Blue and green infrastructure and physical activity

The inclusion of physical activity in climate adaptation

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Abstract

This research focuses on the effect of blue and green infrastructure on physical activity/sporting behavior, specified to the Stadspark XXL in Dordrecht. Most cities focus too much on grey infrastructure, which can lead to heat stress in summer. This focus on grey infrastructure has negative consequences for the overall health of the population, as the city has trouble cooling down and people will not move around as much as they should. Blue and green infrastructure could be a solution to this problem. To find out how and in what way blue and green infrastructure influences physical activity/sporting behavior in combination with heat stress, the main question is; "to what extent and in what way are physical activity and sports included in climate adaptation with regard to heat stress?". This will be done by doing literature research, analyzing policy documents and conducting interviews. The data that comes from this will be analyzed on the basis of the Sport Experience Design framework by Funk (2016), the human health indicators by Pakzad & Osmond (2016) and the climate adaptation cycle by Moser and Ekstrom (2010).

First, elements of blue and green infrastructure that are proven to be successful for promoting physical activity are researched. Furthermore, the connection between municipal policy about sports and physical activity and climate adaptation is analyzed by looked at the policy of the municipality of Dordrecht. Lastly, the looks and shape of the Stadspark XXL in Dordrecht will be made clear, in combination with the way this park will be able to stimulate physical activity.

Key words: blue and green infrastructure, sporting behavior, physical activity, heat stress

Table of contents

1. Background information

1.1 Introduction

Blue and green infrastructure is an aspect of spatial planning that has been growing in importance over the last couple of years. It means that there is more focus on implementing blue and green infrastructure within cities (Ghofrani et al., 2017; Brears, 2017). This concept is defined as "an interconnected network of waterways, wetlands, wildlife habitats and other natural areas; greenways, parks and other conservation lands; working farms, ranches and forests; and wilderness and other open spaces that support species, maintain natural ecological processes, sustain air and water resources and contribute to the health and equality of life" (Deely et al., 2020). Other parts of this are parks, trees, sports fields, a playground, water fountains, canals or a little lake (Almaaitah et al., 2021; Dolman & O'Donnell, 2021). These things help improve the cooling-down process of cities and play a part in the design and looks.

Most of the time, cities are full of buildings, houses, streets and other infrastructure, cultural elements (statues) and parking spaces. All these things are made of stone, which means that there is not a lot of room for green and blue spaces (Ghofrani et al., 2017). According to Dushkova et al. (2021), having a significant number of buildings and houses and having a good infrastructure is crucial for the development of a city, but they also mention that all this stone leads to heat stress in summer. When it is warm, stone heats up fast and creates a hot environment. Then, because of all the buildings, the heat will stay within the city as it cannot go anywhere (Dushkova et al., 2021). This is called the urban heat island effect, which leads to heat stress. Heat stress means exposing inhabitants to hot and humid weather conditions, which can lead to a higher risk of health problems or even mortality (Smoyer et al., 2000). This mostly happens to the elderly in the population, which is even more problematic, as they do not go outside as often as younger people. So, all the stone buildings and grey infrastructure might be instrumental for the development of a city, but there still needs to be room for blue and green infrastructure to cool down.

In summer, most sports competitions are over and teams do not train for a significant amount of time. This means that people cannot train in the complexes that are made for it, but have to do it using their own resources (Priest et al., 2008). Most of the time, people go outside to jog or for a workout. In practice, this very often happens in places a bit further away from the city centre, with enough fresh air and space to move around in (Priest et al., 2008). Pye et al. (2015) state that people who live in the city do not seem to go outside to be physically active often compared to people that live in the suburbs. According to Lamond & Everett (2019), a reason for this is the heat stress that occurs in summer. When more blue and green infrastructure is included in a city, it would cool down and people would be more tempted to go outside for a walk, to ride their bike or even to play sports (Pye et al., 2015). These elements can help reduce symptoms of thermal discomfort in times of heat stress and create an environment in which people do like to be physically active in (Lafortezza et al., 2009; Nikolopoulou & Steeners, 2003). Also, when one of the measures for blue and green infrastructure is a park with fitness equipment or goals, people could use this as a place to come together and be physically active (Lamond & Everett, 2019). This also relates to the health aspect mentioned in the previous paragraph; people that play sports are healthier than people that are not physically active at all (Pye et al., 2015; Lamond & Everett, 2019). This means that creating blue and green infrastructure leads to an increase in the overall health of the population.

In the Netherlands, policy about sports and physical activity in combination with blue and green elements and heat stress is not very developed yet. We know that the elements have a positive effect on sporting behavior and the overall human health, but we do not know as much about what kinds of elements are instrumental for this effect and how to implement them to be successful. It is important to think about this, as climate change will only get worse and will define the way we play sports in the future if we do not know enough about how to tackle heat stress. If it continuously gets warmer, we

have to find other ways to stimulate being physically active. Ways that are less of a harm towards human health when the urban heat island effect occurs. This means that it is important to understand, plan and manage this effect in different phases to tackle the issues that climate change brings.

For this research, the case of Dordrecht will be used. Dordrecht is a city in the province South-Holland in the Netherlands and has approximately 119.576 inhabitants. The government of Dordrecht is planning to create one of the biggest parks in the world, the Stadspark XXL. This park would be even bigger than Central Park in New York (Raad Dordrecht & Mecanoo, n.d.; Rijksdienst voor ondernemend Nederland, 2019). The focus will be on including inhabitants in the planning and design proces and trying to create as much blue and green infrastructure as possible. The rapport of Rijksdienst voor ondernemend Nederland (2019) mentions that sports will be a big part of the Stadspark XXL, as there will be multiple places where people can be physically active.

1.2 Problem statement

Most cities focus on grey infrastructure too much, but there should also be a focus on blue and green infrastructure (Brears, 2017). As mentioned before, having mostly grey infrastructure in a city means that there will be a lot of heat, especially in summer. This heat will stay within the city, because there are few ways of cooling down. As mentioned in the introduction, there are also some negative consequences for the overall health of inhabitants, as heat stress leads to health problems and even mortality, especially for the elderly. In Dordrecht there are around 57.000 inhabitants that are older than 45, with about 23.500 people that are 65 years old or even older (Allecijfers, 2023). This means that around ¼th of the population of Dordrecht is at risk when heat stress occurs. Only 44% of the population in Dordrecht is physically active on a weekly basis (Allecijfers, 2023). This means that not even half of the population is physically active for at least 150 minutes a week. According to Lamond & Everett (2000), implementing blue and green infrastructure would help increase this number, as cooling down will be a lot easier because aspects such as trees, parks and canals take the heat away (Brears, 2017). This shows that the effect of blue and green infrastructure on heat stress and the effect of heat stress on physical activity is clear, which means that blue and green infrastructure also has an effect on physical activity. The combination of those three variables and how they related to each other is something that has not yet been thoroughly researched. This is something that will be done in this research, while using the Stadspark XXL in Dordrecht as case study, as this place covers all three variables.

1.3 Research aim

The aim of this research is to find out to what extent sports and physical activity are included in climate adaptation, while looking at blue and green infrastructure and the way it influences physical activity. This kind of infrastructure is instrumental for cities, as it keeps the city cool in summer and reduces heat stress (Brears, 2017). This research also takes a look at the realization of the Stadspark XXL in Dordrecht to find out how and to what extent physical activity and sporting behavior are part of this. The Stadspark XXL has not yet been fully realized so there will not be any hard proof yet, but doing research on its planning and design process could help to improve the final design for the park or similar projects. This also means that there has not been any specific research about the Stadspark XXL and its relation to physical activity, but there has been some research about blue and green infrastructure and the effect it can have on physical activity in general. This knowledge could be reflected on the Stadspark.

Firstly, a look will be taken at successful and less successful elements of blue and green infrastructure in relation to the promotion of physical activity and the mitigation of heat stress. Then, the policy about sports and physical activity of the municipality of Dordrecht will be looked at, to see

to what extent there is a connection to climate adaptation. Lastly, it will be made clear in what way the Stadspark XXL will facilitate sports and physical activity in its spatial design.

1.4 Research questions

The main question of this research is; “to what extent and in what way are physical activity and sports included in climate adaptation with regard to heat stress?”. To fully answer this question and touch upon all parts of the subject, a total of three sub questions will be used. “What blue and green elements are proven to mitigate heat stress and promote physical activity and sporting behavior?”, “to what extent does the policy about sports and physical activity of the municipality of Dordrecht have a connection to climate adaptation?” and “in what way is physical activity taken into account in the spatial design of the Stadspark XXL?”.

1.5 Academic relevance

As mentioned before, a couple of studies about the relationship between blue and green infrastructure and behavior of people have already been done. Examples are the study of Kimic and Ostrysz (2021) and Dushkova et al. (2021). However, these studies mostly focus on the reaction of people towards changes within cities. They focus on how to nudge people and how to gain the most benefits from their behavior. Then, there are studies that focus on the relationship between blue and green infrastructure and heat stress, such as the studies of Lehnert et al. from 2020 and 2021. Although there are studies that focus on the relationship between blue and green infrastructure and physical activity such as the study of Lõhmus and Balbus (2015), there has not yet been a study that focuses on physical activity in combination with heat stress and blue and green infrastructure. This means that the topic of physical activity certainly is an important factor, but there is a lot that has not been captured about it yet. As mentioned in the problem statement, the knowledge gap is that there has not been much research about the three subjects (blue and green infrastructure, heat stress and physical activity) in relation to each other. This research is focused on trying to find out to what extent and how sports and physical activity are included in climate adaptation, while looking at the realization of the Stadspark XXL in Dordrecht. This means that this research will focus on the case of the Stadspark XXL, which is quite specific. Yet, the results of this research could also be used for further research on other comparable cases. They could benefit from the successful elements and aspects and learn from limitations or challenges that may occur.

1.6 Societal relevance

This research has multiple benefits for society. It contributes to the knowledge gap about physical activity in combination with blue and green infrastructure and heat stress. It can show that there might be a positive relation between those three variables. Finding out which blue and green elements are successful in promoting physical activity and reducing the effects of heat stress might lead to an increase in sporting behavior and physical activity, in normal situations but also in times of heat stress. The increase in sporting behavior and physical activity then might lead to benefits for the overall health of individuals, as being physically active has a positive impact on human health (Rhodes et al., 2017). Furthermore, the area of the Stadspark used to be made out of various (sports)parks and green spaces that were scattered all over the city (Gemeente Dordrecht, 2022). With the realization of the Stadspark, these parks and green spaces will be brought together into one big park with multiple functions that are aimed at welcoming every individual in the city. This research provides information about that, which can also benefit the inhabitants of Dordrecht. They can get to know the different aspects and functions that are present in the park, which might lead to them

wanting to visit it. When various different groups of inhabitants do this, social cohesion can be strengthened, as all these different people will have a place to come together (Iannotti et al., 2009). This also has a relation to human health, as social cohesion strengthens the social health of individuals.

In relation to sports, physical activity and health, the living environment is an important feature. This aspect combines things like physical activity, health, greenery and social aspects and goes beyond direct health effects like heat stress. It focusses on healthy lifestyles in combination with healthy living environments. The way this aspect has a connection to climate adaptation documents/policies would determine whether or not and to what extent this is seen as important and will actually be thoroughly looked at in practice. In short, this research benefits the inhabitants of Dordrecht, as they can get to know the various positive impacts this park can have on their lives; the more knowledge there is about the relation between blue and green infrastructure, physical activity and heat stress, the more people will benefit from its positive consequences.

2. Theoretical framework

2.1 Blue and green infrastructure

The concept of blue and green infrastructure is gaining more and more popularity as time goes by. As the climate is changing, it becomes more important for cities to invest in sustainable forms of infrastructure instead of grey infrastructure (Almaaitah et al., 2021). Grey infrastructure refers to roads, buildings, stone monuments and other urban constructions that are made out of grey materials (Root-Bernstein, n.d.). According to Root-Bernstein (n.d.), blue infrastructure is about water elements, such as ponds, rivers, fountains, canals, wetlands, water treatments facilities, floodplains, etc. Green infrastructure refers to parks, trees, bushes, lawns, gras, fields, hedgerows, forests, etc.

Influence on human health

Most of the time, these blue and green places are multifunctional, which provides benefits for multiple parties and accommodates sustainable development (GreenBlue, n.d.). The importance of creating more blue and green infrastructure is related to human health. According to Grohfani et al. (2017), the quality of life and personal fulfilment is closely related to the provision of blue and green infrastructure within a city. This is because people feel better when they have been in a park, or another green space. It can take their mind off of things they have been dealing with. Generally, being surrounded by a certain amount of greenery has a calming effect on people (Grohfani et al., 2017). As mentioned before, blue and green infrastructure has an effect on the overall human health of the population. This mostly is the case with green infrastructure like green fields that can be turned into sporting venues (Gill et al., 2007; Monteiro et al., 2020). This kind of green infrastructure is designed for a specific use, which is physical activity. People can go to local parks to play sports and be physically active. Then, there also will be room for people to hike, cycle, skate, etc., which are also forms of physical activity. According to Lõhmus and Balbus (2015), the presence of blue and green infrastructure will lead to an increase of sporting behavior of the inhabitants of surrounding neighborhoods. These inhabitants get the opportunity to make use of the blue and/or green elements that were implemented. This increase is instrumental for the overall health of the population (Lõhmus and Balbus, 2015; Nieuwenhuijsen, 2021), especially in times of (extreme) heat.

Heat stress

In recent years, it has gotten significantly warmer in summer (Presbitero et al., 2021). This means that the temperatures will be high for a significant amount of time, which creates heat waves, which then leads to heat stress. Most of the infrastructure in cities is grey, which adds to the warmth in such a period of time. This kind of infrastructure makes it even hotter outside, as the heat cannot go anywhere and it will not cool down. Therefore, the city needs blue and/or green infrastructure to cool down.

Apart from the cooling down problem, heat stress also results in a decrease of physical activity (Presbitero et al., 2021; Bergeron et al., 2011; Nieuwenhuijsen, 2021). Presbitero et al. (2021) state that people find it too hot to be physically active in summer. This means that people are less physically active in times of heat (Bergeron et al., 2011). Blue and green infrastructure can change this. As mentioned before, it cools the city down, so it will not feel as hot and people might be less hesitant to be physically active or play sports. Another reason is that this kind of infrastructure facilitates sporting venues (Bergeron et al., 2011). People do not have to create their own space anymore, but can go out to the parks and be physically active there.

Thus, blue and green infrastructure is important for the cooling-down process of a city and the overall health of inhabitants.

Challenge
Sometimes, implementing blue and green measures is a challenge, as the density in a city is high and there is not much space to create measures. To add to that, most of the time, the attention goes to grey infrastructure, as that is a vital part for mobility and infrastructure in general. Cities (with the ambition to grow) need a good mobility system to function in the right way. The importance of grey infrastructure is clear, but there also needs to be room for blue and/or green infrastructure. This reality leads to difficulties in achieving provision of adequate space for blue and/or green infrastructure components (O'Donnell et al., 2021; Grofani et al., 2017), which means that policy makers have to be creative with the use and implementation of these measures. The smallest opportunities have to be taken to create some blue and/or green elements. Sometimes, green spaces are made out of something that was already there, but then qualified under grey infrastructure (O'Donnell et al., 2021). A building for example, can be used as a green wall or small parking spaces that can be converted to a pocket park.

