in Milan as physical activity. The city is more focused on sports than Amsterdam and Copenhagen are. However, cycling and walking is important here as well. The other wordclouds, related to air pollution, social interaction and mental health can be found in the appendix.

4.1.2.3 Co-occurrence of health codes and green space codes

Table 4.6 shows how often a green space code co-occurred with a health code in the green space planning documents of Milan. As mentioned earlier, it was not possible to do a chi-square analysis.

Overall, there are less co-occurrences than for the case of Amsterdam. Burial grounds, green roofs and façades, outdoor sports areas and recreational areas are not mentioned at all. Parks and gardens co-occurred the most with physical activity (38% of the cases). Green space in general is also mentioned often together with all health themes.

Table 4.6 Co-occurrences of health and green space codes

	Health	Air Pollution	Mental Health	Physical Activity	Social Interaction	UHI effect
	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)
Green space	6 (27%)	6 (86%)	3 (75%)	11 (18%)	8 (17%)	4 (24%)
Agriculture	1 (5%)			4 (7%)	8 (17%)	
Burial grounds						
Forest					1 (2%)	2 (12%)
Green roofs and façades						
Open nature					2 (4%)	
Outdoor sports areas						
Parks and gardens	3 (14%)		1 (25%)	23 (38%)	8 (17%)	
Play areas				1 (2%)		
Private green space	1 (5%)			1 (0%)		
Recreational areas						
Small scale green space		2 (29%)	2 (50%)	3 (5%)		3 (18%)
Urban agriculture					1 (2%)	

4.1.3 Copenhagen

In table 4.7 is visible which documents that are related to the green space planning of Copenhagen were analysed. In Denmark, the spatial planning system is strongly decentralized. Each municipality develops its own objectives in a municipal planning strategy, that can result in revisions in (parts of) the current municipal plan. This municipal plan provides the framework for the detailed local plans (Danish Ministry of the Environment, 2012). Next to this, the municipalities can have several other strategies. E.g. Copenhagen has developed a strategy to become an 'eco-metropolis'.

Since 2007 the regional councils develop regional spatial planning development plans with a vision for the region. In the years before that, the HUR (Hovedstadens Udviklingsråd, translated: Capital Development Council) developed a regional plan for the area. However, the current regional council is more directed at economic development and less at spatial development than the HUR was before. Therefore, other spatial planning policies are important as well. The national government has since 2007 written special planning directives for Greater Copenhagen again: the earlier mentioned Finger Plan. As mentioned earlier, this plan was developed in 1947 and has ever since guided the spatial development of the region. However, the national government did not develop these spatial planning directives for a long time.

Copenhagen is divided in four different zones. The palm of the hand consists of *the core urban region*, urban development and regeneration can take place here within the existing urban zones. In the urban fingers of the city, *the peripheral urban region*, urban development can be located as well. *The green wedges* in between the urban fingers consist of green space and cannot be converted to urban zones. In *the rest of Greater Copenhagen* urban development takes place in connection with municipal centres (Danish Ministry of the Environment, 2012).

For this study, a choice about a district within Copenhagen had to be made as well. In this way it is possible to compare it with Amsterdam and Milan. It would be interesting to study the planning documents mainly concerning the green wedges. However, the borders of the municipality Copenhagen enclose mainly core urban region. The green wedges consist of many different smaller municipalities. This makes the spatial planning of these municipalities incomparable with the planning of the districts in Amsterdam and Milan. Therefore, another part with a lot of green spaces within the municipality of Copenhagen was chosen: the district Amager-Vest (figure 4.14). This district contains the large nature area Amager-Faelled. Moreover, Ørestad is situated in this district, which is one of the newest areas of the city. Many developments are still going on here.

Figure 4.14 Location of Amager Vest in Copenhagen (adapted from Microsoft, n.d.).

Table 4.7 Analysed documents related to the green space planning of Copenhagen

Scale	Plan	Original name	Year of publication	Type*	Role of green space*	Coded pages
Region						
	Regionplan 2005 for Capital Region: Visions and main structure, Guidelines and statement	Regionplan 2005 for Hovedstadsregionen: Visioner og hovedstruktur, Retningslinjer og redegørelse	2005	Strategic	Medium	52
	The Green Structure in the Capital Region	Den Grønne Struktur i Hovedstadsregionen	2006	Strategic	Large	31
	Fingerplan 2007: National planning directive for the planning of the Capital Region	Fingerplan 2007: Landsplandirektiv for hovedstadsområdets planlægning	2007	Strategic	Medium	8
	Denmark's capital region- an international metropolitan region with high quality of life and growth: Regional Developmentplan	Danmarks hovedstadsregion – en international storbyregion med høj livskvalitet og vækst: Regional Udviklingsplan	2008	Strategic	Small	7
	We give Northern Europe a new gear: Regional Developmentplan	Vi gi'r Nordeuropa et nyt gear: Regional Udviklingsplan	2012	Strategic	Small	2
	Finger Plan 2013: National planning directive for the planning of the Capital Region	Fingerplan 2013: Landsplandirektiv for hovedstadsområdets planlægning	2013	Strategic	Medium	14
City						
	The Green Copenhagen: Park policy 2003	Det Grønne København: Parkpolitik 2003	2003	Strategic	Large	22
		Eco-metropolis: our vision for Copenhagen 2015	2007	Strategic	Medium	2

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	Pocketparks, trees and other green: strategy for a greener Copenhagen	Lommeparker, træer og andet grønt: strategi for et grønnere København	2009?	Strategic	Large	11
		Green Roofs Copenhagen	2012	Strategic	Large	28
	The coherent city: municipal planning strategy 2014 for the municipality of Copenhagen	Den sammenhængende by: kommuneplanstrategi 2014 for Københavns kommune	2014?	Strategic	Small	3
	Urban Nature in Copenhagen. Strategy 2015-2025	Bynatur i København Strategi 2015-2025	2015	Strategic	Large	32
	Copenhagen's Municipal Plan: The Coherent City	Københavns Kommuneplan 2015: Den Sammenhængende By	2015	Strategic	Small	5
District						
	Local environmental work in Amager East and Amager West 2017	Det lokale miljøarbejde i Amager Øst og Amager Vest 2017	2017	Operational	Small	4
	Amager Fælled and the northern nature area in Ørestad: Revised Development Plan 2010- 14	Amager Fælled og det nordlige naturområde i Ørestad: Revideret Udviklingsplan 2010- 14	2010	Operational	Large	26
	District Plan of West Amager 2013	Bydelsplan for Amager Vest 2013	2013	Hybrid	Medium	6

	A greener Quay: Proposal for a new green space plan for **Iceland's Quay** made by West Amager Local Committee and **Iceland's Quay** Local Council	Et grønnere bryggen: Forslag til ny grøn byrumsplan for Islands Brygge lavet af Amager Vest Lokaludvalg og Islands Brygges Lokalråd		Operational	Medium	14
	District Plan of West Amager 2017 – 2020: Draft	Bydelsplan for Amager Vest 2017 – 2020: Udkast		Hybrid	Medium	9

* The process of categorizing the type of the document (strategic, operational or hybrid) and the size of the role of green space (large, medium or small) is described in chapter 3 Methodology.

4.1.3.1 Appearance of codes relating to health

Table 4.8 shows how often words were coded with a code relating to health in the green space planning documents of Copenhagen. 672 words were coded in total. In Copenhagen physical activity is coded most often, as 60% of the codes is related to physical activity. Air pollution is coded the least: only three times.

Table 4.8 Appearances of health codes

Copenhagen	District	Municipality	Region	Total
Health	7	28	23	58
Air Pollution	0	1	2	3
Mental Health	5	20	10	35
Physical Activity	143	121	150	414
Social Interaction	11	25	10	46
UHI effect	11	87	18	116
Total	177	282	213	672
# coded pages	59	103	114	276

For Copenhagen the average code count per 100 pages was calculated for the district, municipality as a whole and region as well (figure 4.15). Physical activity is mentioned most often for all scale levels and air pollution the least. The municipal level contains on average the most counts for almost all codes. Only physical activity is mentioned twice as often on district scale. The UHI effect is over four times more often coded on municipal level than on municipal or district level.
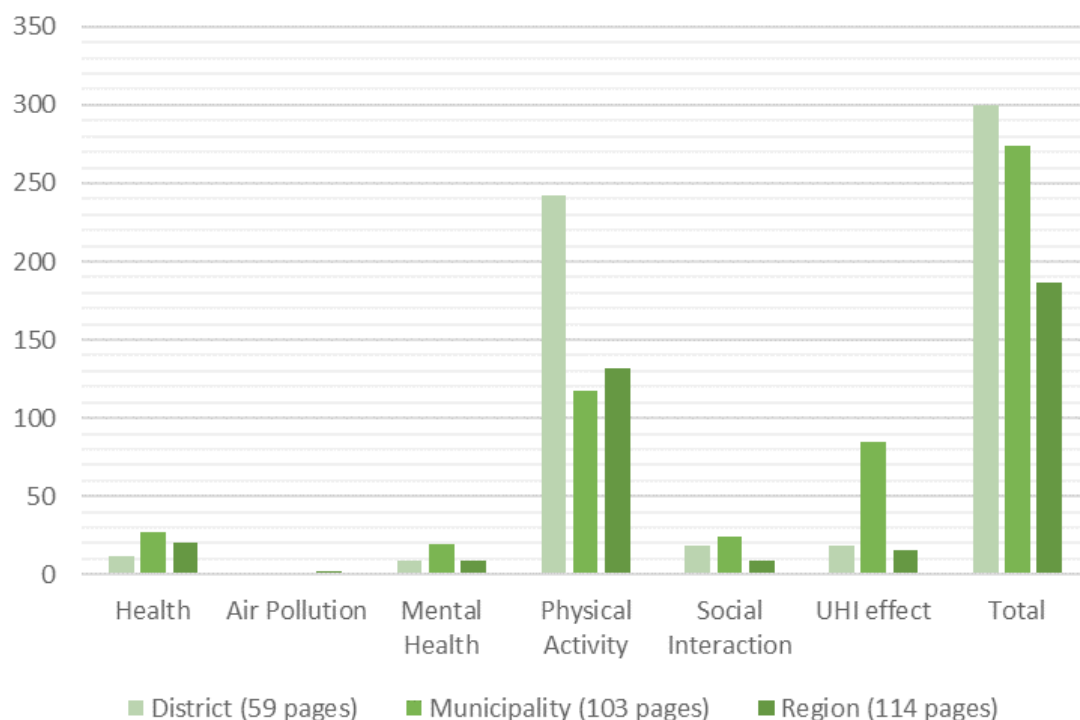
Figure 4.15 Average amount of occurrences of health related coded words per 100 pages for documents related to the district Amager Vest, the municipality of Copenhagen and the region of the municipality

The results for strategic, operational and hybrid documents per 100 pages are visible in figure 4.16. Only fifteen pages are categorized as hybrid, therefore these results have to be interpreted carefully. In general, the strategic documents have more health related codings, except for physical activity.