2.2 Physical activity and sporting behavior

To be able to analyze physical activity and sporting behavior the Sport Experience Design framework by Funk (2016) will be used. This framework provides a consumer-centered approach that incorporates principles from Human Factors and Ergonomics (HF/E). HF/E is an interdisciplinary field focused on learning about human characteristics in order to adapt a human-made environment to individuals (Karwowski, 2005; Funk, 2016). It has three knowledge domains that are useful for physical activity; cognitive, organizational and physical. The cognitive domain represents all mental processes influencing the way the sport user interacts with the experience and the related system design features. The organizational domain represents the organization's structure, policies, processes, and sociotechnical systems related to individual, social and organizational factors of physical activity. The physical domain represents physiological responses occurring when playing sports, which include physical activity requirements related to the usability of design features (Funk, 2016). These three domains together provide a direction to investigate how the design of sport experiences produce thoughts, feelings and behaviors.

The Sport Experience Design framework consists of three interrelated elements; sport context, sport user and sport organization (Funk, 2016). Sport context represents the experience someone has. It includes both physical and technologically mediated interactions that are encountered before, during and after the experience of playing sports. Sport user represents the consumer, with psychological needs and personal characteristics. This influences the desired experiences and the manner in which sporting behavior is perceived and processed. It is a dynamic process that generates emotional and physical responses, which can influence satisfaction and future behavior (Du et al., 2015). Sport organization represents the entity whose purpose is to achieve objectives and goals in order to secure resources to be successful. This element was not used in this research, as there was no data that could be linked to sport organization. Then, there are overlapping areas labelled A, B, C and D that represent the relationships between multiple elements (figure 1 on the next page).

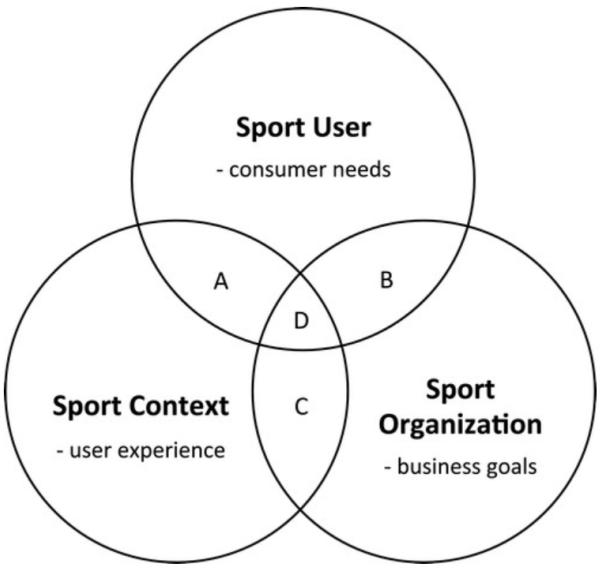

Figure 1: the Sport Experience Design framework (Funk, 2016)

Apart from the Sport Experience Design framework, the seven mechanisms about the influence of the living environment on physical activity of the Mulier Institute are relevant (Prins et al., 2020). Having a living environment that supports and provides opportunities for physical activity is complex, as every living environment is different and successful measures or aspects only work in certain environments. This means that the living environment is an aspect of great importance when it comes to physical activity; it has a lot of influence. The Mulier Institute, thus, identifies seven mechanisms about the influence of the living environment on physical activity (Prins et al., 2020);

- The physical design of the living environment has an influence on social safety.
- The living environment has an influence on physical safety.
- The presence of suitable infrastructure to actively move around in the neighborhood will stimulate walking and cycling.
- Connectivity within the neighborhood will result in an increase in active travel behavior.
- When the neighborhood is esthetically pleasant, it will improve the feeling of safety.
- Facilities designed for physical activity will result in more frequent physical activity, on condition that there is a sufficient number of programs.
- When more people make use of the living environment, it creates a positive image, which stimulates even more people to go outside.

2.3 Sustainability indicator set

Pakzad & Osmond (2016) have created a conceptual framework to analyze the performance of blue and green infrastructure-measures that have been implemented, in relation to human activities. The framework provides the basis for an 'indicator-based model' to assess the performance of blue and green infrastructure. It consists of three groups of parameters that cover all the parts of blue and green infrastructure; ecosystem services parameters, ecosystem health parameters and human health parameters. Each of these parameters have their own share of components (Pakzad & Osmond, 2016).

To further elaborate on this, performance indicators were made. To create indicators that cover everything, the categories of Pitman & Ely (2013) were used. They came up with three central themes; environmental, economic and social. For each of these themes they listed categories and sub-categories. For the environmental theme, categories were mostly about climate (change), air, water and biodiversity. For the economic theme, categories were about commercial vitality and increased property values. The social theme covered visuals and aesthetics, culture and human health.

HEALTH INDICATORS	C10	Improving physical well-being *(e.g. physical outdoor activity; healthy food; healthy environments)*	*(Schipperijn et al., 2013; Li et al., 2011; Kent, Thompson et al. 2011;; Abraham et al. 2010;; Wilbur et al. 2002; Ulrich, 1984)*	
	C11	Improving social well-being *(e.g. social interaction; social integration; community cohesion)*	*(Peschardt et al., 2012; Wood et al. 2010; Maller et al. 2006;Frumkin et al. 2004)*	
	C12	Improving mental well-being *(e.g. reduced depression and anxiety; recovery from stress; attention restoration; positive emotions)*	*Reduction of mental fatigue*	*(Arnberger & Eder, 2012; Kuo & Sullivan, 2001; Kaplan & Kaplan, 1989;)*
			Emotional and spiritual benefits	*(Abraham et al. 2010; Milligan and Bingley 2007; Chiesura, 2004)*

Figure 2: human health indicators (Pakzad & Osmond, 2016)

According to Austin (2014), having human health in there once is not enough. He states that human health not only focuses on the sickness part, but also on socioeconomics, community, physical health and psychological health. With this addition, the importance of human health is made clear in multiple ways. Pakzad & Osmond (2016) agreed with this and proposed an indicator set which included a section about human health (figure 2 above). These specific indicators about human health are closely related to sporting behavior and physical activity.

2.4 Conceptual model

From the literature and the theoretical framework, a conceptual model can be created that will help understand this research. This is done by giving a visual representation of the important variables and frameworks that will be used. For this research the two most important variables are blue and green infrastructure and physical activity. These two variables are therefore connected to each other. Then, the aspect of heat stress comes into play, as it interferes with the effect of blue and green infrastructure on physical activity. In figure 3 below, the conceptual model can be seen.

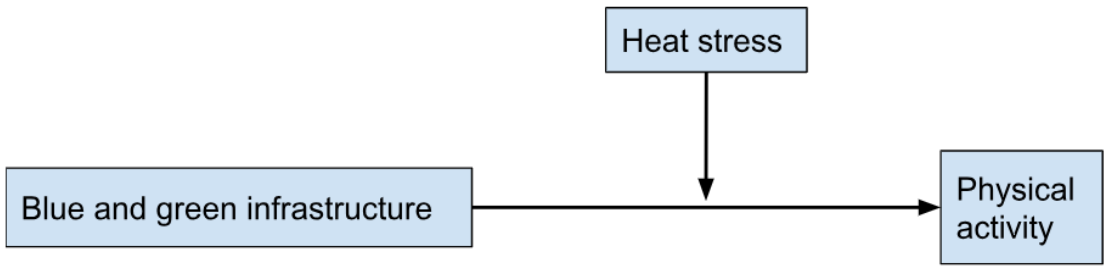

Figure 3: conceptual model

To analyze the data that was collected for this research, an analytical model was created as well. This model focuses solely on the variable physical activity and how to operationalize it. As can be seen, physical activity will be broken down into three variables that have to do with the human health indicators; social well-being, physical well-being and mental well-being. These three variables then can be split into two aspects of the sport experience design framework; sport context and sport user. The analytical model can be seen in figure 4 below.

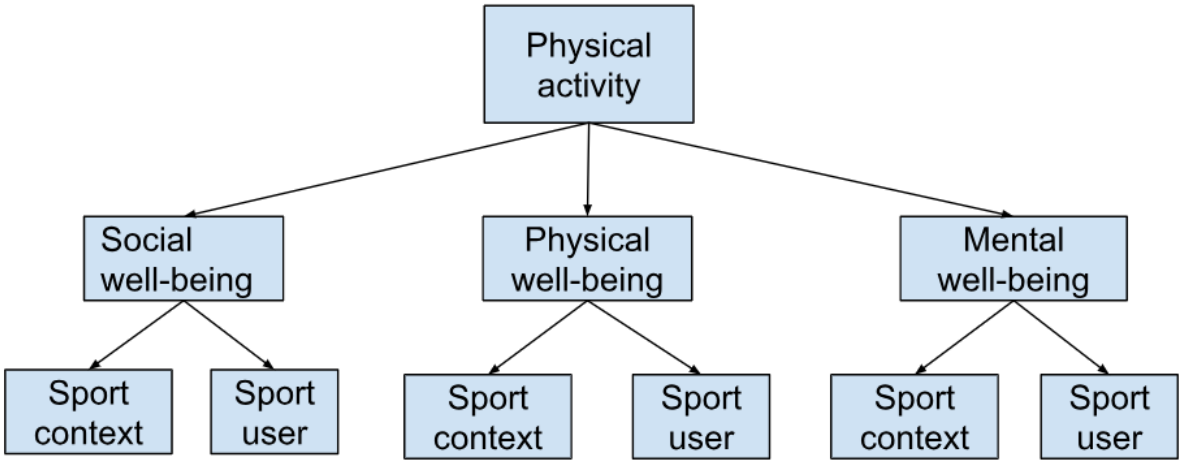

Figure 4: analytical model

3. Methodology

3.1 Research design

3.1.1 Research philosophy

The term research paradigm is used to describe a researcher's view of the world. This worldview is the perspective, thinking, school of thought or set of shared beliefs that informs the meaning or interpretation of research data. Personally, I would place myself in the interpretivism approach, which is mostly used in qualitative research. This approach is predicated on the existence of numerous realities, rather than a single reality (Khaldi, 2017). According to interpretivists, human behavior is complex and cannot be predicted by predefined probability. People always choose what and when they do something and this is not very predictable. Human behavior is not like a scientific variable that can be easily controlled and predicted. The word interpretivism also refers to methods of gaining knowledge that rely on comprehending and/or interpreting the meanings that humans attach to their behaviors (Khaldi, 2017). This last part fits this research, as choosing whether or not to play sports depends on the meaning people attach to it. They might feel like playing sports in times of heat is less important than staying inside and keeping themselves cool. When this is the case, people will not play sports.

Although I personally think human behavior is controllable to a certain extent (by nudging for example), I do agree with the fact that human behavior is hard to predict and it cannot be predefined by probability. You cannot know what goes through people's minds when they decide about a certain behavior or action. This way, human behavior is not predictable.

3.1.2 Research approach

To answer the main and sub questions, qualitative research will be conducted. This type of research is based on collecting data that is mostly made out of words and images, so interviews, literature studies or qualitative observations (Tenny et al., 2017). You can gain insights about subjects that are hard to find a lot of knowledge about. Part of this research identifies as a case study, because of the extended focus on the Stadspark XXL in Dordrecht. A case study helps to focus directly on a particular city or region to gather knowledge. According to Heale and Twycross (2017), some phenomena are carried out differently in certain cities or regions. This is something a case study helps to find out.

3.1.3 Methods and materials

Elements to promote physical activity

To gather data, the right data collection has been done for every sub question. The first sub question is "what blue and green elements are proven to mitigate heat stress and promote physical activity and sporting behavior?". In this part of the research relevant elements of blue and green infrastructure that can help improve physical activity and mitigate heat stress were looked at. This was analyzed by doing literature research, mostly on scientific research and papers. As mentioned before, almost all of these articles focus on nudging people towards certain behavior. Most of these articles neglect sporting behavior and physical activity, but it has a little part in the articles. To analyze these forms of data, a thematic analysis was done, starting with the creation of a coding scheme with use of relevant variables from the theoretical framework. This scheme can be found in the appendix ("1. Policy documents in general & scientific papers"). After coding the information, themes of certain codes with the same context were made and were later reviewed. These themes were used to organize information and help with writing it all down. To gain additional knowledge, interviews with four inhabitants of Dordrecht, Frank Helsloot, Oege Oevering and the sports experts of 'Kenniscentrum sport en bewegen' have been done. Except for the inhabitants, all interviewees gave me permission to use their names in this report. The inhabitants spoke about their reasons (not) to be physically active and what could stimulate them to play sports. Frank told me a lot about sustainable planning, in combination with blue and green infrastructure and Oege told me about the

way the municipality of Dordrecht deals with blue and green infrastructure. The sports experts provided information about the relevance of sports and physical activity and how this could be stimulated in the best way. Then, an interview with Patrick van der Zouwen was done. He told me about how the municipality tackles sports policies and whether or not it is connected to policies about climate adaptation and heat stress.

Inclusion of sports and physical activity in municipal policy

The second question is "to what extent does the policy about sports and physical activity of the municipality of Dordrecht have a connection to climate adaptation?". This part of the research focuses on the municipal policy about sports and physical activity of Dordrecht. To do so, a coding scheme was made, which can be found in the appendix ("2. Policy documents Dordrecht"). Some municipal documents were analyzed and interviews with various individuals that work for the municipality of Dordrecht were done. The interviews that were relevant here were the interview with Patrick van der Zouwen and the interview with Annemarie Lammers and the interviews with Oege Oevering and Karin van den Berg. Annemarie Lammers focusses on the healthy living environment at the municipality of Dordrecht and Karin van den Berg told me about the policies with regard to the Stadspark. Again, for these interviews a coding scheme was made, taking into account the answers that were given to the questions.

The Stadspark XXL

The last sub question of the research is about the Stadspark XXL itself; "in what way is physical activity taken into account in the spatial design of the Stadspark XXL?". The looks and functionalities regarding blue and green elements and physical activity of the park are made clear. To gain some perspective on this, an interview with a designer of the park, Karin van den Berg, was done. She told me about the process of realizing the park and the goals the municipality wants to achieve. She also told me about relevant sporting opportunities and other important aspects of the park. The interviews with inhabitants, Patrick van der Zouwen and Annemarie Lammers were also instrumental for this sub question. To gain more evidence, policy documents about the park were analyzed as well. Again, the coding scheme was used, which can be found in the appendix ("2. Policy documents Dordrecht").

Interviewees

As mentioned before, I interviewed experts and policymakers on blue and green infrastructure, health, the Stadspark itself, sports and physical activity. To add to that, I also interviewed four inhabitants of Dordrecht.

The inhabitants that were interviewed were chosen at random, who ever walked by and wanted to do the interview was interviewed, which resulted in four interviews. The first person was a man around the age of 30, he likes to cycle, go for a run and go to the gym, which makes him very sporty. He lives near the area where the Stadspark will be realized, in the Vogelbuurt. The second interviewee was less sporty. She was a woman around the age of 50 and told me she is physically active once a week "at max". She lives in the same neighborhood as the first interviewee. The third person I interviewed was a man around the age of 40, who liked to be physically active around two times a week. He lives in the Sterrenburg. The last person I interviewed was a girl of 22 years old, who plays football at the local club. Although she lives quite far away from the area of the Stadspark, she was very excited about the plan and wanted to be physically active in the park with her friends.

To give an organized view of all the people that were interviewed, an overview was made (table 1 on the next page).

Interviewee(s)		Topic of interview
Oege Oevering	Municipality of Dordrecht	Blue and green infrastructure
Frank Helsloot	Havenland	Sustainable planning with blue and green infrastructure
Sports experts	Kenniscentrum sport en bewegen	Sports and physical activity
Patrick van der Zouwen	Municipality of Dordrecht	Sports and physical activity
Simone Vermeulen	GGD Zuid-Holland Zuid	Human health
Annemarie Lammers	Municipality of Dordrecht	Healthy living environment
Karin van den Berg	Municipality of Dordrecht	The Stadspark XXL
Four inhabitants of Dordrecht		Sporting behavior and thoughts about Stadspark XXL

Table 1: overview of interviewees

3.2 Research area

The research area for this research is the city of Dordrecht, which is located in the south of the province of South-Holland. As mentioned before, the city has about 119.576 inhabitants. Although Dordrecht itself is the research area, the focus is mostly on the Stadspark XXL. What makes this park such an interesting place for a case study is the fact that this is something that has never been done before in the Netherlands, not on this scale. It is a very big project that combines blue and green infrastructure, sporting behavior, biodiversity, social inclusion, climate change and climate adaptation. With the realization of the Stadspark, the municipality wants to connect the formerly separated (sports) parks and provide multiple opportunities for sports that all inhabitants can use. This way, they focus on sporting behavior and social inclusion. Biodiversity, climate change and climate adaptation will also feature in the park, as there will be a lot of blue and green infrastructure. Parts of this infrastructure will lead to an increase of biodiversity in the area, as it will attract more/new species of flora and fauna. Aspects of blue and green infrastructure will also have an influence on climate change and climate adaptation, as it will help counteract the effects of climate change and, related to that, stimulate climate adaptation. In short, it touches upon multiple relevant aspects in society, which makes it a case that is of interest to every individual. This park is yet to be built and completed, but there already are a couple of maps that show where it will be located when it is done (figure 5, 6 and 7 on the next page). Some of the adjustments/measures that will take place in the park are already known. The most important ones are reducing the barriers between the different parts of the park, upgrading the quality of the already existing green infrastructure and improving the quality of water (Raad Dordrecht & Mecanoo, n.d.). As can be seen in figure 7 on the next page, there will be different zones in the park that each focus on their own characteristics. These characteristics have been present for a long time and will now be explored a little more, in combination with general natural measures (Raad Dordrecht & Mecanoo, n.d.). In figure 6 on the next page, a more detailed version of the purposes of the park can be seen. It shows that the park will be multifunctional, which makes it a place that every individual will want to visit (Atlas Natuurlijk Kapitaal, 2021).

Figure 5: map of the Stadspark XXL (Raad Dordrecht & Mecanoo, n.d.)

Figure 6: Looks/purposes of the Stadspark (Atlas Natuurlijk Kapitaal, 2021)

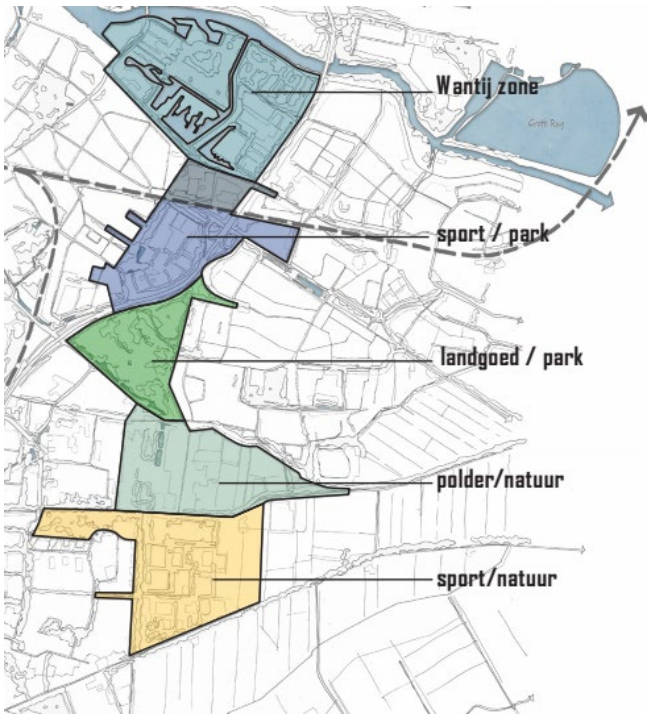

Figure 7: shape and purposes of the Stadspark (Raad Dordrecht & Mecanoo, n.d.)

3.3 Validity and reliability

For this research, the main focus was on literature study and interviews. Eleven interviews were done with interviewees that each provided information about their own topic. For each interview, an interview guide with open questions was made. This was done to make sure that there was room for the interviewees to talk, but also to make sure that every topic was talked about. By making sure there were enough interviewees with the right expertise the external validity improves. The results of this research about the Stadspark could also be used for other, comparable cases, which means that the external validity of this part of the research is high. Internal validity is also an important aspect. Internal validity is about the cause and effect relation between variables. This relation should not be caused or influenced by other variables. In this research, the cause and effect relation can be influenced by other variables, such as heat stress or the living environment. This means that the internal validity is quite low. As for the reliability, there were a couple of people that I wanted to speak to, but they did not answer my messages. This meant that there were not any interviews with experts or policy makers on climate(change), which would have been very helpful for this research. To add to that, I only spoke to four inhabitants in Dordrecht. This number could have been higher, which would have made the reliability of the research also higher. For the literature study, it was attempted to only use objective sources for which the author has no or limited commercial interest, which has a positive impact on the reliability.

4. Results

This chapter presents the main findings of this study, as a result of the data analysis. It will touch upon the blue and green elements that successfully promote physical activity and sporting behavior and the limits and challenges to it. Furthermore, reasons for inhabitants (not) to be physically active in normal situations and in times of heat stress will be highlighted. Lastly, the looks and the influence on sporting behavior of the Stadspark will be discussed.

4.1 Blue and green elements promoting physical activity and mitigating heat stress

There are a couple of measures related to blue and green infrastructure that are proven to be successful, such as parks, green spaces and greenery in general. On the other hand, there are also some disadvantages and limitations. This section will provide more detail on both aspects.

4.1.1 successful elements

Policies of various municipalities in the Netherlands such as 'programma Klimaatadaptatie', 'Challenge Groene Icoonprojecten', 'Water Sensitive Urban Design (WSUD)' and 'Blauwe Agenda Utrechtse Heuvelrug' are examples of (collections of) measures related to blue and green infrastructure that were/will be implemented through spatial planning (Provincie Gelderland, 2019; Provincie Utrecht, 2020; Brears, 2017). Apart from these 'bigger' projects, there also are some individual elements of blue and green infrastructure that help promote physical activity and mitigate heat stress. These elements will be listed and explained in this section.

Importance of blue and green infrastructure

According to the sports experts of 'Kenniscentrum sport en bewegen' the use of blue and green infrastructure can have a positive impact on the physical activity of people (Sports experts, personal communication, 9 May 2023). According to them, "physical activity in areas of nature have a stronger effect on human health in comparison to the same activities in a non-natural environment and being physically active outdoors generates more energy and helps reduce fatigue and negative feelings. This could lead to wanting to do the activity again in the near future" (Sports experts, personal communication, 9 May 2023). This means that implementing elements of blue and green infrastructure plays an important role in creating a living environment in which people can be physically active on a daily basis.

Green spaces and parks

The first example of blue and green elements that help stimulate physical activity are green spaces and parks. These relatively big green areas can be placed anywhere in a city where there is enough room to facilitate them, which makes these elements the most commonly used. Nieuwenhuijsen (2020) defines green spaces as land that is partly or completely covered with grass, trees, shrubs, or other vegetation, which includes parks, community gardens and cemeteries. In cities, green spaces are proven to be correcting factors to various specific climatic aspects such as air temperature (Lafortezza et al., 2009; Akbari et al., 2001; Gómez et al., 2004). This means that green spaces in cities can help reduce the effects of such aspects to make the area more comfortable for people to spend time in, or in this case, be physically active in.

The fact that these elements can help reduce the air temperature means that it can improve the **physical well-being** of people (Pakzad & Osmond, 2016). This is because people might be more tempted to be physically active in a green space, where the air temperature is cooler, than anywhere else. When they are being physically active, their physical health will improve.

Then, green spaces and parks can also relate to **mental well-being**; one benefit of green spaces and parks is fact that people that live close to nature or are surrounded by a high degree of

greenness are healthier and have a better mental health than people that live further away (Lõhmus and Balbus, 2015; Lafortezza et al., 2009; O. Oevering, personal communication, 3 May 2023). This is because these people are more tempted to go for walk, for example, within the park or the green space nearby. When you live further away, there would be much more consideration (Lafortezza et al., 2009).

According to Oege Oevering (personal communication, 3 May 2023), people like to be physically active in green spaces in general. He mentions the example of calisthenics in parks; this could also be done inside a gym, but when people do this outside surrounded by greenery, the impact is different. Then, he mentions that these spaces can be combined with (green) playgrounds for kids to play in. That way the park not only stimulates physical activity for older inhabitants, but also for the kids that live in the neighborhood. This relates to **social well-being**, as people can come together in such places, meet new people and stimulate social cohesion. To add to the effect on **social well-being**, people rate open green spaces higher as population density increases. Which means that people will make use of such green spaces in big cities, where the density increases over time (Austin, 2014). According to Austin (2014) green spaces should be prioritized when the density in a city grows above twenty people per gross acre. Frank Helsloot (personal communication, 5 May 2023) also mentions that the size of parks matters; it has to be in line with the amount of people that live around it and the amount of people that make use of it. When a certain amount of inhabitants make use of such a green space, social/community cohesion and integration will be reached, which means that the living environment around the green space will feel even more pleasant for its inhabitants.

Furthermore, these elements also relate to **sport context** (Funk, 2016), as the experience of the individuals is seen as important here. Also, these green spaces can be used by people in whichever way they want, it is an open space (Brears, 2017). These aspects could be linked to **sport user** (Funk, 2016), as all different individuals can make use of the green spaces.

Trees

The second element of blue and green infrastructure that can help stimulate physical activity are trees. Same as for the green space and parks, trees have a significant effect on heat stress. This effect is strongest when a group of trees planted together. These trees are able to create a big shadow that can facilitate an area that is a little cooler than the surroundings, especially in summer when the sun shines and it is hot outside. Despite it being a relatively small measure; Lehnert et al. (2020) and Lee et al. (2013) claim that only a couple of trees can have a considerable influence on the temperature, decreasing it up to 2°C, just by providing shadow. Another benefit of trees is the evapotranspiration, which has a cooling effect on the air (Pitman & Ely, 2013).

The fact that trees create shadow, means that they have an effect on the urban heat island effect; they cool certain areas down. This also means that these areas will be more attractive for people to be physically active in, as it is less warm. Here, the same goes as for the green spaces and parks, the **physical well-being** of people might improve, as they will be more tempted to be physically active.

This effect could also relate to **sport context**, because the area at which the trees provide shadow will become more comfortable, so the experience of being physically active will improve.

Design of the living environment

Apart from specific (bigger, more significant) measures, such as green spaces, parks and trees, little measures that are integrated in the design of the living environment also have an influence on physical activity. The sport experts (personal communication, 9 May 2023) mention that the design of the urban living environment is important, as it helps stimulate people to be physically active and it raises the attractiveness of the living environment. Examples of elements of design are smaller areas of greenery, a good network of hiking and cycling paths, green roofs, green walls, green garlands along the streets, bushes and flowers. Frank Helsloot (personal communication, 5 May 2023) adds to that, as the mentions taking out some of the paving stones and placing little plants in the hole they

leave. Small measures like these can still have a significant impact on physical activity is the urban heat island effect. These elements are mostly used in urban environments as they do not take up much space, but do provide health-supporting services. For example, a green roof can reduce the stormwater effect, reduce the amount of pollution in the water and decrease the urban heat island effect (Brears, 2017). These elements can also create an environment that people like to be in, which can stimulate social cohesion and social strength of the community. This relates to **social well-being**.

Again, same as the green spaces and parks and the trees, these elements help stimulate the cooling down process, which means that it makes the area more comfortable for people to be physically active in. This means that these elements relate to **physical well-being** and **sport context** as well.

Creative use of space

Lastly, creative use of space is an important part of implementing elements of blue and green infrastructure. This aspect cannot be linked to one specific elements, but goes for all of them in general. Most of the time, there is not much room for such measures, especially not in the urban environment, but the implementation of these elements is very important.

Frank Helsloot actually mentioned an example of using nature in a creative way to promote and stimulate sporting behavior. He mentions a forest close to his neighborhood that is managed by 'Zuid-Hollands landschap'. This forest was not taken care of well enough until the covid-period. During this time, they upgraded it and chopped excess trees. The logs that came from this were left in the area and were placed in such a way that it became an obstacle course. Since then, the forest has been pretty popular. This relates to **sport context**, as the experience of visiting the forest was improved very much. People did not go there very often, but now lots of people use it to be physically active. Families come very often, as the parents like to hike around the forest and their kids like to play on the logs and jump around on them. Apart from families, sporting groups and runners like to spend time in the forest, as they can use the logs as extra exercise (F. Helsloot, personal communication, 5 May 2023). This shows that there is something to do for every individual in this forest, which relates to **sport user**. This is the perfect example to show that you do not need much to create a pleasant environment to be physically active in, you can get very far with just creativity**.**

Apart from sport benefits, using space in a creative way can also have some health benefits. As mentioned in the paragraph about green spaces and parks, people that live close to nature or are surrounded by a high degree of greenness are healthier and have a better **mental well-being** than people that live further away (Lõhmus and Balbus, 2015; Lafortezza et al., 2009; O. Oevering, personal communication, 3 May 2023). This also goes for people that visit areas of nature often. These people have a significantly better mental health than people who do not visit areas of nature as often (Lõhmus and Balbus, 2015; Lafortezza et al., 2009). Then, of course, if people are actually physically active in such spaces, their **physical well-being** will also improve.

4.1.2 Limitations and disadvantages to elements

Apart from benefit, there also are some limitations and disadvantages to elements of blue and green infrastructure, which need to be taken into account when you are trying to implement such a measure. The possible limitations and disadvantages will be listed and explained in this section.

Green space and parks

The first element of blue and green infrastructure that was mentioned were green spaces and parks. Apart from benefits, there are also some negative parts about these elements. Nieuwenhuijsen (2020) argues that a green space should not be just a green space. There should be various possibilities and opportunities to it, so it will be used more often by a diverse selection of people. This means that you have to take all possible outcomes into account. What kind of people will make use of

the element? In what way will be area be used? How can you create facilities or opportunities that will attract as much people as possible?
This claim by Nieuwenhuijsen (2020) also means that you have to take **sport context** and **sport user** into account. This could lead to having a lot of different aspect within the green space or park, which attract multiple different kinds of people. This is not necessarily a bad thing, but you need to find the right balance for this and according to Liu and Russo (2021) this is not an easy task, as there are quite a lot of factors that need to be taken into account.

Apart from sport factors, creating various facilities within the green spaces and parks and attracting various different kinds of people can also relate to **mental well-being** and **social well-being**. Some people do not feel safe in busy places with lots of different people, which can affect their **mental well-being** (Nieuwenhuijsen, 2020; Liu & Russo, 2021). Then, as mentioned in paragraph 4.1.1, social cohesion can be achieved with green spaces and parks, which is a good thing. However, for some people, this could be a negative aspect of the elements, as they do not feel socially safe. This shows that it could also affect to **social well-being** of certain individuals (Liu & Russo, 2021).