Figure 4.16 Average amount of health related coded words per 100 pages for strategic, operational and hybrid green space planning documents of Copenhagen

Figure 4.17 shows the occurrences of health related codes for documents that have of large, medium or small role in the green space planning of Copenhagen. Only 21 pages were coded with a small role. In documents with a large roll, the urban heat island effect is mentioned more often than in the documents with a medium role. For the other health themes, there is no big difference between documents with a large and medium role in the green space planning.
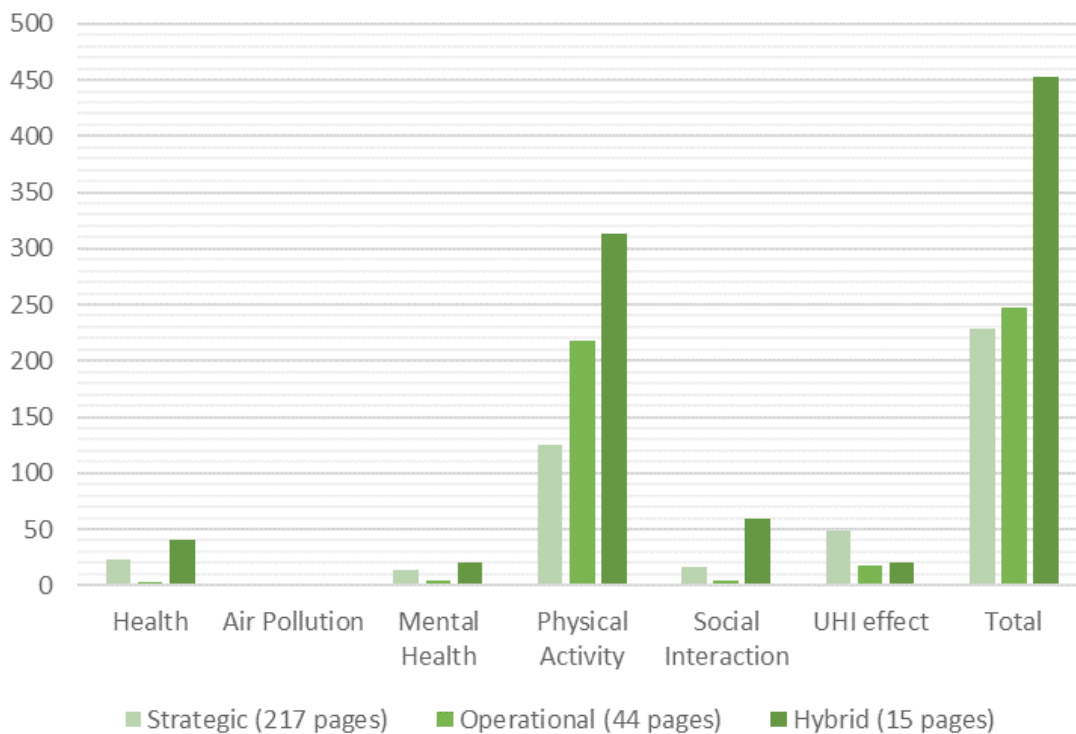
Figure 4.17 Codings for large, medium or small role

4.1.3.2 Terms that were coded

The 35 coded terms for mental health in Copenhagen are visible in figure 4.18. In Copenhagen is focused both on the qualities of the green space, as well as the state of the mental health of the people. Different terms related to stress are mentioned, but also 'rest', 'silent' and 'quiet'.

Figure 4.18 Terms that were coded 'mental health'

In figure 4.19, the 116 coded terms for the urban heat island effect are visible. Many different terms were used a few times, only 'climate adaptation' is really mentioned more often. It is similar for Amsterdam in that many terms are not specifically focused on the urban heat island effect, but on climate in general. Some words were specifically coded for heat, such as 'temperatures', 'shade' and 'urban heat island effect', but most can also be related to other climate related aspects.

Figure 4.19 Terms that were coded 'urban heat island effect'

Figure 4.20 shows the 414 terms that were coded for physical activity in Copenhagen. It is visible that the city is focused on trails and paths, mainly focusing on cycling and hiking as physical activity. However, 'play' for children is also mentioned often.

Figure 4.20 Terms that were coded 'physical activity'

The other wordclouds can be found in the appendix.

4.1.3.3 Co-occurrence of health codes and green space codes

Table 4.9 shows how often a green space code co-occurred with a health code in the green space planning documents of Copenhagen. In general, there are more co-occurrences than for Milan, but less than for Amsterdam. Not any of the green space types co-occurs with air pollution. All types of green space occurred in the documents, though agriculture and outdoor sports areas only once, private green space twice and burial grounds only four times. Green space in general is mentioned most often, as was the same for Copenhagen and Milan. Different is that small scale green space is mentioned second most often, especially together with physical activity and the urban heat island effect. Green roofs and façades are also mentioned often together with the urban heat island effect.

Table 4.9 Co-occurrences of health and green space codes

	Health	Air Pollution	Mental Health	Physical Activity	Social Interaction	UHI effect
	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)
Green space	16 (28%)		11 (31%)	85 (21%)	10 (22%)	13 (11%)
Agriculture				1 (0%)		
Burial grounds			1 (3%)	3 (1%)		
Forest				7 (2%)		
Green roofs and façades	1 (2%)		1 (3%)	2 (0%)	1 (2%)	17 (15%)
Open nature	1 (2%)		4 (11%)	10 (2%)	3 (7%)	3 (3%)
Outdoor sports areas				1 (0%)		
Parks and gardens	1 (2%)		3 (9%)	20 (5%)	11 (24%)	2 (2%)
Play areas			1 (3%)	6 (1%)		2 (2%)
Private green space				1 (0%)		1 (1%)
Recreational areas	2 (3%)			10 (2%)		1 (1%)
Small scale green space	3 (5%)		2 (6%)	23 (6%)	4 (9%)	7 (6%)
Urban agriculture	1 (2%)		1 (3%)	5 (1%)	2 (4%)	

4.1.4 Cross-case analysis

The results of the three cities are compared with each other in figure 4.21. Within the documents of Milan, substantially less words could be health related coded. Especially the difference for physical activity is large, though for most other codes Milan has less codings as well. Only social interaction codings appear more often in the Milanese documents. In general, Copenhagen has a comparable amount as Amsterdam of codings for health in general. Mental health occurs slightly less often and social interaction occurs slightly more in Copenhagen. Physical activity is mentioned more often in Amsterdam than Copenhagen. Air pollution is not mentioned at all in Copenhagen, but it is also not often mentioned in Amsterdam and Milan. The urban heat island effect is coded most often in Copenhagen, twice as much as in Amsterdam and four times as much as in Milan.
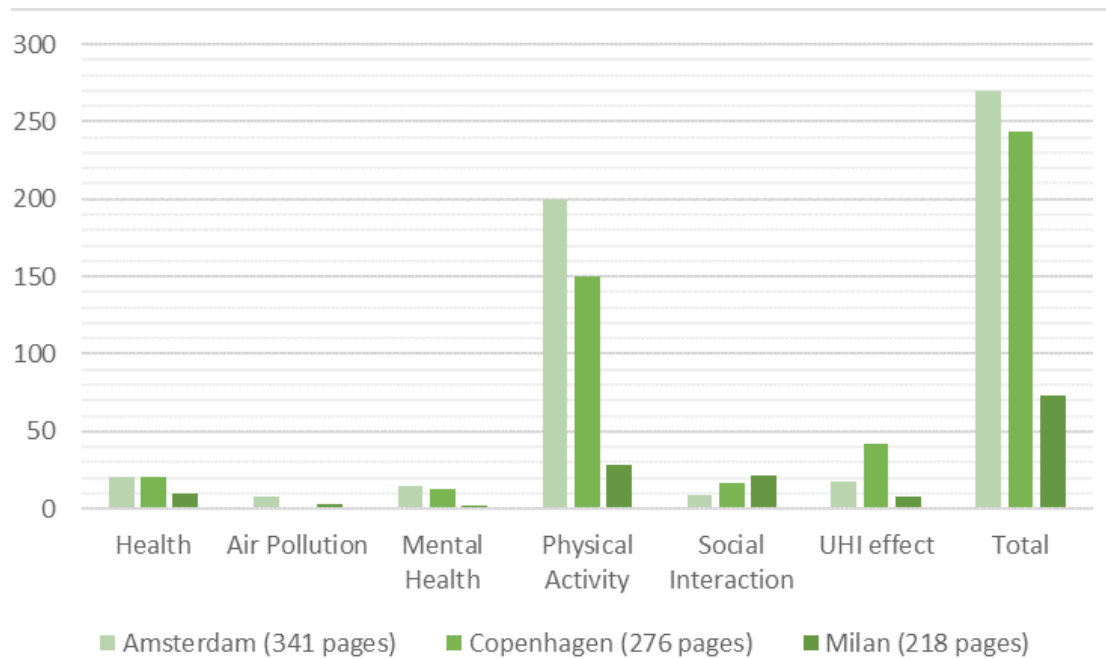
Figure 4.21 Average code count per 100 pages in all analysed green space planning documents

In figure 4.22 the different scale levels are compared for Copenhagen, Milan and Amsterdam together. Almost all themes are mentioned more often on the municipal level, except for air pollution and physical activity, which are mentioned more often on the district level. However, air pollution is hardly mentioned at all.
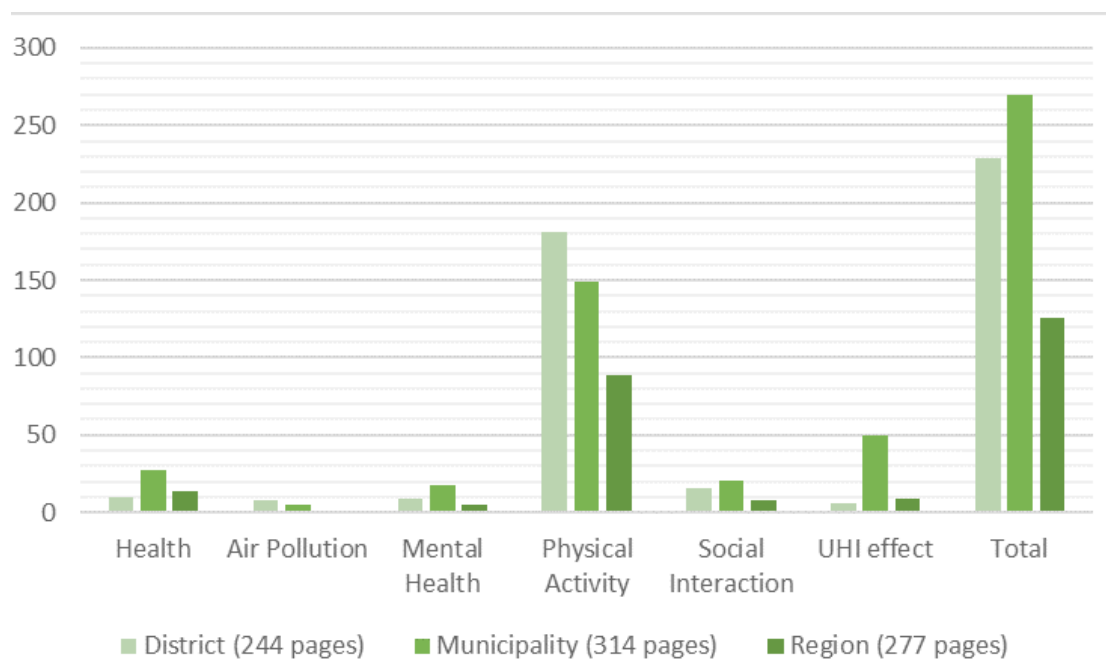
Figure 4.22 Average code count per 100 pages on different scale levels for all cities