Furthermore, the effect on sporting behavior and physical activity is not concretely measurable according to Oege Oevering (personal communication, 3 May 2023). “You can say that blue and green measures have an effect on physical activity in general, but I have never heard anyone say that they were sick for a fewer amount of time because they went for a walk in the park”.

Trees
The second element that was mentioned was trees. Especially when planted in groups, trees can make a significant difference when it comes to the cooling down process and going against the urban heat island effect. This has a beneficial effect on physical activity, but there also is a negative side of the shadow that all the trees create; it cools the area down in times when the urban heat island effect is not present, such as autumn, spring or winter. For example, when kids are playing outside in February and the sun is shining, they would want to take advantage of that little amount of extra warmth. But with the trees providing shadow over the playground, it would still be a little cold. So, you would have to strategically place the elements to tackle heat stress, without experiencing much negative effects in winter (O, Oevering, personal communication, 3 May 2023).

The fact that trees providing shadow in certain times of the year can be seen as a slightly negative thing, could also have an effect on sporting behavior and physical activity. People that like to be physically active outside, mostly do this when the sun is shining to get that extra bit of warmth during their workout (Sussams et al., 2015; McKinney & VerBerkmoes, 2020). When trees provide shadow, they will not like to be physically active anymore, which can relate to both **physical well-being** and **sport context**. Not being physically active because of this reason affects the **physical well-being** of people and the shadow that is provided creates an unpleasant experience to be physically active in, which means that the **sport context** is affected.

Apart from physical health this could also affect the **mental well-being** of individuals, as people usually feel better when the sun is shining (even more so in colder temperatures). When trees provide shadow, it could affect the mental health (McKinney & VerBerkmoes, 2020). This effect on mental health is very small, compared to physical health, but it is still present.

Design of the living environment
The third element of blue and green infrastructure mentioned were aspects of the living environment. As mentioned before, these are little elements like smaller areas of greenery, a good network of hiking and cycling paths, green roofs, green walls, green garlands along the streets, bushes and flowers. Because of the fact that these elements are smaller than the others, they need to be combined to create a significant effect. This means that the location of these elements needs to be thoroughly analyzed and they need to be placed very carefully. Niewenhuijsen (2020) agrees with this as he claims that green roofs on tall buildings have little effect on the heat island effect. To add to the location of measures, Kimic and Ostrysz (2021) argue that there are numerous technical and biophysical limitations to elements of blue and green infrastructure. An example of this is the fact

that most measures require a lot of land and space. Some of these measures interfere heavily with the city's structure, which could lead to a reduction of the effectiveness (Kimic & Ostrysz (2021). Then, the search for the optimal maintenance is also quite hard, as all people have different views on their living environment. This means you cannot make every individual happy and you have to find a compromise that satisfies most individuals. Another bug when it comes to maintenance according to Oege Oevering is the timing of it. He mentions the example of parking on grass; this grass needs to be mowed from time to time, but finding the right time to do so is challenging as there are always cars around. You would have to shut the area down for some time, which is seen as a negative thing (O. Oevering, personal communication, 3 May 2023).

Furthermore, the lack of a long-term vision is a limitation of these smaller measures (Deely et al., 2020 Borelli et al., 2017). This limitation is about the fact that you cannot know now what will happen in the future, which means that the elements you implement now might not be suitable for the area in the future. This can have multiple reasons such as climate change, a change in inhabitants or a change in the way we view blue and green infrastructure in the future. This makes implementing elements that should be there for a long time a little more difficult. You really need to be sure that it will still be relevant in the future.

Then, another limitation would be the competing priorities that you have to deal with (Deely et al., 2020; Thorne et al., 2018; Di Marino et al., 2019). This relates to the limitation mentioned before, about the suitability of elements in the future. Dealing with competing priorities means that you have to think of the aspects that will change over time and deal with those.

Lastly, general aspects like funding, knowledge about the elements that will be implemented & their effects, lack of technical guidance, institutional inexperience, negative past experiences, the estimating benefits and costs, linking providers & users, design challenges, construction challenges, onsite limitations and maintenance & performance challenges are aspects that could turn into limitations (Deely et al., 2020; Sussams et al., 2015; Johns, 2019; Albert et al., 2019; Di Marino et al., 2019).

The limitations mentioned above can be linked to **sport user**, especially the part about the search for the optimal maintenance, as this aspect makes it clear that every individual has a different view on their living environment. This leads to having to find a compromise that satisfies most individuals. **Sport user** is about people and their various wants and needs, which is the centre of the limitation here.

Apart from that, the importance of the location of elements can also have an effect on **sport context**, as some elements in a certain location might make the experience of being physically active more comfortable compared to another location. People might not even want to make use of an element and be physically active in a certain location, which might lead to negative consequences concerning the **physical well-being** of people.

Lastly, some of these smaller measures are designed to create a more open and comfortable environment to be in. They are not all just focused on physical activity, but also on getting people together and creating social cohesion. When these elements are not placed and designed well enough, people might not want to go out and visit that location and their **social well-being** might be affected.

The 'Beweegroute'

One important thing that needs to be taken into account when implementing measures that change the living environment is societal support. Without this, a measure might not work the way it is supposed to (Kimic and Ostrysz 2021). When people do not accept a measure, they will not make use of it, which leads to the measure being unsuccessful. An example of this is the 'Beweegroute' in Dordrecht. In the covid-period the municipality opened a route that connected a school to an area of nature. Along the route, there were a few posts with six different challenges that had to do with physical activity and nature. People that went on this route had a dice and at each post, they had to roll the dice to let it decide which challenge they had to do. In theory, this was a really good plan to

get kids to go on a walk while combining it with fun games. In practice, however, this route was not used that much, even though the municipality did discuss the plans with the neighborhood-manager and several inhabitants (A. Lammers, personal communication, 11 May 2023). This shows that, even when you discuss your plans with inhabitants to find out what they think, a measure can still turn out to be unsuccessful.

Related to societal support, new measures, even well-planned designs, can lead to unintended risks and side effects such as people not accepting the measures, unwelcome changes to the biodiversity or a negative aftermath that nobody thought of in the beginning (Lõhmus & Balbus, 2015). The amount of societal support of measures also really differs within society, as some generations accept the importance a little easier than other generations (O. Oevering, personal communication, 3 May 2023).

The 'Beweegroute' could have been a great success if it was used a little more, which shows that just asking some inhabitants and speaking to the neighborhood-manager is not enough. You need to know what all inhabitants really need and want to implement such an element successfully. This relates to **sport user**, as all inhabitants might want something different, but you also might find a way to combine it all. In this case, that was a missed chance.

This element was not socially accepted and as a result, was not used as much as it was intended to. This might relate to **social well-being**, as people might need other kinds of elements to come together and create that social cohesion and acceptance.

Differences between people

Another part that needs to be taken into account is the fact that people are very different. They live in different neighborhoods, have different jobs, have a different amount of money and so on. All people have their own problems and struggles, which means that they all need something else. This could lead to limitations when it comes to the implementation and use of elements of blue and green infrastructure.

As mentioned before, people differ from each other, which also means that they react in different ways to certain changes or implementations and behave differently (Evans & Cohen, 2004). This needs to be taken into account when creating or implementing a blue and green element to try to stimulate physical activity. The element either needs to be broad so multiple 'different' individuals will make use of it, or there need to be various elements that facilitate physical activity, each targeting another group of people. This way an individual can choose to use the element that fits them best (Lafortezza et al., 2009; Evans & Cohen, 2004). This shows why it is important to take **sport context** and **sport user** into account. It shows that such elements need to be multi-appliable to gain the most successful results.

Mental well-being and **Physical well-being** also play a big part in this. When people live in poverty, have a lower education or have debts, it can lead to stress, mentally and physically. According to Simone Vermeulen (personal communication, 10 May 2023), people struggle with this and that could lead to them being harder to reach which then leads to problems creating the right elements. Annemarie Lammers (personal communication, 11 May 2023) mentions that people that experience a lot of stress function a little differently compared to other people. This means that you cannot see the effect a blue or green element has on these kinds of people very clearly.

4.1.3 Summary

Elements and aspects	Benefit(s)	Disadvantage(s)/limitation(s)	Sport aspect(s)	Health aspect(s)
Green spaces and parks	Help reduce heat stress. People that live nearby are healthier. Stimulates social cohesion.	It should not just be a green space → various opportunities. Finding the right balance is challenging. (Social) safety needs to be maintained. The effect on physical activity is not concretely measurable.	Sport context Sport user	Physical well-being Mental well-being Social well-being
Trees	Creates shadow → reduces temperature. Help reduce heat stress.	Shadow → cooling down when it is not needed, which makes it less comfortable.	Sport context	Physical well-being
Design of the living environment	Raises the attractiveness. Provide health supporting services. Help reduce heat stress. Stimulates social cohesion and strength.	A combination between elements is needed to have an impact. Elements might interfere with the city's structure. Search for optimal maintenance is challenging. Lacks a long-term vision. Competing priorities. Funding, knowledge, inexperience, etc.	Sport context	Physical well-being Social well-being
Creative use of space	Finds room for elements. People that live nearby are heathier.	-	Sport context Sport user	Physical well-being Mental well-being
The 'Beweegroute'	Listened to inhabitants.	Lacks societal support. Unintended risks and side effects.	Sport user	Social well-being
Differences between people	-	People react differently to elements. Some people are harder to reach than others.	Sport context Sport user	Physical well-being Mental well-being

Table 2: Summary of the elements and their benefits/disadvantages

4.2 Municipal policy around sports and physical activity

As of right now, there still are multiple places in Dordrecht with lots of grey infrastructure and little elements of blue and green infrastructure. This means that these places are more prone to the urban heat island effect, which results in health issues, a decrease in physical activity and those places being uncomfortable to be at in summer (Gemeente Dordrecht, 2022). According to Patrick van der Zouwen (personal communication, 10 May 2023), policy about sports and physical activity is not directly combined with heat stress, but they look at a combination with when needed. Within the policy about sports and physical activity, the municipality of Dordrecht tries to stimulate walking and hiking by creating trails and specific routes that are surrounded by nature and being physically active outdoors.

General aspects of policy about physical activity

To describe the way the municipality of Dordrecht deals with sports and physical activity in their policies, an interview with Patrick van der Zouwen was done. He mentions that the best way to stimulate physical activity is need to look at facilitations per target group; you have to offer different types of elements (personal communication, 10 May 2023). This is also a part of the policy around sports and physical activity of the municipality of Dordrecht. They try to connect all the different wants and needs and make it so that everyone has something that they are comfortable with. Patrick mentions an example of the development of certain areas; you cannot always just put spatial designs in an area, but you need to think about the identity and inhabitants of the area and match the elements to that. “What do you facilitate in which neighborhood? Sometimes, only a facilitation is not enough and you need to involve coaches or trainers to create a certain program that inhabitants can use. You could also involve the managers of each neighborhood and get them to approach and stimulate the inhabitants to take part in physical activity” (Patrick van der Zouwen, personal communication, 9 May 2023). This show that the municipality of Dordrecht tries to look at the whole picture when implementing elements to stimulate physical activity to make sure they use the right elements that gain the most positive results. Two of the most important parts of this ‘whole picture’ are mentioned below.

As mentioned before, one of the most important parts when trying to implement certain elements to stimulate people to be more physically active, is listening to the wants and needs of inhabitants to make the experience as pleasant as possible, which relates to **sport user**. The inhabitants should be the ones to decide what measures are more important than others, because they are the ones that will be using them (sports experts; Patrick van der Zouwen; Simone Vermeulen; Annemarie Lammers, personal communication, 9; 10; 11 May 2023). The sports experts (personal communication, 9 May 2023) also highlight the importance of this; “it is extremely important to listen closely to the wishes and needs of the user. To do so, a bottom-up strategy would work best, as you can easily gather all the wishes and needs and include them in the design process of new measures for the stimulation of physical activity. This way, you make sure the new implementations meet the expectations, wishes and needs of the people that will actually be using it”.

An example of listening to inhabitants is a little basketball field in Dordrecht that Patrick van der Zouwen (personal communication, 10 May 2023) mentions. It is a little field at which you can only really play 3x3 basketball, but kids, especially boys, really like to play there. The municipality asked those boys what they wanted them to do with the field and how they could improve the location. With the answers they got the municipality got to work and improved the location by implementing a couple of adjustments such as the lightning, another foundation that improves to bounciness of the ball and reduces the noise it makes, better baskets, better lines and some other colors that make the field more attractive. They added a few benches, a trash can and a water tap. After they touched up the place, you could see the results immediately; “instead of ten kids a week, there now are ten kids a day. Apart from the days when it is raining, about thirty to forty kids are playing there” (Patrick van der Zouwen, personal communication, 10 May 2023).

Another important part of physical activity that the municipality focuses on is the way people feel when they are being physically active. This means they focus on **sport context**; the experience people have before, during and after being physically active. An example of this is facilitating green areas. Oege Oevering mentions that it is common that people are more cheerful and happy when they have been to a green space like a park or a field, then when they are being physically active inside or in a place with a lot of grey infrastructure. So, visiting and being physically active in such a green space helps brighten your mood and it also increases your **mental well-being** (Gómez et al., 2004). The municipality rates this very highly, so they try to facilitate enough of these areas of greenery. They even have a special rule for this; they try to create a green space every 300 meters. This means that you have to walk about 300 meters to find a new green space (F. Helsloot, personal communication, 5 May 2023; O. Oevering, personal communication, 3 May 2023). This way, there will be enough green spaces that people can be physically active in, which makes them feel more comfortable. Of course, this will also improve the **physical well-being** of individuals, as they will visit these green spaces more often and will be physically active while visiting.

Design of the living environment

Another thing that the municipality of Dordrecht frequently looks at is the design of the living environment. With the amount of grey infrastructure, it is important to facilitate some blue and/or green elements, not only to stimulate physical activity, but also to tackle the effects of heat stress. According to Patrick van der Zouwen (personal communication, 10 May 2023), policies about heat stress are often combined with sports and physical activity when the municipality wants to implement something. The municipality tries to facilitate multiple areas and elements that stimulate physical activity and tackle heat stress at once. They try to design Dordrecht in such a way that it naturally promotes (minimal forms of) physical activity and mitigates heat stress. An example of this is a good network of cycling paths with areas of greenery on the side; people will make use of it and be more physically active and the greenery will stimulate cooling the air temperature (sports experts, personal communication, 9 May 2023; Prins et al., 2020). The municipality really focuses on creating such a network, especially with the realization of the Stadspark, but more on that in paragraph 4.3.

When the living environment you live in is neglected and unattractive, you will be less tempted to go outside, let alone be physically active in this environment (Oppert & Charreire, 2022; Jongeneel-Grimen et al., 2014). During their research, Jongeneel et al. (2022) found out that having more favorable environmental factors such as safety, green spaces and social cohesion leads to an increase of physical activity. The municipality really tries to make the experience of being outside as comfortable as possible (Gemeente Dordrecht, 2022). Related to that, when your neighborhood is mostly filled with grey infrastructure, has only a few small gardens and lacks other green spaces, you would not like to be outside in times of heat stress, let alone be physically active within your living environment (Simone Vermeulen, personal communication, 10 May 2023). This shows that the living environment you are surrounded with can play a big part in the physical activity of inhabitants. This can relate to **sport context, physical well-being** and **social well-being**, as people will feel comfortable enough to go out to be physically active and meet each other.

Little measures can make big progress

Most of the time, the big measures in the living environment such as large spaces of greenery or big parks have the most potential to have an effect on sporting behavior, but the smaller measures can also have a significant effect. These measures on their own might not be as impactful as bigger measures, but together they can create a significant impact on sporting behavior.