In figure 4.23 the strategic, operational and hybrid documents can be compared for all cities. Within the hybrid documents the health related themes occur less often than in the strategic and operational documents. However, this may also be due to the large share of Milanese hybrid documents (about two third of analysed pages of the hybrid documents is Milanese). Most of the operational pages belong to Amsterdam's green space planning (three quarters of the pages). In general, there are more health codings within the strategic documents than in the operational, except for air pollution and physical activity. Because of the large difference for physical activity, in total there is not much difference between the strategic and operational code counts.
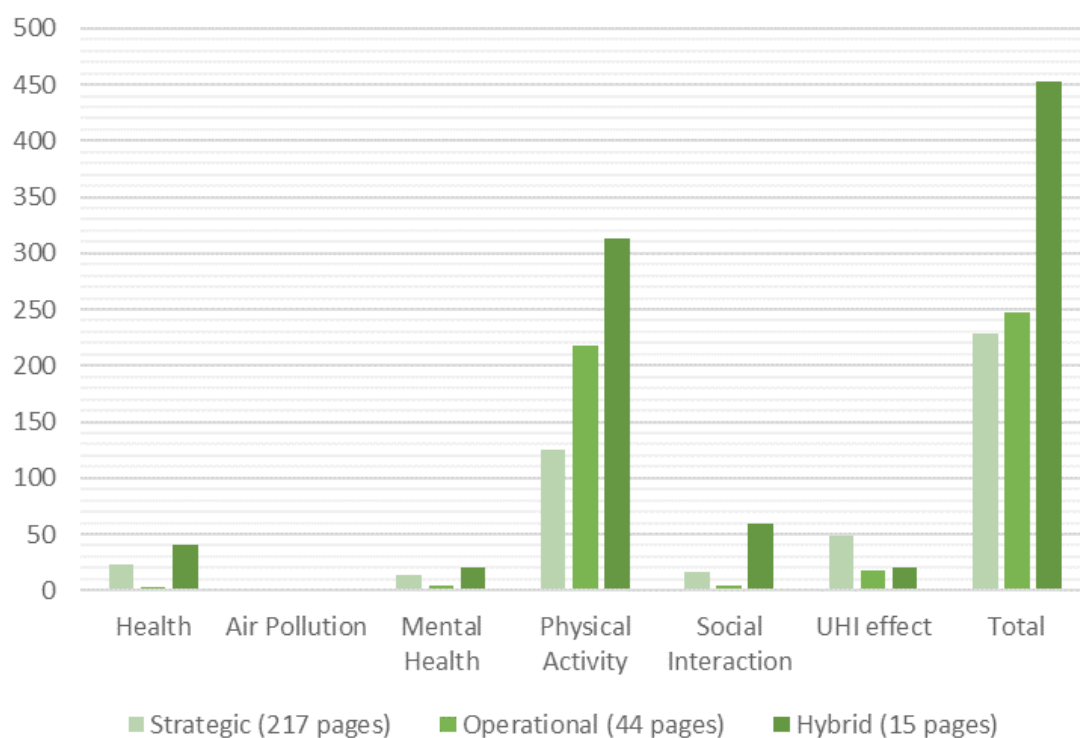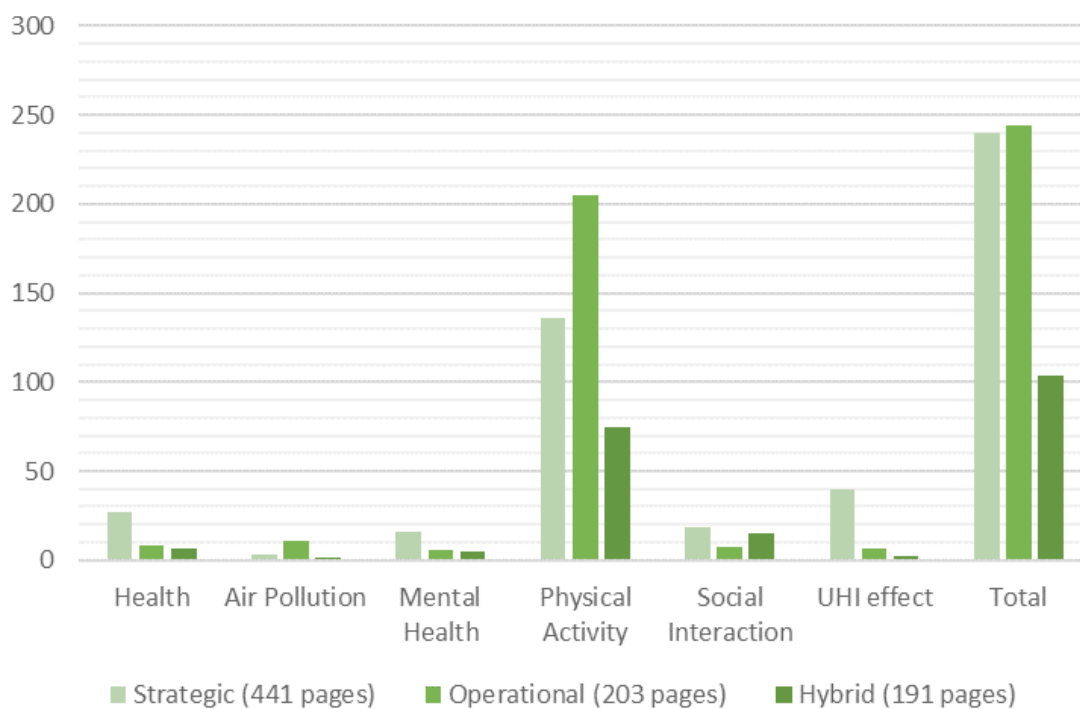

Figure 4.23 Average amount of codes per 100 pages for strategic, operational and hybrid green space planning documents of Amsterdam, Milan and Copenhagen

Figure 4.24 shows the average amount of codes for documents with a large, medium or small role in the green space planning There are not many large differences visible. The biggest difference is that urban heat island effect is mentioned most often in the documents with a large role. In general, the documents with a medium role have slightly less health codings.
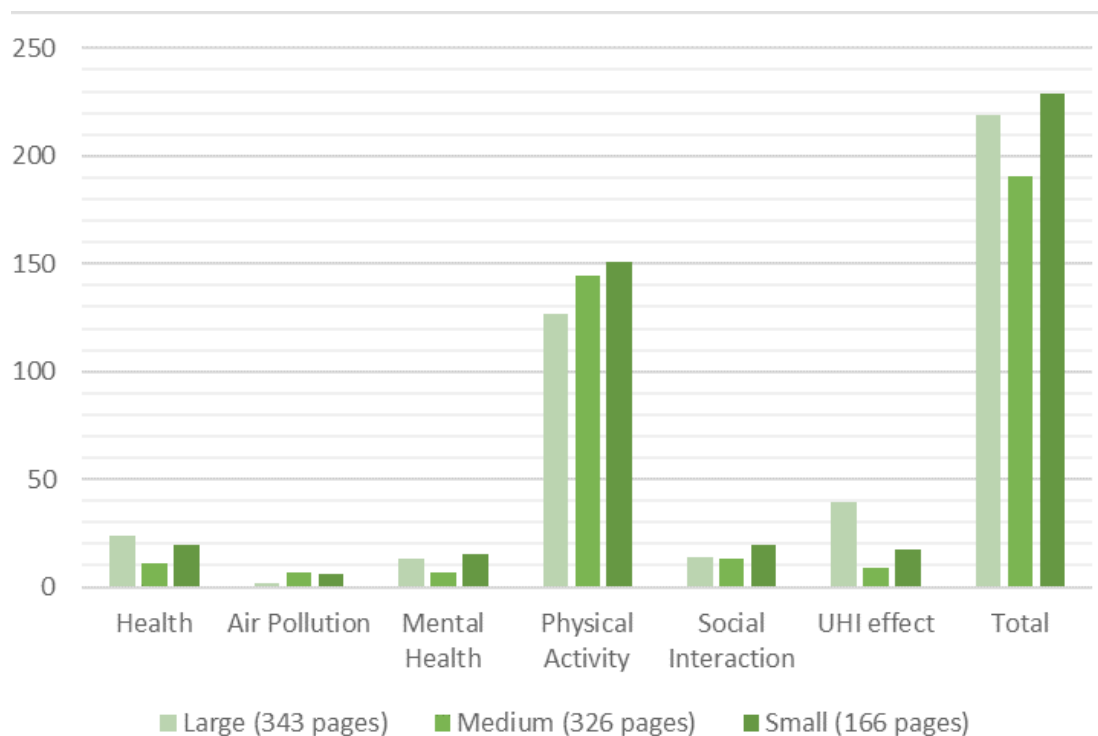
Figure 4.24 Average code count per 100 pages for small, medium or large roles in the green space planning of all cities

In table 4.10 the co-occurrences of the health and green space codes in the documents of all cities together are visible. Green space in general co-occurs most often with all health codes. Parks and gardens also co-occur often, especially together with social interaction codings (18% of the times that social interaction is coded). Small scale green space and green roofs and façades co-occur most often with the urban heat island effect (12% and 10% of the cases that the urban heat island effect is coded). Many of the other green space codes do not or rarely co-occur with the health codes. Especially agriculture (14 times), burial grounds (9 times), forest (13 times), private green space (4 times) and recreational areas (15 times) only co-occur a few times.