One of the measures to gain more blue/green infrastructure and tackle the effects of heat stress that the municipality of Dordrecht has is planting a tree for every newborn baby in Dordrecht (Gemeente Dordrecht, 2022). This means that the population of trees will grow at an equal rate as the population of inhabitants of the city. This is another example of combining policies about sports and physical activity and heat stress. The sports experts mention that alternative ways of

implementing blue and green elements such as trees, bushes or a leafy canopy along the streets can help decrease the temperature in the city, which stimulates people to carry out their daily activities, even in times of heat stress (personal communication, 9 May 2023). Most of the time, these daily activities are things like cycling, walking or playing (for kids). The fact that these measures tackle the effects of heat stress, results in the air being a lot cooler than with the urban heat island effect. As mentioned before, this has a positive effect on the **physical well-being** of people and it relates to **sport context**, as it makes an area more comfortable.

Another example of a little measure that can have a big impact on sporting behavior has to do with the amount of grey infrastructure in cities. In Dordrecht, this problem is also present as there are lots of schoolyards that mostly made out of grey infrastructure and lack blue and/or green elements. These schoolyards are mostly made out of stone, with spaces of artificial grass for the kids to play. Lots of stone in combination with artificial grass means that these schoolyards will heat up pretty quickly which might makes it uncomfortable for kids to play there during the breaks or before and after school (Liu & Jim, 2021; Annemarie Lammers, personal communication, 11 May 2023; Simone Vermeulen, personal communication, 10 May 2023). This relates to **sport context**, as greenery can make the experience of playing at the schoolyard much more comfortable. This way, the kids might even come back to play there after school. The municipality looks at options of elements to find the right way to make schoolyards greener, but cannot do that alone. That is why they made an arrangement that says that schools that facilitate a green schoolyard can get subsidy for their actions. This way, schools in Dordrecht are stimulated to green their schoolyards (A. Lammers, personal communication, 11 May 2023). Greening schoolyards actually relates to all aspects of human health; **mental health**, **physical health** and **social health**. This is because the kids will feel better in a green environment, they will play at their schoolyard and they can get the chance to meet up with friends while doing so.

Public sporting events

Another aspect that could stimulate people to be more physically active is organizing public sporting events. The municipality of Dordrecht does this multiple times a year and people seem to really like it. There is a website in Dordrecht called the 'Sportagenda'. Here people can see an overview fo all public sporting events that will take place and they can even sign themselves up. According to Pitman and Ely (2013), attending such public events can get people to be more enthusiastic about certain sports or just about physical activity in general. This relates to **sport context**, as people can a get feeling of the experience a certain sport bring. That could lead to people wanting to participate themselves in the following year, or people wanting to join a club or team that plays said sport. Another benefit of having various different events each year is the fact that people could find out what they really like (Pitman & Ely, 2013). Taks et al. (2015) actually mentions that they think this could go even further; after the big 'professional' event, smaller, more accessible events that are less competitive should be organized. These events should be aimed at people that want to try some sports. These people could participate in the events and see whether they like it or not. If so, they could join a sport club that offers the sport they like. With these less competitive events, the atmosphere is crucial, as people are more likely to return to the sport when they think it is a pleasant experience (Taks et al., 2015). Apart from the effect on **physical well-being**, such an event can also have an effect on the **social well-being** of an individual, as they are participating in the event with others (Pakzad and Osmond, 2016). Everybody is welcome to join the event, they make contact, new friends even, so the social inclusion, integration and cohesion is high. The sports experts agree with this, but they claim that you need a certain amount of organization to make sure you really stimulate physical activity. Examples of organization are sports coaches, sport clubs, workshops, events, management, supervision and maintenance (sports experts, personal communication, 9 May 2023).

Inclusion of sports and physical activity in climate adaptation documents

The policy about sports and physical activity of the municipality of Dordrecht is quite developed and has already come up with various measures that have stimulated physical activity. However, as was by Patrick van der Zouwen (personal communication, 10 May 2023), the connection between policy about sports and physical activity and climate policy/heat stress is not very much developed yet. That seems to be confirmed by the fact that sports and physical activity are mostly only a little part of climate adaptation documents. In some documents physical activity is mentioned multiple times, but most documents only slightly touch upon the element of sports, mostly related to blue and green infrastructure. Most of these documents focus entirely on the realization of the Stadspark and mention the blue and green elements that will feature in the park and how these elements can have a positive effect on physical activity and sports. They show maps and matrixes that include sports and physical activity. For example, it is mentioned that new and extra green elements have a positive effect on the mental health and physical activity of people, which means that people will tend to be more physically active when certain green measures are taken (Gemeente Dordrecht 2022; Atlas Natuurlijk Kapitaal, 2021; Rijksdienst voor ondernemend Nederland, 2019; Balat & Jancovicová, 2021; Gemeente Dordecht, n.d.; Raad Dordrecht & Mecanoo, n.d.). This means that there already is a very good foundation of the policy of sports and physical activity, but there should be more attention towards the direct connection with climate adaptation and heat stress.

4.2.3 Summary

Aspects	Benefit(s)	Disadvantage(s)/limitation(s)	Sport aspect(s)	Health aspect(s)
General aspects of policy	Basketball field: listening to inhabitants. Increases mental health.	Every individual is different.	Sport context Sport user	Physical well-being Mental well-being
Design of the living environment	Multiple facilitations & opportunities. Safety, green spaces & social cohesion stimulate physical activity.	Neglected living environment leads to less physical activity. Too much grey infrastructure leads to heat stress.	Sport context	Physical well-being Social well-being
Little measures → big progress	Help reduce heat stress. Small measures stimulate going outside. Greening schoolyards.	A combination between elements is needed to have an impact.	Sport context	Physical well-being Mental well-being Social well-being
Public sporting events	People get to know (new) sports. Stimulates social cohesion.	Certain amount of organization needed.	Sport context	Physical well-being Social well-being
Inclusion in climate policy	-	Underdeveloped connection.	-	-

Table 3: Summary of the municipal policy about sports and physical activity

This table shows that the municipality of Dordrecht is already quite developed when it comes to sports and physical activity and how to stimulate that. What stands out is the fact that the aspect of sport user is still somewhat underdeveloped, as it is mentioned and used significantly less compared to sport context. The aspects of human health are quite evenly represented within the municipal policy. Physical well-being is everywhere, which makes sense as physical activity always stimulates physical well-being. The other two aspects are less frequently present, but they still are a big part of the policy. Apart from that, is it mentioned that the connection between sports and physical activity and heat stress is present, but not all the time. This means that the municipality can grow in this area and has to focus on including sport user and the connection with (other aspects of) climate adaptation in the next couple of years.

4.3 The Stadspark XXL and physical activity

With the realization of the Stadspark in Dordrecht, the municipality wants to stimulate people to be more physically active on a daily basis. In the next two sections, the process and looks of the Stadspark and the way it will have an influence on sporting behavior will be made clear.

4.3.1 Process and design of the Stadspark

Current state of the area

At this moment, the Stadspark is located in the in the middle of Dordrecht; an area currently known as the Dordwijkzone, which already has a lot of quality, but still consists out of multiple individual areas (Rijksdienst voor ondernemend Nederland, 2019). The north of the area is characterized by the different tides, the south is characterized by water and polders and the middle of the area is woody (Rijksdienst voor ondernemend Nederland, 2019). Another example of the multiple individual areas is the fact that the Dordwijkzone consisted of separate sports parks like sports park Schenkeldijk, sports park Krommedijk and sports park Stadspolders. These parks will be connected by the realization of 'de groene loper'; various routes through the park that connect nature and the surrounding neighborhoods with the different features within the park. To do this, the Stadspark will spread from the north of the city until the south of the city, which can be seen in figure 8. It is a central place in the expanded city of Dordrecht and it consists for thirty percent of sports parks right now (Balat & Jancovicová, 2021).

A lot of reasons (not) to be physically active have to do with the living environment and its facilities. The current state of the area in which the Stadspark will be realized is far from ideal; not all sporting fields are accessible for every inhabitant to freely use. Most of the facilities that are meant for physical activity are only accessible for people that have a membership which allows them to enter those facilities (Balat & Jancovicová, 2021). This means that these facilities are not free and people have to pay a certain amount of money to be able to get into the facilities. Some people are simply not able to pay that kind of money and will have to find another way to be physically active (A. Lammers, personal communication, 11 May 2023). To add to that, about sixty percent of the park is not publicly accessible and half of that sixty percent are sporting facilities. This means that a great amount of the sporting opportunities are not accessible to every citizen (Balat & Jancovicová, 2021).

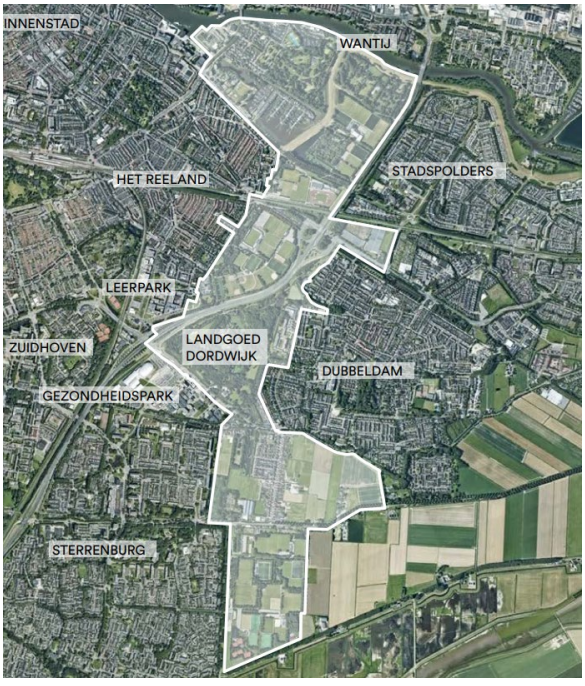

Figure 8: location of the Stadspark (Balat & Jancovicová, 2021)

Realization process

To understand the process of the realization of the Stadspark you have to go back in time to 1992. This year the first plans were presented and put on the agenda to carry out somewhere in the future (Karin van den Berg, personal communication, 26 May 2023). The most important part of the start of the realization process is looking at the various functions such a park should have. The municipality did this and out of all those things, they made a list of all the features that will be implemented in the Stadspark. They looked at basic assumptions, to get a clear image of what the Stadspark should contain and what it should look like. During this time, the area of the Stadspark was made out of various (sports)parks and green spaces that were scattered all over the city. These parks were not designed for free use, which had to change. Despite the disconnectedness, the municipality thought the area had a lot of potential for good use, so they made plans to connect all those scattered green spaces and parks.

A couple of years after the plan for the area was made, the city of Dordrecht sold its stocks to the energy company Eneco and used what they got in return as a means to invest in the city. Also, the municipality had to present a plan and a social business case for the area of the Stadspark to get started. They needed the money to really get it started, because it was quite a big area with all the separate sports parks, which meant that it would be a big investment. The parties that were involved in the realization process were presented 51 million euros, when the budget they actually needed was around 120 million euros. This meant that not everything could be done at once, but there were some major steps that could already be taken. The investments that cost the biggest amount of money are the ones that have to do with infrastructure. An example of such an investment is a big new tunnel for hikers and cyclists that goes under the train rails and the road to create a better connection between the park and the neighborhood. This is something that cannot yet be realized, so this problem has to be solved in another way; a little detour around a park to, later on, end up at the original destination of the route (Karin van den Berg, personal communication, 26 May 2023). These are choices you have to make; you have to be flexible when it comes to such a big project. The money that is available will also be used to add more greenery to the area, improve the ecology, add climate and water buffers and stimulate biodiversity a little more.

A limitation about the realization process of the Stadspark is the fact that it lacks clear leadership (Deely et al., 2020). In this case, the municipality carries the realization of the park, but there are multiple other parties involved that also have a say and a big part in the realization process. For example, parties that actually facilitate the elements that will be present within the park. These parties kind of lead the way in the implementation process, as they might know a little more about than other parties when and how to implement certain elements. This could result in unclear communication and a conflict of interests. This means that the process needs to be monitored very closely by the municipality to make sure that everything goes to plan. This way, the municipality can also make sure that they take the leadership in this process.

Design aspects of the park

The ambitions with the realization of the Stadspark XXL are high; the municipality wants it to be the biggest city-park ever, for all inhabitants, while combining nature, biodiversity, recreation, sports and water collection (Gemeente Dordrecht, 2022). Apart from connecting the different parts of the city, the park has various other goals such as improving the health of inhabitants, creating an identity for the city of Dordrecht, climate adaptation, improving the biodiversity, increasing inclusiveness and stimulating physical activity (Gemeente Dordrecht, 2023). As can be seen in figure 9 on the next page, the Stadspark aims to create a just park, with the help of a couple of parameters under the names ecological and social justness. Ecological justness is divided into respect, biodiversity and health. Social justness is divided into equivalency, diversity and democracy.

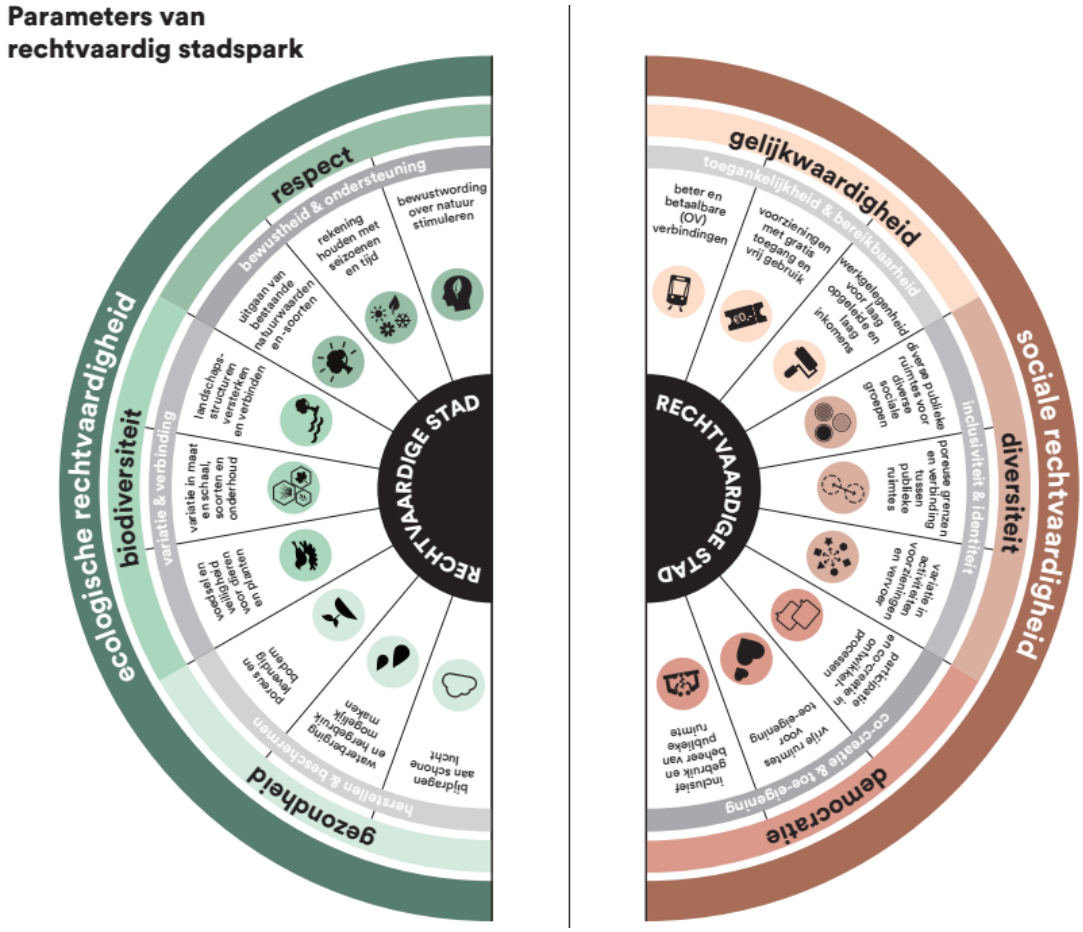

Figure 9: parameters of the Stadspark (Balat & Jancovicová, 2021)

In figure 10 and 11 on the next page, the shape and purposes of the Stadspark can be seen, together with some of the attributes that will be located within the park. The various functions of the Stadspark can be seen in figures 12 to 16 on pages 34 and 35; routes within the park, water facilities, greenery, 'programma' (sports facilities, sports clubs and buildings) and objects that create the scenery and looks of the park.