Table 4.10 Co-occurrences of health and green space codes

	Health	Air Pollution	Mental Health	Physical Activity	Social Interaction	UHI effect
	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)	Count (Percentage)
Green space	42 (28%)	11 (29%)	29 (32%)	197 (17%)	23 (18%)	31 (16%)
Agriculture	1 (1%)			5 (0%)	8 (6%)	
Burial grounds	1 (1%)		2 (2%)	6 (1%)		
Forest			1 (1%)	9 (1%)	1 (1%)	2 (1%)
Green roofs and façades	1 (1%)	1 (3%)	2 (2%)	2 (0%)	1 (1%)	20 (10%)
Open nature	2 (1%)		4 (4%)	12 (1%)	5 (4%)	3 (2%)
Outdoor sports areas	2 (1%)			34 (3%)	3 (2%)	
Parks and gardens	4 (3%)		12 (13%)	101 (9%)	23 (18%)	3 (2%)
Play areas	1 (1%)		2 (2%)	10 (1%)		2 (1%)
Private green space	1 (1%)		1 (1%)	1 (0%)		1 (1%)
Recreational areas	2 (1%)			12 (1%)		1 (1%)
Small scale green space	5 (3%)	2 (5%)	7 (8%)	30 (3%)	5 (4%)	23 (12%)
Urban agriculture	8 (5%)		1 (1%)	28 (2%)	7 (6%)	

4.1.5 Double-coding

For each city, at least 10% of the material was recoded. Which documents were recoded was chosen randomly using www.random.org. This resulted in the selection of 2 documents for Amsterdam (35 pages), 1 for Copenhagen (31 pages) and 3 for Milan (31 pages). In total 97 pages of 6 different documents were recoded, using the exact same procedure as described in the methodology. 341 codings (84% of the old codings) in the first round was coded again in the second round. 75 new codings were found in the second round (14% of all codings). However, in 19 of these cases (6% of the old codings), the quotation remained the same, but the applied code was different.

4.2 Interviews

To raise the case study of Amsterdam to a higher level, two interviews were done with planners at the Department of Urban Planning and Sustainability of the municipality of Amsterdam. The first interviewee is Geertje Wijten, who has been involved in the development of the Agenda Groen and is also coordinator of the implementation of it. She is also chairman of the Groenoverleg (translated: Green Council) of Amsterdam and member of the platform Rainproof. Secondly, Wouter van der Veur was interviewed, who is involved in many different projects. Some of these projects are related to green space, but mainly to public space in general. He has been involved in the green space planning of the city as project leader of the Agenda Groen and the Visie Openbare Ruimte. At the moment he is working on a study about green space in relation with the growth of the city. The interviews were done in Dutch, so all quotations below have been translated to English by the researcher.

4.2.1 Main themes in green space planning

When asked about the most important themes in the green space planning of Amsterdam, Geertje Wijten and Wouter van der Veur did not mention health as an important theme immediately. Both of them started with the fact that Amsterdam is expanding. One of the most important challenges in the green space planning is related to the growth of the city. 50 000 new dwellings will be built within the existing city. This means that the city will become more compact, increasing the need for high-quality green space within the city.

> *'The most important is focusing on the future: what are we going to do while the city becomes more compact and how do we keep the green space at least the way it is and preferably even better?'* – Geertje Wijten

In the first part of the interview, the interviewer did not yet mention that health plays an important role in this study. This gave the interviewees the opportunity to really mention the important themes, without being influenced by the fact that the study is focused on health. After some time talking about the importance of green in the city and the main themes and challenges in the green space planning, the role of health was mentioned. Especially the role of green space for stimulating physical activity was discussed.

> *'And of course things like: is it also climate proof? Because we have developed ourselves a lot in that in the past years. Is there enough space for children? Is the public space attractive? Themes such as health and physical activity are gaining importance and become more connected with green space as well'.* – Geertje Wijten

When asked about their ideas about the relation between green space and health, physical activity was mentioned again. They agree that green space can stimulate people to exercise more, they think that this is the most important health related function of green space. This relates well with the results of the content analysis, in which physical activity occurs far more often than the other health codes. Geertje Wijten also mentions that there are differences between neighbourhoods, so physical activity and overweight is an important theme at the moment.

'Well, it is mostly about, a lot about physical activity. So, how can you use green space to stimulate people to exercise more. As that is something that is currently important, people exercise less in certain neighbourhoods than in other neighbourhoods.' – Geertje Wijten

Wouter van der Veur thinks that other parts of green space are also important for human health, as he mentions aspects of mental health and climate change:

'And of course, green space is also important because of the reduction of CO_2, though that will not make a big difference in Amsterdam. It is not that if we add a lot of green space, that suddenly the amount of CO_2 will be much lower. But a lot of studies show that green space is healthy, looking at green space alone appears to be healthy. Children learn better, can concentrate them-selves better, there is less absenteeism, you name it. The studies are piling up, that show that there is indeed a relation between green space and health. So yes, I think that more green space is good for the health of people'. – Wouter van der Veur

4.2.2 Physical activity

As mentioned earlier, physical activity plays a main role when dealing with health and green space. However, when talking about physical activity, it is not only green space that is important. Geertje Wijten mentioned that there are differences in physical activity levels between neighbourhoods. Exercising has become an important theme in Amsterdam.

'There is also an alderman who is really, alderman van den Burg is very fond of exercising, sporting, also because of obesity. And the Agenda Groen also states that this link between green space and exercising, it is there, but it is not only about green space. Also other pleasant public space, a wider side-walk already helps.' – Wouter van der Veur

Within this topic, Geertje Wijten also mentions the 'Bewegende Stad' (translated: Exercising City), with this programme, the municipality tries to make people exercise as much as possible. Parts of the programme are related green space.

'With all kinds of 'exercise principles', so you are really designing in a way to make the people exercise as much as possible. We have the 'green carpets' in Amsterdam. These have been translated to the green network, where we try to make cycling routes as attractive and green as possible, so you can use green cycling routes on long distances as well. Further, nature play grounds, we are very much trying to take care of these right now. We do so of course, because of many benefits, the greening of school yards as well. These are de-signed so children will undertake more physical activity or in a different way. And yes, there are also the free running tracks, the swimming beach near the Sloterplas and well, all those facilities in parks. Calisthenics is very popular now. People come from far and wide to parks to grow a lot of muscles with it.' – Geertje Wijten

4.2.3 Mental Health

Wouter van der Veur already mentioned some themes related to mental health. Geertje Wijten also sees the value of green space for the mental health.

> *'So people become more calm because of green space, or are happier when they can stay in in a green place.'* – Geertje Wijten

However, they both agree that Amsterdam is not planning green space to improve the mental health of its inhabitants. The other themes of green space are more important and the mental health effects will follow from that.

> *'I think that we, I am not personally involved, I think we see it as a nice by-catch. In my opinion we do not consciously plan green space to improve mental health. We see it as a basic need of people to recreate, be outside and make the city rainproof. These kinds of things we see as a real necessity. And that the mental health of the Amsterdammer also gets a boost, well that is a nice bonus, but we do not have a special policy for that. At least, as far as I know.'* – Wouter van der Veur

Geertje Wijten also adds that green space is not added because of mental health reasons. However, they do work together with studies on this topic. She also responds that quiet places have become more important as well.

> *'Ehm, let's see. What is happening now, is that in many parks we try to, yes, we have investigated quiet areas, as in my opinion green is different for everyone, everyone experiences it differently. But nowadays people need peace and quiet as well. So they actually took care that there is a quieter zone in all our urban parks.'* – Geertje Wijten

These spaces are thus planned so people can experience some quietness. Interestingly, quietness is thus seen as important for the mental health effects. However, quietness is not mentioned in the theoretical framework as a quality of green space that can help in reducing stress. It is possible that green spaces with a lot of sounds are still good for you mental well-being. But in general, green space is not planned because of mental health. This relates well to the results of the content analysis. The interviewees also responded that they recognized the results of the content analysis on mental health.

4.2.4 Social interaction

While discussing mental health, Geertje Wijten responds that she also thinks that social cohesion also has to do with it. She thinks that Amsterdam is dealing more with social cohesion than mental health.

> *'But, what really is a thing, and that also has to do with it [mental health]: social cohesion. That can of course deeply influence mental health I think'* – Geertje Wijten

She knows some initiatives that stimulate social interaction and cohesion.

> '*People that are lonely and thereby [because of green space] yet encounter other people on the street. You can see that it works. And well [...] I know that GPs, or others such as social workers, accompany small groups in for example the Noorderpark. There are many initiatives that people can join, and then, while they did not go outside before, now they can walk every week and meet other people.*' – Geertje Wijten

However, these are more social initiatives. Social interaction does not seem to play a large role in the design of green space in the city. This may also explain that social interaction is not very often coded in the aforementioned content analysis. However, when looking at the graphs of the content analysis, Geertje Wijten explains that she expected different results for social cohesion.

> '*I expected that social cohesion would also be high, much higher. Because all our policy on urban agriculture and food is directed to that. I would have expected that. [...] Yes I am really surprised by this one [red. social cohesion], because this one is in my opinion more important than it seems here.*' – Geertje Wijten

Though on the other hand, Geertje Wijten also explains that to what extent the policy is directed at improving social cohesion is very well dependent on the Mayor and Executive Board of the municipality.

> '*The alderman that we have now, so D66 or actually the whole Executive Board, they know that it is important, but we do not focus on that consciously. But we know that everything we do with green space in the neighbourhood and pocket parks and kitchen gardens, that these contribute to the social cohesion. So I think we also mention that in the Agenda Groen. So in that way especially the small scale green space contributes to that.*' – Geertje Wijten

So apparently, especially the small scale green space is important for the social cohesion. Wouter van der Veur also mentions mainly small scale green space, and he also links that to neighbourhood initiatives on the maintenance of the green. However, he does not think that this green space can always improve the social cohesion.

> '*Well, I think that is mainly green space in the neighbourhood. Yes, by facilitating, providing space for initiatives in the neighbourhood, green space initiatives in the neighbourhood, kitchen gardens, maintenance of green space. The Artsenijtuin it is called I believe, that is managed and maintained and kept beautiful by a group of inhabitants, I think that also favours social cohesion. [...] But it does not always work that way of course. I think that there may also be people in the neighbourhood that think: 'but hey, that piece of green space does not feel mine anymore now.' So it is also, it can favour social cohesion, but I am not sure whether it always works that way. But yes,*

*it is one of the underlying objectives of the stimulation of initiatives in the
neighbourhood, green space initiatives in the neighbourhood.'* – Wouter van
der Veur

They both mention that small scale green space is important, but this is different from what
is found in the content analysis. Social interaction co-occurs only once together with small
scale green space and more often with green space in general, parks and gardens and urban
agriculture. However, the mentioned kitchen gardens and maintenance of the green space
by neighbours, can also be linked to urban agriculture. This co-occurs indeed more often with
social cohesion.

4.2.5 Air pollution

Geertje Wijten and Wouter van der Veur are both more sceptical about the effects of green
space on air quality.