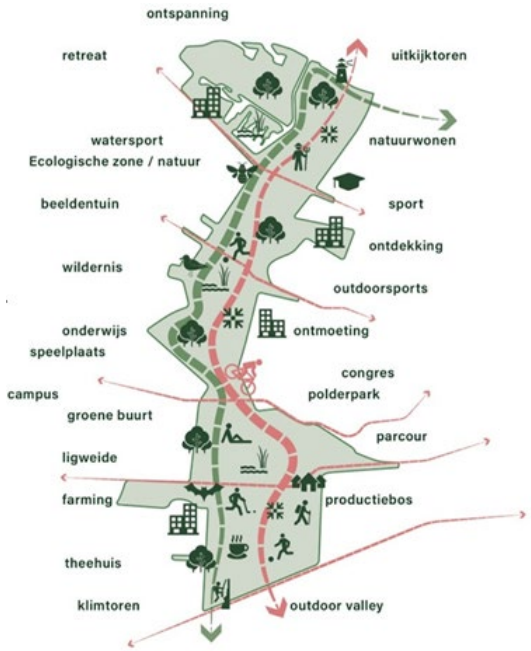

Figure 10: Looks/purposes of the Stadspark (Atlas Natuurlijk Kapitaal, 2021)

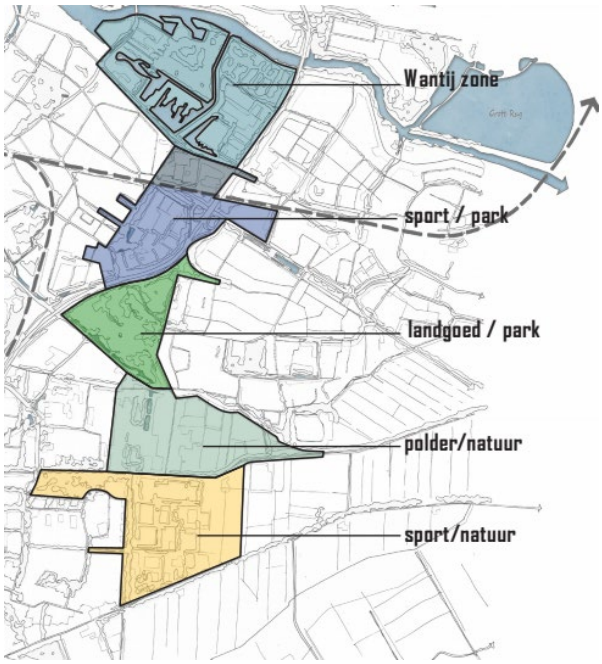

Figure 11: shape and purposes of the Stadspark (Raad Dordrecht & Mecanoo, n.d.)

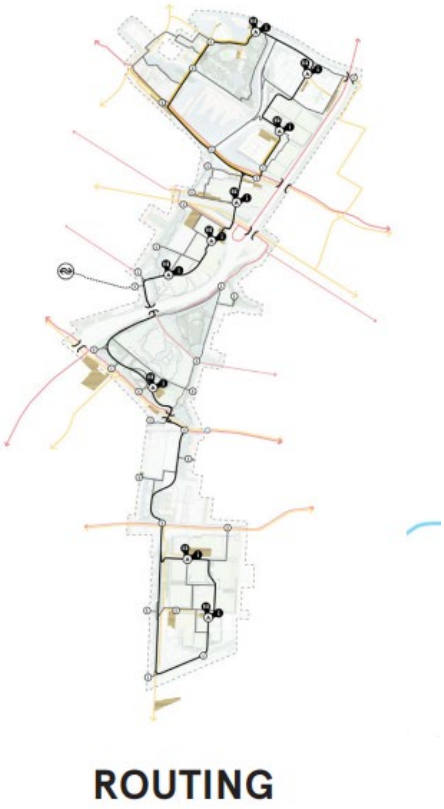

Figure 12: routing through the park (Gemeente Dordrecht, 2023)

Figure 13: water facilities (Gemeente Dordrecht, 2023)

Figure 14: greenery (Gemeente Dordrecht, 2023)

Figure 15: 'programma' (Gemeente Dordrecht, 2023)

Figure 16: objects (Gemeente Dordrecht, 2023)

Routing

There are some basic aspects that a park needs to have an influence on physical activity such as hiking and bicycle trails, a good connection towards to surrounding neighborhoods and a minimal level of attractiveness (Rijksdienst voor ondernemend Nederland, 2019). In the case of the Stadspark, the connection towards surrounding neighborhoods will be taken care of, mostly by bicycle or car routes. The bicycle trails will continue within the park, in combination with hiking trails. With the way the park is located, it facilitates a connection between the north and the south of the city, which means that it will be easier to get from north to south while using the routes within the park (Oege Oevering, personal communication, 3 May 2023). This shows that the various routes to and through the park have a connecting function. The trails through the park altogether will be about 12,5 kilometers and will vary in shape, looks and terrain (Gemeente Dordecht, 2023). There will be a head route that goes through every part of the park and secondar routes, ‘wander routes’, tunnels and bridges. All these routes through the park will improve accessibility; the (sports) facilities will be easier to reach and people will be tempted to use them more. This also means that the experience before the (physical) activity will be improved.

While designing the routes, spatial aspects such as greenery, shadow, and scenery are taken into account. An example of this is the fact that the municipality designed the routes through the park in such a way that enough shadow and greenery will be provided. This way, the routes will become more attractive and it will be more comfortable to use them in times of heat stress, because of the shadow that will be provided.

4.3.2 Influence on physical activity and sporting behavior

As mentioned before, there are a lot of sports parks in the Stadspark, which means that there will be a lot of opportunities to be physically active and play sports. Inhabitants of the surrounding neighborhoods and maybe even people living further away can make use of these facilities. These aspects and other features of the park will contribute to the sporting behavior of inhabitants of Dordrecht. These elements can also have an effect on the human health indicators, which will be mentioned below.

Physical well-being

As mentioned before, the realization of the Stadspark is still ongoing, but some parts of the park are already done. Mostly, these parts are renovated sports parks that were already present. An example of such a park is sports park Reeweg, which was opened on May 10th, 2023. This is a sports park that used to be a training field for football with fences, but is now an open park that all inhabitants can make use of. The municipality tries to make these parks and facilities open places with the help of the sports clubs. In the case of the Reeweg park, this meant that the athletics track was also opened for everybody to use, when it is not being used by the sports club that manages the track. Opening the park for public use, means that every different individual can be physically active there, which improves the **physical well-being**. The sports facilities are still there, but they have been expanded with greenery, with the trees still to be planted in autumn. The fact that the sports facilities are still there means that the people that are members of the sports club that uses the facilities will still be able to play sports in this part of the park. Now, the facilities are accessible for everybody, which might mean that more people will become interested in joining the club or playing the same sport. Karin van den Berg (personal communication, 26 May 2023) tells me that this was in fact one of the goals of creating a public park next to sports facilities. That is why the municipality, together with 'Stichting Wijk voor Wijk', organized clinics for kids to try out the sports that are facilitated in this part of the park. Kids could try football, handball, track running and hurdling. These clinics introduced kids to these sports and helped them find the sport that they like.

The fact that the athletics track can only by used by the public when it is not occupied by the local sports club makes sense, but can also be seen as a disadvantage to having an open park. This facility cannot always be used.

The football field that used to be located in the Reeweg park has been moved to another location in the park. At first, this location was not easily accessible, so people that needed to go there had to make a detour. This is not efficient, so the municipality created a bridge to connect the park to the neighborhood (Patrick van der Zouwen, personal communication, 10 May 2023). This way, the inhabitants of that neighborhood and the surrounding ones can get to the football field a lot easier and faster, which makes the field more accessible and attractive to use. The route towards the football field also connects the west side of Dordrecht with the city centre and was made more attractive, so people with other purposes would also make use of it. This relates to **sport context**, as the experience before being physically active in the park is more pleasant than it was before, because the accessibility of the area has improved.

Apart from integrating already existing sports parks, there will also be some water and nature based facilitations. Karin van den Berg (personal communication, 26 May 2023) mentions an example of this; the municipality looks to create locations based on water, so kids can play in that area and adults can cool down. Such facilities are key aspects to a successful park, as they can be used by various different inhabitants. This can be related to **sport user**, as these facilities create spaces in which everybody can be physically active. Another example of water and nature-based elements are trees. Trees are simple elements that can be placed almost everywhere. In autumn, multiple more trees will be planted all over the area. Furthermore, as mentioned before, they can help tackle the effects of heat stress as more co2 will be stored, which leads to the effect of cooling an area down in

temperature. Then, trees provide shadow that can also be used as a way to cool down. Again, this relates to **sport context**, as it will be more comfortable to be physically active.

The last example of elements based on water and nature are areas of greenery in general. Greenery will be present all over the park, in all sizes and types. These spaces of greenery will stimulate human health, ecology and biodiversity in the area and reduce the effects of heat stress. Related to that, the municipality looks to create innovative solutions for artificial grass, as fields with that kind of grass will become significantly warmer when heat stress occurs. When these fields are made out of natural grass and their surroundings are filled with greenery, this will not be a problem. The municipality tries to make the existing four sports parks and the surroundings greener to make it more attractive and accessible for people. This way, you can create an area that will be used by every individual (Karin van den Berg, personal communication, 26 May 2023).

Social well being

Another goal of the realization of the park that Karin van den Berg (personal communication, 26 May 2023) mentions is the fact that it aims to stimulate social cohesion and interaction. With the help of young innovators and government architects, the municipality tries to find out in what ways the park can be attractive to most of the different groups in society and how they can get those groups to interact. Having facilities for all different kinds of people shows that the municipality takes **sport user** into account, as they want to make sure that every individual feels at home in the park. An example of this is an urban gym in the North-West corner of the park, close to the nursing home that is located there. The addition of such a gym will stimulate elderly to go there and be physically active (Rijksdienst voor ondernemend Nederland, 2019). This shows that you need to take a look at the surroundings and see what is already there that you can use to your advantage. By using and trying to strengthen the qualities that are already there, places where club athletes, individual athletes and individual inhabitants feel at home can be created (Rijksdienst voor ondernemend Nederland, 2019).

Social interaction is an important part of the realization process of the Stadspark, as the municipality wants to stimulate people coming together in the park, trying new sports and meeting new people through that. Having a stern foundation for social cohesion in the park might make people feel like it is more comfortable to be physically active in the park than in another place in the city (Simone Vermeulen, personal communication, 10 May 2023). When people feel socially safe, they will be more stimulated to be physically active. This relates to **sport context**.

Here, communication is key. When you want to include every individual in society, you need to make sure that you are using multiple methods of communication. Some people that do not use social media, read the newspaper or listen to the radio, but you still need to get through to them. This can be seen as a limitation to the process, as this can be really challenging to inform all inhabitants (Simone Vermeulen, personal communication, 10 May 2023).

Mental well-being

According to Patrick van der Zouwen (personal communication, 10 May 2023), the municipality wants to stimulate the joy that being physically active outdoors brings. By showing what it does to your health and how much fun it is, they hope to increase the daily physical activity of the inhabitants. He also emphasizes the importance of being physically active at your own rate; “it does not always have to be a sporty physical activity, but it could also be more natural. For example, taking your bicycle to work or to school” (Patrick van der Zouwen, personal communication, 10 May 2023). A big part of stimulating sports in a new environment is making the area attractive. People will feel much more comfortable in an attractive environment and will more likely be physically active there. This shows that **sport context** is a very important part of getting people to be more physically active. The attractiveness of the park will be taken care of by adding multiple features and elements, such as green spaces, necessary basic facilities, design features and a sufficient number of sporting opportunities. (Atlas Natuurlijk Kapitaal, 2021). While doing this, they try to use multiple inviting colors in the area, which according to Patrick van der Zouwen (personal communication, 10 May 2023), is also a main component in making people feel more comfortable. This leads to people being

tempted to go to the park and be physically active. According to Karin van den Berg (personal communication, 26 May 2023), an attractive park that is located close to your living environment makes it easier for people to go there, than when the park would not be attractive at all. The experience people have is much better in a park that is attractive to them. Annemarie Lammers (personal communication, 11 May 2023) agrees with this; "when it will be easier and more attractive, people will make use of the facilities. As for unorganized sports, the people that are physically active at their own time and pace, they might find new beautiful places within the park that is suited for the way they play sports and be physically active on that location".

Another aspect that could influence physical activity is a positive pedestrian environment with access to nearby recreational facilities within the park, a mixture of open spaces that are associated with physical activity and a mixture of various residential densities (Patrick van der Zouwen, personal communication, 9 May 2023). Especially the open spaces that are associated with physical activity will have a big contribution to stimulating physical activity and sporting behavior.

Expected use by inhabitants

The inhabitants I have spoken to all think the realization of the Stadspark will have a positive influence on their sporting behavior and physical activity. One of them mentions that they believe the Stadspark will be a beautiful new place to explore while running through it and they would like to play sports at one of the fields with their friends (inhabitant 3, personal communication, 12 May 2023). Another one praises the variety in sports facilities and says they would like to make use of all of them to find out what they really like. They also mention that the variety in facilities will lead to more people coming into the park to be physically active, so this is an aspect that will likely be rated highly by inhabitants (inhabitant 1, personal communication, 12 May 2023).

4.3.3 Summary

Aspects	Benefit(s)	Disadvantage(s)/limitation(s)	Sport aspect(s)	Health aspect(s)
Integrating existing sports parks	Open facilities for everybody to use.	Some facilities can only be used when they are not occupied by the sports clubs that use them.	Sport context	Physical well-being
Water and nature-based facilities	Facilities for everybody.	Artificial grass heats up when heat stress occurs.	Sport context Sport user	Physical well-being
Improving the attractiveness	Creates social cohesion. People feel comfortable.	Communication to all individuals is challenging.	Sport context Sport user	Social well-being Mental well-being

Table 4: summary of the aspect of the Stadspark

5. Conclusion

In this research, the extent to what and in what way physical activity and sports are included in climate adaptation with regard to heat stress was researched. To do so, the main question was; “to what extent and in what way are physical activity and sports included in climate adaptation with regard to heat stress?”. To fully answer this question and touch upon all parts of the subject, three sub questions that each cover a little part of the main question were used. The first one was; “what blue and green elements are proven to mitigate heat stress and promote physical activity and sporting behavior?”. The second one was; “to what extent does the policy about sports and physical activity of the municipality of Dordrecht have a connection to climate adaptation?” and the last one was; “in what way is physical activity taken into account in the spatial design of the Stadspark XXL?”. To answer these questions, a couple of interviews with experts, policymakers and inhabitants of Dordrecht and a literature study of scientific research and policy documents were done.