*'Well, several studies have been performed, on the influence of the trees
in streets where trees were planted in a certain way. It appears that some-
times these can have a negative influence on the air quality. Also other stud-
ies have been done, I think recently by the Municipal Health Services, or at
least together with the Municipal Health Services. Those studies show that
everything in public space catches fine dust. So that does not have to be, you
can also use other things for it, that are not green. So this discussion is quite
difficult and therefore we are not going to plant trees to improve the air
quality.'* – Geertje Wijten

*'Well I do not think that plays an important role in the green policy. That is,
well, we are still using research from a few years ago. The relation between
green space or more trees and air quality was investigated. I think, to say
it a bit rude, the conclusion was: you have to plant so many trees to notice
a small difference. So it is not, we see the value of green space, it does not
mean that we suddenly have to cut trees, we have to keep what we have,
but there is not an active policy to plant a lot of green because of the air
quality.'* – Wouter van der Veur

This opinions relate well with the theoretical framework in that e.g. Nowak et al., 2006 found
that the average air quality improvement was less than 1 percent. Therefore, Geertje Wijten
and Wouter van der Veur stress that other policies, for example related to mobility and
traffic, will make a bigger difference in improving the air quality.

*'We are dependent on so many other factors and weather factors et cetera,
so we say in Amsterdam mainly: we invest in air quality by changing or limit-
ing car traffic.'* – Geertje Wijten

However, it is interesting to note that air pollution was mentioned 28 times in the
Amsterdam documents and social interaction 31 times. The difference is thus only marginal,
but the opinions of the interviewees on the possible effects of green space are very different.
Moreover, Geertje Wijten did not expect the results for social cohesion, but the results for air

pollution link well with her experiences on this topic.

4.2.6 Urban Heat Island effect

Making the city climate proof is becoming more important in Amsterdam and that green space can help with that is also recognized more and more. On the other hand, the urban heat island effect and making the city heat proof are not yet very important at the moment, though slowly it starts to change.

> *'It starts to come up a little, but yet, I think that making the city rain proof really gets a foot in the door [...]. And also the role of green space in it, that it is also important for making the city heat proof, that starts to trickle down slowly, but there is not yet widespread awareness. That green space plays an important role in that. I do not think that the urgency is really felt, say, the problem. And I think that it is there, but that is not yet, or well, maybe people think: yes, well, that is not necessary yet, that will happen sometime, so no, that is not yet really… We do mention it in the Agenda Groen though, green roofs as well, we mention making the city heat proof. But it is not very conscious policy.'* – Wouter van der Veur

Geertje Wijten also expects that making the city heat proof will become more important in the coming years.

> *'I also expect that the next Executive Board of the municipality will put it higher on the agenda. Making the city rain proof is very important now, and that will have effects, and I also expect that there will be more attention for a heat proof city.'* – Geertje Wijten

It is not that this topic is not important at all at the moment. There are currently people working on projects to make the city more heatproof, Geertje Wijten mentions some examples of what is already happening in Amsterdam.

> *'Our designers also collaborate and visit other cities where the temperature is higher and see how they deal with that. We also looked into the climadap-tool with the Wageningen University, with Sanda Lenzholzer, she developed it. And there have also been European projects, also with the idea that wa-ter influences temperature, but I understood, at least from the last study, I heard that it is especially shadow, from buildings as well, but also from trees that causes a temperature decline.'* – Geertje Wijten

That it is seen as important, but not yet really part of the policy reflects well with the results of the content analysis. It is mentioned twice as often as air pollution and social interaction, and also slightly more than mental health. Geertje Wijten also explains that she recognizes this results, but she expects is to grow in the future.

5. Discussion

5. Discussion

This research has contributed to the knowledge on the incorporation of health policies in the green space planning of municipalities. Firstly, the relevance of the study for practical and theoretical applications will be discussed. The limitations of the study will be discussed in the second part of this chapter. Lastly, suggestions for further research will be done.

5.1 Relevance of the study in science and practice

In the theoretical framework of this thesis, we have seen that there has been a lot of research on the effects of green space on human health. Several studies stress the role of green space in encouraging physical activity (e.g. De Vries et al., 2011; Bonnefoy, 2005), improving mental health (e.g. De Vries et al., 2013; Mitchell, 2013) and improving social interaction and cohesion (e.g. Van Herzele & De Vries, 2012; Maas et al., 2009). Some studies find a reduction of air pollution because of green space (e.g. Yang, Yu & Gong, 2008), but others stress that the reduction is only marginal (Nowak et al., 2006). Lastly, the role of green space in reducing the Urban Heat Island effect is stressed in several studies (e.g. Gill et al., 2007; Bowler et al., 2012). However, until now, none of these studies investigated to what extent these positive effects are also used in urban green space planning. It is important to use the insights in the health effects in the green space, because the green space planning could be tailored to the health effects that are necessary. Some spaces are more suitable for providing certain health benefits, while others have different qualities.

Marieke Kums describes that very often a green wall is added, without knowing whether it actually does something. It is very important to be able to understand what really helps and why that is the case. In this way, adding green in an urban plan can be effective for human health and be more than just increasing sales (Marieke Kums in Greenport Aalsmeer, 2017).

Moreover, linking green space with health seems to be an upcoming topic. For example, the Erasmus MC, a large hospital in Rotterdam (the Netherlands) built a new hospital with a large roof garden for its patients, visitors and staff. Two gardens of almost 3000 m^2 were opened in April 2018, as the new hospital must become a good 'healing environment' with lots of green space. It is stressed that this green space has a positive influence on the recovery of the patients (Erasmus MC Vriendenfonds, n.d.). Another example is the development of a 'Healthy Urban Quarter' in the centre of Utrecht (the Netherlands). The plan 'Wonderwoods' will be built, consisting of the first 'vertical forest' of the Netherlands. The concept was developed around health and bringing nature into the city (Stationsgebied Utrecht, 2016).

An academic example consists of the 'Ontwerptool Groene Gezonde Stad' (Design tool Green Healthy City). Researchers of Wageningen University & Research are developing a tool that can provide insight in the health benefits of specific types of green space. This tool can help bridge the gap between science and practice, as it can be very useful for professionals that are working with green space, such urban planners, designers, local governments and developers (Greenport Aalsmeer, 2017).

5.1.1 Health topics in green space planning

The necessity of this tool is also clear from the results of this study, as it was found that not all health topics are represented in the green space planning documents of the cities. For all cities, health considerations related physical activity in green space were the mentioned most often. It was expected that physical activity would be an important topic. It is often said that we are living in an obesogenic environment and it is necessary to stimulate as much physical activity as possible (Kirk, Penney & McHugh, 2010). Therefore, it was no surprise that this topic was mentioned often in the green space planning documents. However, it was surprising that the other topics were mentioned a lot less often.

The topic of mental health was not found very often in the green space planning documents, which is surprising if you compare it with the abundance of scientific papers that are written on this topic (de Vries et al., 2013; van Herzele & de Vries, 2012). Moreover, it is often stated that more and more people are having issues with their mental health, as for example more people are suffering burnouts in the Netherlands (Nederlands Centrum voor Beroepsziekten, 2018). Providing green space that is tailored at reducing stress, could help solve this problem. The interview with people working at the municipality of Amsterdam provides possible reasons for the lack of mental health topics in the green space planning. Many of the health effects are seen as a nice by-catch of the green space planning, but they are not going to purposefully plan stress reducing green space.

The Urban Heat Island effect is also becoming more important, as climate change will make the weather more extreme and lead to higher temperatures. In these circumstances, it is important to take measures to protect the health of citizens, as because of the high temperatures more people have health issues. Moreover, it can cause heat-related deaths, especially in cities (Gill et al., 2007; Kleerekoper, van Esch & Salcedo, 2012). However, the Urban Heat Island effect was incorporated only a few times in the documents. Within the interviews some reasons for this were found. At least in Amsterdam, the necessity of planning for the Urban Heat Island effect is not yet seen. It is probable that this will become more apparent in the future. However, it also seems to indicate a gap between science and practice, as it takes time for the knowledge to reach the policy makers.

Social interaction also did not appear often, though literature suggests that green space can influence this positively. It is possible that this is discussed more in other documents, but this was not studied. However, the lack of these three topics in the documents can also be the signal of a gap between science and practice. The earlier mentioned 'Ontwerptool Groen Gezonde Stad' can help solve this problem.

Air pollution is mentioned the least often of all health considerations. However, this links well with the theoretical framework, in which is explained that this relation is only marginal. The interviewees also mentioned that they had doubts on the air cleaning qualities of green space.

5.1.2 Differences between cities

The importance of health themes was not the same in every city. Physical activity was mentioned less often in the Milanese documents than those of Amsterdam and Copenhagen. The last two cities are really famous for the great possibilities to cycle. It is possible that this is reflected in all policy documents and therefore also in the green space planning documents.

Milan incorporated social interaction relatively more into the green space planning. It is possible that this is the case because of the differences in climate and culture in Italy. People in Italy may meet each other more often in public spaces than Dutch and Danish people do. This could therefore be more important and more visible in the documents.

The researcher also expected to find more about the Urban Heat Island effect and air pollution in Milan, as these are a larger problem in this city than in Amsterdam and Copenhagen. However, the results do not confirm this relation. It is possible these terms were not found as the green space planning in Italy differs from the green space planning in the Netherlands and Denmark. The researcher already encountered this, as it was much more difficult to find the right documents. It is possible that not everything is written down in the documents that were found, but also in other places.

5.1.3 Different types of green space

Within table 2.2 in the theoretical framework, the possible links between green space and health aspects are described. However, these links were not always found in the results. There are some co-occurrences of green space and health aspects of spaces that were left blank in the theoretical framework or no co-occurrences in spaces that seem important. For example, the importance of green space for social interaction for children was discussed in the theoretical framework. However, there are no co-occurrences of social interaction and play areas, though these may be the green spaces where children meet each other. However, most often the documents remain rather unclear on what type of green space is meant and discuss green space in general.

The researcher expected more concrete mentions of a type of green space and less often a general term. Especially in the documents that are of the operational type, the measures that are taken are often very concrete. These signs could be an indication of a gap between science and practice, as the municipalities may want to invest in e.g. social interaction, but do not know what kind of green space can help in this case.

In the theoretical framework, several green space planning models were discussed. The cities of Copenhagen and Amsterdam both have a shape related model of the 'green fingers' or 'green wedges', while the city of Milan has a 'green belt' and green rays, which are more similar to 'greenways'. The size of the green space that enters the city is thus smaller in Milan. The results of Copenhagen and Amsterdam are also more similar to each other than to the results of Milan. This could be due to the type of green space model that was used. Within the greenways is less space available and therefore also less space to include health themes. In Amsterdam and Copenhagen is much more room to make different kinds of spaces and that could increase the possibility of health themes.

On the district level of Amsterdam was chosen for Nieuw-West in which some garden villages are present. It was expected that from the philosophy of the garden city, health is seen as an important theme and would appear more often than other scale levels in Amsterdam. However, this is not what was found, as almost all themes appear more often on the municipal level than on the district level. It is possible that the original ideas of the garden village have faded in the municipality of Amsterdam. Living circumstances have become increasingly better of the past years and other themes have become more important.

5.2 Limitations

First of all, it is important to mention that this study is a meta-analysis of green space and health in policy. It is unknown to what extent these policies are well executed and it is not possible to make statements on the effectiveness of these policies on the health of the inhabitants. Especially in the documents of Milan, many different types of green space planning models are mentioned: green rays, green belt, green necklace, nine parks for Milan and many more. It is unclear which ones are really incorporated and which ones are only described, but not executed. This means that it is also unclear which parts of the health considerations are really taken into account.

However, within the short timeframe of this study, it was the best possible option to do this content analysis. Moreover, the results of the interviews in Amsterdam confirm the results of the content analysis. This makes it very probable that the results reflect the situation as it is in reality. Moreover, it is probable that if health considerations are taken into account, this is visible in the planning documents of the city. The outcomes of this study are therefore more likely to be overestimations than underestimations.

There have been some practical limitations within this study. Only six months of full-time involvement of the researcher were available and the research could have been done more extensively if more time had been available. The researcher tried to spread this time among the several parts of the research and the several cases. However, she found out that some parts took more time than others. Especially for Milan, more time has been spend on looking for documents. It appears that many of the policy and related documents of the municipality are not online available. The researcher has tried to contact the municipality, but did not receive a response to her e-mails. She therefore also did not visit and interview people of the municipality of Milan. The time constraint, together with a constraint in resources, led to the fact that Copenhagen was not visited at all. However, in the end 835 pages of 43 different green space planning documents were studied. The results from the interview at the municipality of Amsterdam were in great agreement with the results from the content analysis. The researcher is therefore convinced that the results of the research are well underpinned.

This study was performed in an international context and documents of four different languages were studied, English, Dutch, Danish and Italian. The researcher's mother language is Dutch and she speaks English well. However, she has never had any classes in Danish and Italian. Knowledge of related languages, such as Spanish and French for Italian, helped in understanding the documents. Moreover, several people were consulted to help formulate the coding scheme and bring the amount of language mistakes to a minimum. Next to that, google translate and other automatic translation devices were used to understand the documents in Italian and Danish. It is possible that the researcher misunderstood some parts of the documents, but in general the researcher did not have any trouble with the translation process. Hardly any ambiguities were encountered. It is therefore probable that the results for the cases of Milan and Copenhagen are as reliable as the case of Amsterdam.

This study has provided a broad overview of to which extent health considerations are incorporated in the green space planning of three cities. However, this research can only provide a broad overview of the numbers. There are still differences in the health terms and concepts that are use. These are described in the results sections as well, but interviews could provide more in depth knowledge on which parts of the separate health considerations are taken into account.

For each of the cities, the type of documents that was analysed was different. It is therefore possible that the presented results are biased. The differences between the cities may not only be explained by the differences in the way health considerations are incorporated in green space planning, but also by the fact that the documents describe different aspects of the green space planning. For example, the municipality of Copenhagen has written a document completely focused on green roofs and another document on pocket parks. The health considerations that are taken into account will differ between these documents. For the city of Milan, mainly documents on larger parts of the city were written. This results in another way in which health can be considered. However, these kind of documents describe how the cities deal with their green space planning, so this is also the way health considerations are taken into account in it. The only way to analyse this, is to analyse the different kinds of documents. The researcher is therefore convinced this is the right way to analyse whether health considerations are taken into account. Moreover, the researcher has made the differences between the documents visible by grading the documents on the importance for the green space planning and by making the distinctions between operational, strategic and hybrid documents. It differed per city how many of the documents were operational, how many were strategic and how many can be considered hybrid. That the hybrid documents contain substantially less codings may be due to the fact that many of the documents belong to Milan and not because they are hybrid. More research is necessary to confirm whether this is true. There were no large differences between documents with a small, medium or large role for the green space planning of the city. It is therefore very likely that the differences between cities and health themes are really due to differences in to what extent the health considerations are taken into account and not because of the small, medium or large role of the document.

Most of the documents were written by the three municipalities. However, for the city of Milan it proved to be difficult to find some of the green space planning documents. Therefore, some adaptations had to be made to gain enough data. Firstly, documents written by other involved parties were analysed as well. Secondly, it proved to be even more difficult to find documents discussing the district level. Therefore, documents about several districts were used. This may have influenced the results. The analysed documents of the districts in Milan were written on a municipal level, while in Amsterdam and Copenhagen a district government wrote them. They may have different ideas about health and green space than the municipal government, while in Milan it would merely be a repetition of the ideas of the municipal government. However, the results on the different scale levels in Milan were not very different from the results of the different scale levels in Copenhagen and Amsterdam. The results on the district level of Milan can therefore still be considered reliable.

The documents that were analysed are written in different years. In the future, ideas about health and green space planning may change as well. It is possible that in the past months, health has popped up as an important theme, but it is too soon to be visible in the documents. For example in the interviews was expressed that making the city heat proof is an upcoming theme, but it is possible that it will take some time to pop up in the policy documents.

As this study deals with qualitative information, the researcher will have an influence in obtaining the data and analysing it. The researcher brings with her earlier experiences, values and norms. This will always influence the decisions she takes and the way she interprets the data.

Firstly, the researcher had to obtain the documents and decide whether they were related to green space planning or not. The researcher tried to do this objectively using the procedure described in chapter 3. Secondly, the researcher used a coding scheme to make the coding as objective as possible. Double coding was used to check to what extent the researcher coded consistently. The results of this double coding show that 84% percent of the codes in the first round also appeared in the second round. The researcher is therefore convinced that the coding scheme is reliable. However, in some cases only small differences were found. For example, in the Milanese documents social interaction was mentioned 22 times in 100 pages and in Copenhagen 17 times per 100 pages. With this margin of error, it could also be 18 per 100 pages for Milan and 20 for Copenhagen. These differences are therefore too small to be completely reliable. However, all conclusions are based on numbers that are large enough to be reliable.

Lastly, the researcher may have influenced the interviewees during the interview. However, the researcher has thought thoroughly on the formulation of the questions in the interview protocol (see appendix). This made it possible to ask the questions in a neutral way, leaving enough space for the interviewees to answer in many different ways.

5.3 Suggestions for further research

In the theoretical framework of this study, many more different kinds of green space planning models are visible. It would be interesting to study whether the other models are of influence on the extent to which health considerations are important. Municipalities could then try to use a specific green space model that works best for integrating health aspects in the green space planning.

As mentioned earlier, this research mainly provides a large overview of the three cities. More insight could be gained with qualitative research on why the municipalities choose to consider health within green space planning and which aspects they include. It could then become clear what steps have to be taken to make sure that more aspects are taken into account and what is necessary to make sure that for example mental health is considered.

However, it remains unclear whether planning for healthy green space also results in healthier green spaces. It is probable that this is the case, as each type of green space has its own qualities. Analysing to what extent healthy green space policy also leads to healthy public spaces could help in confirming or denying this relation. It is then also important to take the different health aspects into account. The municipality of Amsterdam is not planning for mental health, partly because they hope think this is a nice bonus of green space. But it is unclear whether the green space that was planned with mental health in mind also leads to a better mental health than green space that was planned with e.g. physical activity in mind.

The municipalities also wrote documents about health in the city. These documents were not analysed, as green space planning was the topic of this study. However, it is possible that these documents also contained information about how green space can be used to improve health. It would therefore be interesting to have a look at these documents and analyse which parts of public space are most important for the health policies. This might be green space, but other types of public space might be even more important.

Lastly, within this chapter it was often mentioned that there is possibly a gap between science and practice. Professionals might not have all knowledge necessary to create the green, healthy spaces that are necessary in a certain location. However, it is uncertain whether this is really the case and why this gap could exist. More extensive interviews with policy makers and professionals could gain insight in this and help to find out how to make sure that more scientific knowledge is incorporated in policies.

6. CONCLUSION

6. Conclusion

6.1 The incorporation of human health considerations in urban green space planning

The purpose of this study was to explore which improvements can be made in the incorporation of human health considerations in the urban green space planning of Milan, Copenhagen and Amsterdam. By analysing 43 green space planning documents with a quantitative content analysis and two additional qualitative interviews, the following research question was answered:

Which elements related to human health are incorporated in the urban green space planning of Milan, Copenhagen and Amsterdam?

Within the theoretical framework, five different mechanisms through which green space can influence health were distinguished: encouraging physical activity, improving mental health, stimulating social interaction, decreasing air pollution and decreasing the urban heat island effect. For each of the mechanisms was analysed to what extent they were formally documented in the green space planning of Milan, Copenhagen and Amsterdam. This study thus made it possible to have a look at whether the gap between science and practice is bridged, meaning to find out to what extent the scientific evidence for the health effects of green space are incorporated in the green space planning.

To answer this main research question, three sub questions were answered firstly. The first sub question was: Which human health considerations are (not) incorporated in planning documents concerning the development or conservation of urban green space in Milan, Copenhagen and Amsterdam does this differ per city or per type of document?

The results show that encouraging physical activity is seen as a very important contribution of green space to health, as this theme occurred most often in all cities. Especially cycling and walking are often taken into account. The cities could also look at other types of physical activity, such as playing outside for children or sports in the open air. However, Copenhagen and Amsterdam consider physical activity much more than Milan. Milan could learn a lot from these cities.

Surprisingly, all other health aspects are hardly taken into account, though they can contribute to human health according to scientific literature. Social interaction is almost as important in Milan as physical activity, but it is still not considered very often. The interviews with the municipality of Amsterdam show that it was expected this was considered more. Social programmes are already present there and it would be good to link them better with the green space planning of the city. But also for the other cities it is good to be aware of the role that green space can play for social interaction. Especially within neighbourhoods that lack social cohesion and in times of migration and an increasing opposition against migrants, it is necessary to use all possible mechanisms to improve the situation.

Air pollution was only considered a few times. This absolutely makes sense, as the green space can improve air quality only slightly. To improve the health of the citizens with green space, it is probably more useful to look at other health aspects.

The mental health can get a lot more attention in the green space planning, as this was also hardly considered. Employees of the municipality of Amsterdam express that they see this as a nice bonus of green space, but that they are not planning for it. However, stress related problems and burnouts are becoming increasingly common and planning green space while taking mental health into account can help solving this problem. This advice is for all cities, as they all hardly discuss this problem.

The urban heat island effect is of the three cities considered the most in Copenhagen, but probably upcoming in Amsterdam. In the coming years this will become more important, especially with hotter summers due to climate change. Especially for the city of Milan it is advised to take the role of heat into account while planning green space, as it can become very hot there.

It is surprising that only physical activity is mentioned that often in the green space planning documents and that many of the other aspects are hardly mentioned. It seems that in this case, there is a gap between the science and practice on incorporation the health aspects of green space.

The second sub question was: Which types of green space are (not) discussed together with human health considerations in planning documents concerning the development or conservation of urban green space in Milan, Copenhagen and Amsterdam and does this differ per city or per type of document?