Blue and green elements supporting physical activity and mitigating heat stress

The first sub question was about elements of blue and green infrastructure that were proven to mitigate heat stress and promote physical activity and their limitations or disadvantages. Elements and aspects that have successfully done this are green spaces/areas and parks, trees, the design of the living environment and creative use of space. The last two aspects cannot be linked to one specific element, but cover various elements. Each of these elements have an effect on sport context, as they all create a more comfortable environment to be physically active in. This relates to aspects such as (social) safety, reduction of heat stress and attractiveness. Green spaces and parks and the creative use of space both have an effect on sport user, as these measures facilitate multiple opportunities to be physically active, that multiple different individuals can make use of. These two elements/aspects also relate to mental well-being. Clearly, all elements relate to physical well-being as they stimulate physical activity. Green spaces and parks specifically also have an effect on social well-being, because of the stimulation of social cohesion.

There can also be some limitations and disadvantages to elements and their implementation. Most of these limitations are physical, such as the shadow that trees provide. In winter, this prevents the sun from heating up the air under the trees, which can make it less comfortable to be physically active (sport context). Then, a green space or park that is being realized should not just be a green space, but there need to be more opportunities and possibilities to it. This means that finding the right balance is important. That can also be related to the design of the living environment, as a balanced combination between elements is needed for this aspect to be successful. Some other challenges are the lack of clear leadership, the lack of a long-term vision, the fact that you have to deal with competing priorities, the lack of knowledge about the elements and their effects, funding, the lack of technical guidance, institutional inexperience, negative past experiences, the estimating benefits and costs, linking providers & users, design challenges, construction challenges, onsite limitations and maintenance & performance challenges. The lack of societal support is also an important challenge that needs to be addressed; people are different and support different things. Related to that, people also react differently to elements and some people might be harder to reach than others. These individual differences also need to be taken into account with the implementation of such an element.

Municipal policy about sports and physical activity

The second sub question was about the municipal policy of Dordrecht about sports and physical activity and how it connects to policies about climate adaptation. Again, all aspects of policies about sports and physical activity have an effect on sport context. Only the general aspects of policies about sports and physical activity do also have a connection to sport user. This shows that the relation between sport user and the policy is not quite as established as the relation between sport context and the policy. This is something the municipality of Dordrecht has to work on in the next few years. The aspects of human health are quite evenly represented within the municipal policy. Physical well-

being is mentioned and looked at everywhere, which makes sense as physical activity stimulates physical well-being. The other two aspects are less frequently present, but they still are a big part of the policy. Social well-being, for example, is not a big part of the general aspects of policy around sports and physical activity, but is mentioned multiple times in the other parts. As for mental well-being, it is a part of the general aspects of the policy, but not so much for smaller aspects of it.

The municipality of Dordrecht really tries to bring the connection between sports and climate adaptation to life, but does not succeed very well yet. There is a solid connection between policy about sports and physical activity and heat stress, which is used in various situations, using various elements. However, heat stress is only a small part of climate adaption, which means that the connection towards climate adaptation as a whole needs to be more established in the future.

The Stadspark XXL

The last sub question was about the Stadspark itself, about the design of the park and the ways it can stimulate physical activity. The aim of the Stadspark is to connect all the green spaces and (sports) parks and create a big park. There will be lots of green spaces all over the area, that will be combined with blue infrastructure and nature-based facilities. This will also help make the area more attractive, which means that people will have a pleasant stay and will likely come back. Then, to facilitate movement, there will be various routes to and through the park. The already existing sports parks will be opened for everybody to use. The realization process of the park consist out of different phases with different elements and measures.

As for the effects on physical activity, the amount of blue and green elements in the park will reduce the effects of heat stress. This means that it will be cooler in the park, which could make the experience of being physically active in times of heat stress more pleasant. This has to do with sport context, as the area will be made more comfortable and attractive for people to use. The attractiveness of the park is an important aspect, as it can have an effect on all the aspects of human health; physical well-being, mental well-being and social well-being. It creates an attractive space to be physically active in, people feel better in attractive areas and it stimulates forms of social cohesion. Physical well-being is also affected by all the other elements of the park, as they al try to stimulate physical activity. The aspect of sport user will also play a big part in the realization process; there will be facilities for everybody, which means that every individual will want to visit the park.

Connection sports and climate adaptation

The answer to the main question would be that sports are a part of climate adaptation in reality, when in practice, it should feature a lot more. It is mostly just about heat stress, in combination with physical activity and blue and green infrastructure. The municipality of Dordrecht is an example of a municipality that already combines heat stress with physical activity by adding elements that help reduce the effects of heat stress. However, the connection to other aspects of climate adaptation is lacking. Policymakers are aware of the positive effects physical activity can have on the mental, physical and social health of people, such as a more relaxed state of mind, better physicality and social inclusion or integration, but not all of these themes are always taken into account when it comes to the implementation of elements. The same goes for the two aspects of sporting behavior; sport context and sport user. Sport context is used on a regular basis, while sport user is mostly left behind. These two aspects will have a more significant effect if they are combined, but that is something that is not always happening yet.

In conclusion, sports and physical activity are only a small part of climate adaptation and this connection needs to be more established in the future.

5.1 Discussion

In the academic relevance at the beginning of this research it was stated that research that focus on blue and green infrastructure in combination with people's behavior already has been done, but these studies are mostly about the way people treat new measures and not about sporting behavior specifically. There have also been some studies about blue and green infrastructure and its relation to heat stress, but not in combination with sporting behavior and physical activity. The fact that there has not yet been much research about the three variables together was identified as the knowledge gap. With this research, there is a study that focuses on all three variables and combines them to find out to what extent and how physical activity is included in climate adaptation. This means that there is some knowledge about the relationship between blue and green infrastructure, heat stress and physical activity now, which can be used for further research.

Then, the extended focus on the realization of the Stadspark XXL in Dordrecht also helps filling up the knowledge gap, as it shows a thorough example of a place where all three variables are combined. The information that has been provided in this research is rather abstract and descriptive, but this could be extended and completed with new research in the upcoming years, when the realization of the park has fully finished and there is proof that the inhabitants of Dordrecht actually make use of it.

One of the frameworks that was used in this research was the sustainability indicator set, which in this case focused on the human health indicators; social well-being, mental well-being and physical well-being. These three aspects are all important factors to keep in mind when you are trying to stimulate physical activity in any circumstance, situation or area. In the case of the combination of sports and physical activity with climate adaptation, physical well-being was looked at pretty regularly, as all (policy)documents and interviewees mentioned various facilities and elements that people could use to be more physically active. Social and mental well-being were present less frequently. Social safety, social cohesion and the effect of greenery on the mental health was mentioned a couple of times, but as a whole, these aspects lacked a little bit. There was no real focus on it (yet) and documents did not mentioned it much. This is something that could be looked at more in the future.

5.2 Recommendations

For further research it would be advised to look at the situation again. As of right now, the Stadspark is not fully realized, for now there is only one little part of the park, the Reewegpark, that has been opened. This means that you cannot say much about the influence of the Stadspark on sporting behavior and physical activity, as there is not any real proof yet. In a few years, when the park is fully open and people make use of it on a daily basis, the same research could be done. During that time, you can really find out to what extent and how the Stadspark has an influence on the physical activity of inhabitants of Dordrecht. When the park is opened, you can find out whether or not people will actually use the park because of certain sporting opportunities that were implemented or because of the focus on accessibility and attractiveness. Maybe the realization of the park will not have the effect it was supposed to have and the physical activity of the inhabitants will not be stimulated by it. These are things that could be established in further research about the park specifically. The framework about the climate adaptation cycle could also be used during that time. The combination of the three main variables of the cycle and the focus on the Stadspark could also make a great setup for further research about comparable situations, such as other big blue and/or green investments in cities that are aiming to stimulate physical activity. This framework was intended to be used for this research but it did not fit in the end. Then, other municipalities that would like to facilitate such an area of their own could look at the successful elements and the challenges and limitations that come with such a big project. This way, they can see what is proven to be successful and what elements would need some adjustments. This research and further studies about the Stadspark could be used as

examples of how to look at such a place and what aspects could be successful. The interview guides that belong to the interviews that were done for this research could also be used as starting points.

Apart from research about the Stadspark, further research could also focus on the relation between blue and green infrastructure and physical activity. As mentioned before, there already is some research about this, but not nearly enough. For example, the focus could be on several elements of blue and green infrastructure to find out what kind of physical activity they stimulate and how this should be implemented in order to stimulate people and gain the most successful result.

As for recommendations for practice, I think sports and physical activity should be involved more in climate adaptation. It is only a small part nowadays and it is mostly seen as a side effect of blue and green infrastructure, with a connection to heat stress, while it is more important than that. I think the combination with blue and green infrastructure should stay, but there should be more focus on creating blue/green sport facilities and opportunities, than just blue and green infrastructure in general. This way, you stimulate people to be more physically active and you assist climate adaptation.

5.3 Reflection

This research focused on the Stadspark in Dordrecht and its influence on physical activity and sporting behavior of inhabitants of Dordrecht. The aim of the research was clear from the beginning. When I look back, I did measure all the aspects I wanted to measure, but it was quite a struggle to do so as some potential interviews did not take place and some policy documents were not accessible for me.

To collect the right amount of data, interviews with experts and policy makers on sporting behavior, physical activity, the Stadspark itself, blue and green infrastructure and (human) health were conducted. Besides those interviews, I also spoke to four inhabitants of Dordrecht when I visited the city. I learned how to approach people you do not know and ask them for an interview. These eleven interviews led to a lot of useful information and were the base of the data analyzation. However, at the early stages of this research the ambition was to speak to some more experts and policy makers. I contacted several other individuals on climate change/adaptation, sports organization and nature, but they did not answer my messages. I could have been more persistent, but I also did not want to bother them much, so I let it go. If there will ever be a next time, being more persistent will be the key to getting all the interviews that are needed. Then, I also wanted to speak to the project manager of the Stadspark and to some more inhabitants of Dordrecht, but that did not go the way it was supposed to go. After all, the interviews that were conducted were of great use and I learned that conducting and analyzing interviews fit me way better than statistics. I am more familiar with words than numbers and I am more at home in Atlas.ti than SPSS.

The theoretical framework was changed a little during the process of writing the thesis. At first, the human health indicators that belong to the sustainability indicator set were perceived as not very important. I shortened the text within the theoretical framework, but kept the aspects in my coding schemes, just to be sure. It turned out that these aspects actually played a significant part in the interviews and policy documents that were used for this research. This meant that the human health indicators were important and I included them in the section about the results. Contrary to this, the climate adaptation cycle was perceived very important at the beginning of the process, but after reading some documents and conducting the interviews, I found out that it was not that important. The interviewees only told me about the design and implementation process when it came to sports and physical activity. Climate adaptation did not feature at all. This lead to the deletion of the climate adaptation cycle from the research, as it did not add any important information.

It would have also been very helpful if there were some more documents about the Stadspark and its realization in general. There are a couple that can be accessed by everybody, but I would have loved to read more about it and gain some more knowledge about it. Most of the documents that really helped me gain perspective on the park, I found pretty late in the process of

writing my thesis. Which is not really a problem, because I still gained a lot of information that I added afterwards, but I would have liked to have read those documents before the process of writing the results, as it would gain me some more perspective beforehand.

As mentioned before, there were a couple of people that I wanted to speak to, but they did not answer my messages. This meant that there were not any interviews with experts or policy makers on climate(change), which would have been very helpful for this research. To add to that, I only spoke to four inhabitants in Dordrecht. This number could have been higher, which would have made the reliability of the research also higher.

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7. Appendix

7.1 Coding schemes

Policy documents in general & scientific papers

Main code	Sub code	Description
Blue and green infrastructure	Theories	Theories about B&G infrastructure found in policy documents
	Strategies	Strategies for implementing and creating fitting measures of B&G infrastructure
	Benefits	Benefits of B&G infrastructure
	Disadvantages	Disadvantages that have to do with B&G infrastructure
	History	The history of blue and green infrastructure
	Acceptation	The way new measures about blue and green infrastructure are accepted by inhabitants
	Successful locations	Locations at which B&G infrastructure-measures have been implemented successfully
	Unsuccessful locations	Locations at which B&G infrastructure-measures have been implement, but were not successful
	Policies B&G	Examples of specific policies about B&G infrastructure
	Implementation	Ways and/or steps to implement B&G infrastructure-measures
Human health indicators	Improving social well-being	How B&G infrastructure contributes to social interaction, social integration and community cohesion
	Improving mental well-being	How B&G infrastructure contributes to reduced depression + anxiety, attention restoration, positive cohesion and recovery from stress
	Improving physical well-being	How B&G infrastructure contributes to physical outdoor activity, healthy food and healthy environments
Heat stress	Human health	The effects heat stress has on human health
	Policies heat stress	Policies to counteract heat stress
	Specific measures - city	Existing specific measures cities have to counteract heat stress

	Age	The effect heat stress can have on people differs because of their age difference
	Cooling down	What are ways to cool down during times of heat stress?
Climate adaptation cycle	Barriers	Barriers that are detected within the cycle
	System of concern	The system of concern of the barrier within the cycle
	Larger context	The larger context in which the actors and system of concern come together
	Actors	The actors that are involved in the cycle and the barrier
Climate adaptation cycle – understanding	Detect problem	Step of the climate adaptation cycle
	Gather/use information	Step of the climate adaptation cycle
	(re)define problem	Step of the climate adaptation cycle
Climate adaptation cycle - planning	Develop options	Step of the climate adaptation cycle
	Assess options	Step of the climate adaptation cycle
	Select option(s)	Step of the climate adaptation cycle
Climate adaptation cycle - managing	Implement option	Step of the climate adaptation cycle
	Monitor option and environment	Step of the climate adaptation cycle
	Evaluate	Step of the climate adaptation cycle
Sporting behavior	Health	The relation between sporting behavior and the overall health of people
	Age	The relation between sporting behavior and age
	Gender	The relation between sporting behavior and gender
	Reasons to sport	The reasons people have to be physically active
	Reasons not to sport	The reasons people have not to be physically active
	Sport context	The experience someone has when playing sports
	Sport organization	The entity whose purpose is to achieve objectives and goals in order to secure resources to be successful

	Sport user	The consumer, with psychological needs and personal characteristics

Policy documents Dordrecht

Main code	Sub code	Description
Blue and green infrastructure	Theories	Theories about B&G infrastructure found in policy documents
	Strategies	Strategies for implementing and creating fitting measures of B&G infrastructure
	Benefits	Benefits of B&G infrastructure
	Disadvantages	Disadvantages of B&G infrastructure
	Successful locations	Locations at which B&G infrastructure-measures have been implemented successfully
	Unsuccessful locations	Locations at which B&G infrastructure-measures have been implement, but were not successful
	Policies B&G	Examples of specific policies about B&G infrastructure
	Implementation	Ways and/or steps to implement B&G infrastructure-measures
Human health indicators	Improving social well-being	How B&G infrastructure contributes to social interaction, social integration and community cohesion
	Improving mental well-being	How B&G infrastructure contributes to reduced depression + anxiety, attention restoration, positive cohesion and recovery from stress
	Improving physical well-being	How B&G infrastructure contributes to physical outdoor activity, healthy food and healthy environments
Heat stress	Human health	The effects heat stress has on human health
	Policies heat stress	Policies to counteract heat stress
	Specific measures - city	Existing specific measures cities have to counteract heat stress
	Age	The effect heat stress can have on people differs because of their age difference