In many of the documents it was not very specific what type of green space was considered. The documents mainly discussed green space in general while discussing health topics. This is surprising, as not only strategic, but also operational documents were studied. The expectation was that the municipalities are more concrete in these. I would recommend to the municipalities to be more concrete in the way they are going to improve the health of their citizens in what way with which type of green space.

Parks and gardens were also mentioned often, but there are many more types of green space available that were hardly mentioned, though useful when trying to improve human health. When discussing more concretely what types of green space is meant, it becomes clear whether there are possibilities to improve human health. It is thus advised to also have a look at the role private green space, agriculture, burial grounds, forest and recreational areas, as these are hardly mentioned. However, the lack of concreteness can also be a sign of the gap between science and practice, as policymakers do not know how to incorporate health topics in the green space planning.

Lastly, the third sub question was answered: Is there a relation between the appearance of a health consideration and the appearance of a type of green space in planning documents concerning the development or conservation of urban green space in Milan, Copenhagen and Amsterdam?

Cities are not very specific in their description of the green space. All health considerations co-occur thus most often with green space in general. Mental health and social interaction occur most often with parks and gardens. The most interesting fact is that the Urban Heat Island effect is discussed often together with green roofs and façades and small scale green space. These types of green space do not occur often together with other topics.

Concluding, Copenhagen and Amsterdam are well on their way while using green space to stimulate physical activity. However, the green space in the city can be used in many more ways to positively influence human health. It seems that there is a gap between science and practice on how to use green space to improve human health. This also becomes clear as the types of green space that are discussed together with the health topics are not very concrete. The main advice is thus to take steps to reduce the gap between science and practice.

6.2 Recommendations

From these conclusions, some recommendations can be made. Firstly, the cities are advised to have a broader look on health than only physical activity. Green space has a lot more qualities than stimulating people to exercise more. Moreover, it can help in solving health issues of this time, such as an increase in mental health issues and higher temperatures because of climate change. It is advised to find out what health issues are important in each city and in what way green space can help in solving that issue. Making the health considerations more specific, can help to tailor the green space to the type of health improvement that is necessary.

Secondly, it is recommended to make clear what kind of green space is used in improving health. Making this concrete, can help to make sure that the best solution is used. Different types of green space can fulfil different needs. Trees can improve mental health, but a small park may be more effective in improving social cohesion. Moreover, explaining the concrete health considerations can help underpin why this type of green space is necessary in cities that are becoming more compact and competing for space.

Lastly, the most important advice from this thesis is to take steps to bridge the gap between science and practice. There is a large knowledge base of scientific research available that needs to be incorporated in the green space planning of cities. The new design tool that will be developed can be a good start to help bridge this gap. It is thus advised to seize these opportunities that this tool provides and make Copenhagen, Amsterdam, Milan and all other cities as healthy as possible.

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APPENDICES

Appendix I Coding scheme

Code	Keywords			
	English	Dutch	Danish	Italian
Health				
		Volksgezondheid	Folkesundhed	Salute
	Health	Gezond(heid)	Sund(hed)	Salutare
	Healthy		Helbred	Sano
	Well-being	Wel (-zijn,-bevinden)	Trivsel	Benessere
Physical activity				
	Physical activity	Fysieke activiteit	Fysisk aktivitet	attività fisica
	Physically active	Fysiek actief	Fysisk aktiv	fisicamente attivo
		Actief bezig zijn		
	Activity	Activiteit	Aktivitet	attività
	Active transport	Actief transport	Aktiv transport	trasporto attivo
	Commute	Woon-werkverkeer, pendelen	Pendle	commutare, fare il pendolare
	Cycle	Fietsen	Cykle	andare in bicicletta
	Train	Trainen	Træn	allenarsi
	Exercise	Bewegen	Motion	esercitarsi
	Soccer, football	Voetbal	Fodbold	calcio
	Play	Spelen	Spille, lege	giocare
	Recreation	Recreatie	Rekreation, adspredelse	ricreazione
	Run	Hardlopen	Løbe	correre
	Sport	Sporten	Sport, idræt	sport
	Walk, stroll	Wandelen, wandeltocht	Spadsere, gå (tur), vandre (tur)	camminare, passeggiare
	Footpath	Voetpad	Sti	sentiero
Mental health				
	Mental	Mentaal, geestelijk	Mental	mentale
	Mental health	Mentale gezondheid, geestelijke gezondheid	Mental sundhed	salute mentale
	Mental well-being	Mentaal welzijn	Mental helbred	benessere mentale
	Attention	Aandacht, concentratie	Fokus, koncentration	attenzione, concentrazione
	Mental fatigue	Mentale vermoeidheid, aandachtsmoeheid	Mental træthed	stanchezza mentale
	Effectiveness	Effectiviteit	Effektivitet	efficacia
	Stress	Stress	Stress	stress

	Attention restoration	Aandachtsherstel		recupero dell'attenzione
	Restorative	Herstellend	Genoprettende	corroborante, rigenerante
	Satisfaction, satisfied	Tevredenheid	Tilfred(shed)	soddisfazione, soddisfatto
	Tranquility	Kalmte, rust	Ro, rolig	tranquillità
	Quietness	Stilte	Stilhed, stil	quiete
	Happiness	Geluk	Lykke, glæd	felicità, letizia
	Psychological	Psychologisch	Psykologisk	psicologico
	Psychological resources	Psychologische bronnen	Psykologiske ressourcer, hjælpekilde	Risorse psicologiche
	Psychic	Psychisch	Psykiske	psichico
	Life functioning	(Levens)functioneren	Funktionere, fungere	Funzionamento della vita, funzionamento vitale
Social interaction				
	Social	Sociaal	Social	sociale
	Interaction	Interactie	Interaktion	interazione
	Integration	Integratie	Integration	integrazione
	Cohesion	Cohesie	Samhørighed	coesione
	Meet	Ontmoeten	Møde	incontrare
	Communicate	Communiceren	Kommunikere	comunicare
	Friend	Vriend, vriendin	Ven, veninde, venner	amico, amica
	Friendships	Vriendschappen	Venskab	amicizia
	Culture	Cultuur	Kultur	cultura
	Ethnicity	Etniciteit	Etnicitet	etnia
	Population group	Bevolkingsgroep	Befolkningsgruppe	gruppo di popolazione
	Socioeconomic status	Sociaal-economische status	Socioøkonomisk status	stato socioeconomico
	Rich, wealthy, affluent	Rijk, vermogend	Rig	ricco, benestanti
	Poor	Arm	Fattig	povero
	Segregation	Segregatie	Adskillelse	segregazione
	Contact	Contact	Kontakt	contatto
	Inclusion	Inclusie	Inklusion	inclusione
	Social support	Sociale ondersteuning	Social støtte	supporto sociale
	Lonely	Eenzaam, alleen	Ensomm alene	solitario, solo
	Community	Gemeenschap	Fællesskab	comunità
	Neighbour	Buurman, buurvrouw, buur	Nabo	vicino, vicina

	Neighbourhood activity	Buurtactiviteit	(Nabolag) Fællesskab aktivitet	attività di vicinato
	Neighbourhood initiatif	Buurtinitiatief	(Naboskabs) Fællesskabsinitiativ	iniziativa di vicinato
	Social tie levels	Sociaal bindingsniveau, sociale samenhang	Sociale slipsniveauer??	livelli di legame sociale
	Common space	Gemeenschappelijke ruimte	Fællesrum	spazio comune
	Connected	Verbonden		collegato, connesso
	Informal interaction	Informele interactie	Uformel interaktion	interazione informale
Air pollution				
	Air pollution	Luchtvervuiling, luchtverontreiniging	Luftforurening	inquinamento atmosferico
	Air	Lucht	Luft	aria
	Pollutant	Vervuilende stof	Forurenende	inquinante
	Air quality	Luchtkwaliteit	Luftkvalitet	qualità dell'aria
	Air purifying	Luchtzuiverend	Luftrensning	purificazione dell'aria
	Concentration	Concentratie	Koncentration	concentrazione
	Air movement	Luchtbeweging	Luftbevægelse	movimento dell'aria
	Dispersion	Verspreiding	Spredning	dispersione
	Ozone	Ozon, O3	Ozon	ozono
	Oxides of nitrogen, NO2	Stikstofoxide, NOx	Kvælstofoxider	ossidi di azoto
	Oxides of sulphur, SO2	Zwaveloxide, SOx	Svovloxider	ossidi di zolfo
	Particulate matter, PM	Fijnstof, PM	Partikelformigt stof	particolato, polveri sottili
	Gaseous pollutants	Gasvormige luchtvervuiling	Forurenende luft	inquinante gassoso
	Pollen	Pollen	Pollen	polline
	Allergy	Allergie	Allergi	allergia
	Asthma	Astma	Astma	asma
UHI				
	Urban Heat Island	Hitte eiland	Varme-ø-effekten	isola di calore
	Air temperature	Luchttemperatuur	Lufttemperatur	temperatura dell'aria
	Climate change	Klimaatverandering	Klimaforandring	cambiamento climatico
	Climate	Klimaat	Klima	clima

	Climate adaptation	Klimaatadaptatie	Klimatilpasning	adattamento climatico
	Temperature	Temperatuur	Temperatur	temperatura
	Solar radiation	Zonnestraling	Solstråling	radiazione solare
	Sun	Zon	Sol	sole
	Sunshine	Zonneschijn	Solskin	luce del sole
	Heat	Hitte	Varme, hede	calore
	Cooling	Koeling, afkoeling, verkoeling	Kølighed, kulde	raffreddamento
	Absorb	Absorberen	Absorbere	assorbire
	Reflect	Reflecteren	Reflektere	rispecchiare
	Thermoregulatory	Thermoregulatorisch	Termoregulatorisk	termoregolazione
	Air	Lucht	Luft	aria
	Warm	Warm	Varm	tiepido
	Hot	Heet	Hed	caldo
	Degrees	Graden	Grader	gradi
	Airflow	Luchtstroom	Luftstrøm	flusso d'aria
	Evaporation	Evaporatie, verdamping	Fordampning	evaporazione
	Transpiration	Transpiratie	Transpiration	traspirazione
	Evapotranspiration	Evapotranspiratie	Evapotranspiration	evapotraspirazione
	Shade, shadow	Schaduw	Skygge	ombra
	Air movement	Luchtbeweging	Luftbevægelse	movimento dell'aria
	Temperature reduction	Temperatuurreductie	Temperaturreduktion	riduzione della temperatura
General green space	Green space	Groen, groene ruimte	Grøn, grønt område	verde, spazio verde
Parks and gardens	Urban park	Stadspark	Bypark	parco urbano
	Municipal garden	Stadstuin	Byhave	giardino municipale, parco municipale
	Municipal park			giardino comunale
Recreation areas	Recreation areas	Recreatiegebied	Rekreative område	aree ricreative
Outdoor sports areas	Sports area	Sportgebied, sportveld	Sport område	area sportiva
	Sports park	Sportpark	Sportspark	parco sportivo
Play areas	Playground	Speeltuin, speelplaats	Legeplads	campo da gioco
	Playing field	Speelveld	Spillerum	terreno di gioco
	Schoolyard	Schoolplein	Skolegård	cortile della scuola
Small scale green space	Street trees	Straatbomen	Gadetræer	alberi di strada
	Lawn	Grasveld	Græsplæne	prato

	Visible green	Zichtbaar groen, kijkgroen	Synlig grøn	verde visible
		Groenstrook		
		Straatgroen		
	Pocketpark	Postzegelpark	lommepark	giardino tascabile
Private green space	Garden	Tuin	Have	giardino, orto
	Domestic garden	Privétuin	Privat have	giardino domestico
	Backyard	Achtertuin	Baggård, baghave	cortile
Agriculture	Farmland	Bouwland, akkers	Landbrugsareal	terreni agricoli
	Agricultural areas	Agrarische gebieden	Jordbrug	aree agricole
	Agriculture	Landbouw, akkerbouw	Landbrug	agricoltura
Urban agriculture	Urban agriculture	Stadslandbouw	Byen landbrug, bylandbrug	agricoltura urbana
	City farm	Stadsboerderij	By gård	coltivazione urbana
	Allotment garden	Volkstuin	Kolonihave	giardino comunitario
	Cultivation	Teelt	Dyrkning	coltivazione
	Kitchen garden	Moestuin		orto
	School garden	School(werk)tuin	Skolehaven	giardino della scuola
	Community garden	Gemeenschapstuin	Fællesskabshave, fælleshave	giardini comunitari
Burial grounds	Cemetery	Begraafplaats	Kirkegård	cimitero
	Churchyard	Kerkhof		camposanto
Open nature areas	Wetland	Wetland, drasland	Vådområde	zona umida
	Heath, heather	Heide	Lyng	brughiera, erica
	Nature	Natuur	Natur	Natura
	Grassland	Grasland	Græsarealer, græsland, græsmark	prateria
Forest	Forest	Bos	Skov	foresta
	Woods	Woud		boschi
	Woodland			bosco, zone boschive
Green roofs and façades	Green roof	Groen dak	Grønne tagene	tetto verde
	Green walls	Groene muren	Grønne vægge	pareti verdi
	Vertical garden	Verticale tuin	Vertikale have	giardino verticale
	Green façade	Groene gevel	Grøn facade	facciata verde
	Vertical farming		Vertikal landbrug, dyrkning	agricoltura verticale

Appendix II Interview protocol (in Dutch)

Date: 12 juli 2017
Location: Amsterdam
Interviewees: Geertje Wijten/Wouter van der Veur

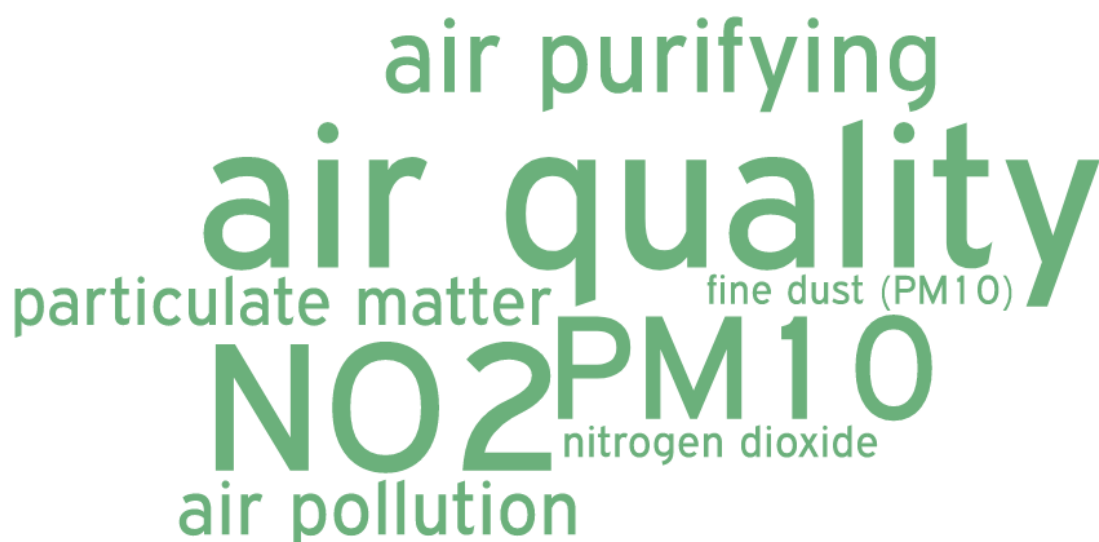|	
Introductie	MSc student WUR, ruimtelijke planning
	Onderzoek naar overwegingen bij planning van groenstructuren
	Amsterdam, Kopenhagen en Milaan
	Documentenstudie, aanvullend interviews
	Meer uitleg gedurende interview
	Is het goed als ik het interview opneem?
	Mag ik uw naam gebruiken? Eerst mailen ter controle.
	Resultaat wordt gemaild.
Icebreaker	Kunt u wat meer vertellen over uw werk en welke rol u speelt bij de ruimtelijke planning van groen in Amsterdam?
	Wat was uw rol bij het schrijven van de Agenda Groen/andere documenten?
Algemeen	Wat zijn de belangrijkste overwegingen bij de planning van groenstructuren?
	Wat zijn naar uw idee de belangrijkste thema's binnen de visie op groen van de gemeente Amsterdam?
Gezondheid	In mijn onderzoek kijk ik naar welke gezondheidsoverwegingen meegenomen worden.
	Waar denkt u aan bij het samennemen van de thema's groen en gezondheid?
	Welke gezondheidsoverwegingen spelen ook echt een rol bij de planning van groene ruimte in Amsterdam?
	In mijn onderzoek kijk ik naar fysieke activiteit, mentale gezondheid, sociale interactie, luchtkwaliteit en UHI.
	Op welke manier denkt u dat fysieke activiteit en groen met elkaar verbonden zijn?
	Wordt er bij de planning van groene ruimte actief nagedacht over het stimuleren van fysieke activiteit?
	Wordt er bij de planning van groene ruimte actief nagedacht over het stimuleren van mentale gezondheid?
	Wordt er bij de planning van groene ruimte actief nagedacht over het stimuleren van sociale interactie?
	Wordt er bij de planning van groene ruimte actief nagedacht over het stimuleren van luchtkwaliteit?
	Wordt er bij de planning van groene ruimte actief nagedacht over het stimuleren van Urban Heat Island effect?
Resultaten	Uitleg over onderzoek, geanalyseerde documenten en resultaten tot nu toe.
	Herkent u deze resultaten of niet?
Afronding	Bedankt voor het interview.

Appendix III Wordclouds

Amsterdam

air purifying
air quality
particulate matter
fine dust (PM10)
NO2 PM10
nitrogen dioxide
air pollution

Figure 8.1 Terms that were coded 'air pollution' in the green space planning documents of Amsterdam.

burn out
quiet silence
recovery plan
psychological resting points restore
peace
quiet area happier rest
rest oasis
rest areas

Figure 8.2 Terms that were coded 'mental health' in the green space planning documents of Amsterdam.

cultural
meet
face-to-face contacts cohesion
meeting integration
social cohesion social interaction interaction
social
meetings
socio meeting place
meeting places

Figure 8.3 Terms that were coded 'social interaction' in the green space planning documents of Amsterdam.
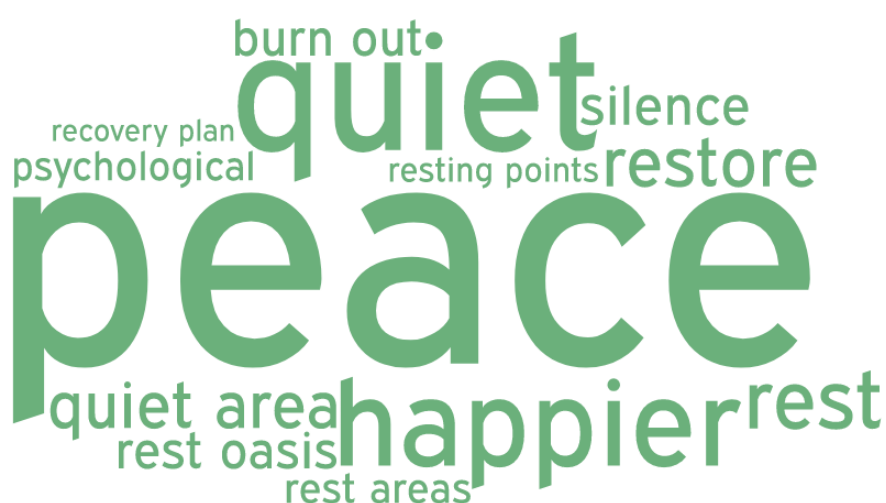
Figure 8.4 Terms that were coded 'air pollution' in the green space planning documents of Milan.

Figure 8.5 Terms that were coded 'social interaction' in the green space planning documents of Milan.
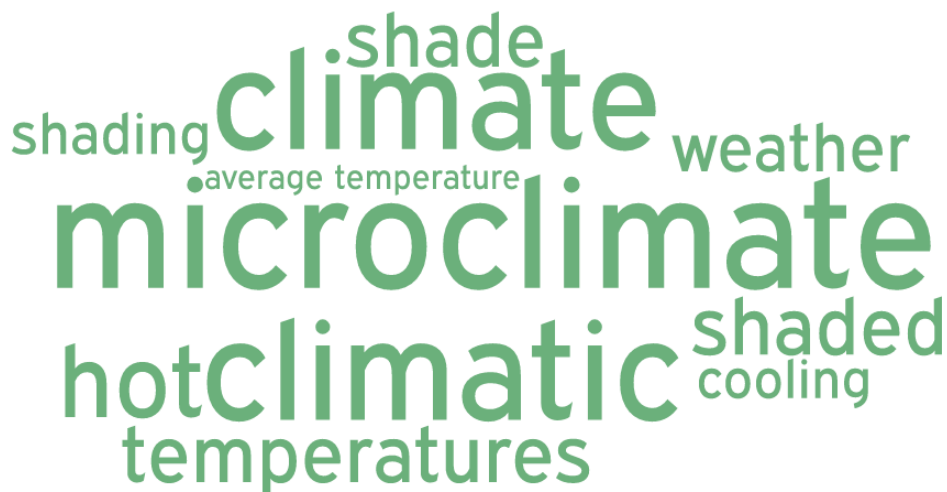

Figure 8.6 Terms that were coded 'Urban Heat Island effect' in the green space planning documents of Milan.

Figure 8.7 Terms that were coded 'air pollution' in the green space planning documents of Copenhagen.

Figure 8.8 Terms that were coded 'social interaction' in the green space planning documents of Copenhagen.