	Cooling down	What are ways to cool down during times of heat stress?
Climate adaptation cycle	Barriers	Barriers that are detected within the cycle
	System of concern	The system of concern of the barrier within the cycle
	Larger context	The larger context in which the actors and system of concern come together
	Actors	The actors that are involved in the cycle and the barrier
Climate adaptation cycle – understanding	Detect problem	Step of the climate adaptation cycle
	Gather/use information	Step of the climate adaptation cycle
	(re)define problem	Step of the climate adaptation cycle
Climate adaptation cycle - planning	Develop options	Step of the climate adaptation cycle
	Assess options	Step of the climate adaptation cycle
	Select option(s)	Step of the climate adaptation cycle
Climate adaptation cycle - managing	Implement option	Step of the climate adaptation cycle
	Monitor option and environment	Step of the climate adaptation cycle
	Evaluate	Step of the climate adaptation cycle
Sporting behavior	Health	The relation between sporting behavior and the overall health of people
	Age	The relation between sporting behavior and age
	Gender	The relation between sporting behavior and gender
	Reasons to sport	The reasons people have to be physically active
	Reasons not to sport	The reasons people have not to be physically active
	Sport context	The experience someone has when playing sports
	Sport organization	The entity whose purpose is to achieve objectives and goals in order to secure resources to be successful
	Sport user	The consumer, with psychological needs and personal characteristics
Stadspark XXL	Looks/shape	The looks and shape the Stadspark XXL will have

	Sporting opportunities	The amount of opportunities to sport the Stadspark XXL will have
	B&G adjustments/measures	Examples of B&G infrastructure adjustments-measures that are or will be featured in the Stadspark XXL
Existing sports parks - Reeweg	Use	How much and in what way is sports park Reeweg used
	Looks/shape	What are the looks and shape of existing sports park Reeweg
Existing sports parks - Schenkeldijk	Use	How much and in what way is existing sports park Schenkelijkdijk used
	Looks/shape	What are the looks and shape of existing sports park Schenkeldijk

Interviews

Main code	**Sub code**	**Description**
Blue and green infrastructure	Successful elements	Elements that are successful in creating B&G measures
	Unsuccessful elements	Elements that are not successful in creating B&G measures
	Benefits	Benefits of B&G measures
	Disadvantages	Disadvantages of B&G measures
	Strategies/theories	Strategies and theories about B&G infrastructure
	Acceptation	Acceptation of measures
	Implementation	Process or steps of the implementation of B&G measures
	Locations	Locations with specific importance to B&G measures
	Policies B&G	B&G policies
	History policies B&G	History of B&G policy
	Living environment B&G	The role the living environment has in B&G measures
Sporting behavior	Stimulation	Things that stimulate people to plays sports
	Human health sb	Human health aspects related to sports
	Including inh	Including inhabitants in the decision making about sports
	Reasons to sport	Reasons people have to sport
	Reasons not to sport	Reasons people have not to sport
	Sporting opportunities/facilities sb	Facilities and opportunities to sport

	Living environment sb	The role of the living environment in sporting behavior
	History policy sports	History of sports policy
	Accessibility/attractiveness	Accessibility and attractiveness of sporting places
	Differences between groups	Differences between groups when it comes to sporting behavior
	Communication sb	The role of communication in the process of sports
	Sport user	The consumer, with psychological needs and personal characteristics
	Sport organization	The entity whose purpose is to achieve objectives and goals in order to secure resources to be successful
	Sport context	The experience someone has when playing sports
	Policies sport	Policies related to sports
	Sporting behavior inw	The sporting behavior of inhabitants of Dordrecht
Heat stress	Human health hs	The effects heat stress has on human health
	Stadspark hs elements	Elements in the stadspark that have an influence on heat stress
	Cooling down	What are ways to cool down during times of heat stress?
	History policy hs	History of heat stress policy
	Age	The effect heat stress can have on people differs because of their age difference
	Sporting behavior hs	Sporting behavior in times of heat stress
Health	Health policies	Policies about health
	History health policies	History of policies about health
	Differences health	Differences between people when it comes to health
	Communication h	The role of communication in the process of health
	Living environment health	Influence of the living environment on health
Human health indicators	Improving social well-being	How B&G infrastructure contributes to social interaction, social integration and community cohesion
	Improving mental well-being	How B&G infrastructure contributes to reduced depression + anxiety, attention

		restoration, positive cohesion and recovery from stress
	Improving physical well-being	How B&G infrastructure contributes to physical outdoor activity, healthy food and healthy environments
	History policy health	History health policy
Climate adaptation	Sports included	How and in what way are sports included in climate adaptation
	Heat stress included	How and in what way is heat stress included in climate adaptation
	Human health included	How and in what way is human health included in climate adaptation
	Barriers	Barriers that are detected within the cycle
	System of concern	The system of concern of the barrier within the cycle
	Larger context	The larger context in which the actors and system of concern come together
	Actors	The actors that are involved in the cycle and the barrier
	History climate policy	History of climate policy
	Policies climate	Policies about climate and climate adaptation
Climate adaptation cycle – understanding	Detect problem	Step of the climate adaptation cycle
	Gather/use information	Step of the climate adaptation cycle
	(re)define problem	Step of the climate adaptation cycle
Climate adaptation cycle - planning	Develop options	Step of the climate adaptation cycle
	Assess options	Step of the climate adaptation cycle
	Select option(s)	Step of the climate adaptation cycle
Climate adaptation cycle - managing	Implement option	Step of the climate adaptation cycle
	Monitor option and environment	Step of the climate adaptation cycle
	Evaluate	Step of the climate adaptation cycle
Stadspark XXL	Use sp	The intended use of the stadspark
	Looks/shape sp	The looks and shape of the stadspark

	Sporting opportunities/facilities sp	Sporting opportunities and facilities that will feature in the stadspark
	History sp	The history of the stadspark
	Attractiveness/accessibility sp	The influence of attractiveness and accessibility on the park
	Awareness sp	Are people aware of the realization of the park
	Stimulating sports sp	How the stadspark will stimulate sporting behavior
	B&G elements sp	B&G elements present in the stadspark
	Process sp	The process of creating the stadspark

7.2 Interview guides

B&G expert:

1. Allereerst, kunt u zich voorstellen? Hoe lang werkt u al bij … en wat doet u daar precies?

2. Welke b&g elementen worden vaak gebruikt in Nederlandse steden over het algemeen? Zijn deze dan ook het meest succesvol?
3. Hoe ziet dit eruit in Dordrecht?

4. Waar moet een gebied aan voldoen om een geschikte plek te zijn voor b&g infrastructuur? Zijn er bepaalde dingen waarbij het beter werkt dan in andere gevallen?

5. Welke b&g elementen worden het vaakst gebruikt? Welke zijn het meest succesvol, in welke situatie?
6. Bestaan er verschillen tussen blauwe en groene elementen? (qua succes → misschien ligt het aan de locatie/het probleem)

7. Welke gezondheidsaspecten spelen volgens u een rol in de besluitvorming rondom b&g infrastructuur in Dordrecht?
   (Op welke manier worden b&g elementen gebruikt om de algemene gezondheid van inwoners te verbeteren?)

8. We weten dat b&g infrastructuur verschillende voordelen kan bieden op het gebied van klimaatadaptatie, waar ligt volgens u de prioriteit? Is dat ook vooral rondom hitte stress?
9. Op welke manier worden die b&g elementen gebruikt om hitte stress tegen te gaan? Hoe werkt dat/ hoe gaat dat precies in zijn werk?

10. Door met b&g infrastructuur een gezondere leefomgeving te creëren, zou het goed zijn als ook in tijden van hittestress mensen in beweging blijven. Kent u voorbeelden van hoe b&g infrastructuur wordt ingezet om sportgedrag te stimuleren in het algemeen? En in tijden van hitte? Hoe wordt dit dan precies gedaan?

11. Denkt u dat de realisatie van het Stadspark in Dordrecht invloed zal hebben op het sportgedrag van mensen in die omgeving?

Sport/beweeg expert:

1. Allereerst, kunt u zich voorstellen? Hoe lang werkt u al bij … en wat doet u daar precies?

2. Hoe zit het met het sportgedrag in tijden van hitte? Denkt u dat klimaatverandering het sportgedrag van mensen beïnvloedt?

3. Op welke manier speelt de leefomgeving van mensen een rol bij het sportgedrag? Zou de leefomgeving een reden kunnen zijn voor mensen om niet te gaan sporten? Of juist wel?
4. Op welke manier spelen (sport)faciliteiten een rol bij het sportgedrag? Zou dit een reden kunnen zijn om niet te sporten? Of juist wel?
5. Hoe kan het sportgedrag van mensen het beste gestimuleerd worden? Zijn elementen van b&g infrastructuur een goede optie?
   Uitleg: B&g infrastructuur houdt in dat er natuurlijke maatregelen genomen worden om bv hitte stress tegen te gaan, een plek groener te maken of klimaatverandering tegen te gaan.

6. Waardoor worden mensen in het algemeen gestimuleerd om te gaan sporten? Hoe kan de leefomgeving aangepast worden zodat men meer gaat sporten?
7. Op welke manier zouden b&g elementen hier een bijdrage aan kunnen leveren?
8. Zijn er, naar uw idee, verschillen tussen bewonersgroepen en wijken in hoe ze omgaan met de buitenruimte en hoe deze voor hun sportief gedrag beïnvloedt? *(dus; verschillen tussen groepen in sportgedrag?)*

9. *Sport user=de sporter; met psychologische behoeftes en een persoonlijke karakter. Leidt tot de totale behoeften van sporters.* In hoeverre is het belangrijk om rekening te houden met de sporter zelf, wanneer men probeert sportgedrag te stimuleren? (Hoe kan dit het beste gedaan worden?)
10. *Sport context=de ervaring die iemand heeft; voor, tijdens en na het sporten.* In hoeverre is het belangrijk om rekening te houden met de ervaring die iemand heeft voor, tijdens en na het sporten?
11. *Sport organization=het behalen van bepaalde doelen zodat de middelen succesvol zijn.* In hoeverre is het stellen van doelen belangrijk bij het stimuleren van sportgedrag?
12. Wordt dit in de praktijk ook echt toegepast in het beleid en hoe belangrijk zijn de drie domeinen?

13. Denkt u dat de realisatie van het Stadspark in Dordrecht invloed zal hebben op het sportgedrag van mensen in die omgeving?

Beleidsmaker gezonde leefomgeving:

1. Allereerst, kunt u zich voorstellen? Hoe lang werkt u al bij de gemeente Dordrecht en wat doet u daar precies?

2. Wat is de huidige focus van het beleid op het gebied van sport en bewegen? Hoe kwam dit tot stand? (problemen, uitdagingen van provincie of rijk)
3. Hoe was de situatie 10/20/30 jaar geleden in de gemeente Dordrecht? Is er veel veranderd? (ook qua beleid?)

4. Zijn er op het gebied van gezondheid bepaalde verschillen te zien tussen geslacht, leeftijd, woonplek, etc in Dordrecht?
5. Hangen deze gezondheidsverschillen samen met het sportgedrag in Dordrecht?

6. En hoe zit dat met hitte stress, zijn het meer hitte gerelateerd gezondheidsklachten in bepaalde delen van de stad? (Is er in tijden van hitte een verandering te zien in de gezondheid van mensen?)

7. Op welke manier wordt er rekening gehouden met sporten en beweging binnen het beleid over gezondheid? Is dit iets waar standaard naar gekeken wordt?

8. Wordt er ook met hitte stress rekening gehouden binnen het beleid over gezondheid? (misschien in relatie met sport?)

9. Wordt er ook rekening gehouden met klimaatadaptatie/verandering binnen het beleid over gezondheid?

10. Denkt u dat de realisatie van het Stadspark invloed zal hebben op het sportgedrag van mensen in die omgeving?

Gezondheidsexpert:

1. Allereerst, kunt u zich voorstellen? Hoe lang werkt u al bij Havenland en wat doet u daar precies?

2. Zijn er op het gebied van gezondheid bepaalde verschillen te zien tussen geslacht, leeftijd, woonplek, etc in Dordrecht?

3. Hangen deze gezondheidsverschillen samen met het sportgedrag in Dordrecht?
4. En hoe zit dat met hitte stress, zijn het meer hitte gerelateerd gezondheidsklachten in bepaalde delen van de stad? (Is er in tijden van hitte een verandering te zien in de gezondheid van mensen?)

5. Op welke manier speelt de leefomgeving van mensen een rol bij het sportgedrag? Zou de leefomgeving een reden kunnen zijn voor mensen om niet te gaan sporten? Of juist wel?
6. Op welke manier spelen (sport)faciliteiten een rol bij het sportgedrag? Zou dit een reden kunnen zijn om niet te sporten? Of juist wel?
7. Hoe kan men dit het beste stimuleren (met kijk op b&g infrastructuur)?
   Uitleg: B&g infrastructuur houdt in dat er natuurlijke maatregelen genomen worden om bv hitte stress tegen te gaan, een plek groener te maken of klimaatverandering tegen te gaan.

8. Denkt u dat de realisatie van het Stadspark in Dordrecht invloed zal hebben op het sportgedrag (en dus de gezondheid) van mensen in die omgeving?

Beleidsmaker sport/bewegen:

1. Allereerst, kunt u zich voorstellen? Hoe lang werkt u al bij de gemeente Dordrecht en wat doet u daar precies?

2. Wat is de huidige focus van het beleid op het gebied van sport en bewegen? Hoe kwam dit tot stand? (problemen, uitdagingen van provincie of rijk)

3. Wat is het bewegingsgehalte van de gemiddelde bewoner van Dordrecht? Zijn er bepaalde verschillen te zien tussen geslacht, leeftijd, woonplek, etc?

4. Is de gemeente Dordrecht een geschikte plek om te sporten? Verschilt dit per locatie? En waar hangt dit van af?

5. Op welke manier wordt er rekening gehouden met de algemene gezondheid van inwoners binnen het beleid over sport en bewegen? Is dit iets waar standaard naar gekeken wordt?

6. Wordt er bij het maken van beleid mbt sport en bewegen rekening gehouden met de sporter zelf (de personen met verschillende behoeftes en karakters etc), en op welke manier wordt dat gedaan? *(user=de sporter; met psychologische behoeftes en een persoonlijke karakter. Leidt tot de totale behoeften van sporters)*
7. En met de ervaring die de sporter heeft voor, tijdens en na het sporten? *(context=de ervaring die iemand heeft; voor, tijdens en na het sporten)*
8. Wordt er tijdens het maken van beleid m.b.t. sport en bewegen ook rekening gehouden met het behalen van bepaalde doelen qua sport organisatie (zodat de middelen succesvol zullen zijn)? *(organization=het behalen van bepaalde doelen zodat de middelen succesvol zijn)*
9. Wordt er rekening gehouden met de overlappende delen van deze drie domeinen? Worden deze domeinen gezamenlijk of per twee bekeken of alleen maar apart?

10. Is hitte stress een onderdeel van het beleid rondom sport en bewegen? Zo ja, op welke manier wordt dit toegepast?

11. Wordt er rekening gehouden met klimaatverandering/adaptatie in het beleid over sporten en bewegen? Op welke manier wordt dit dan gedaan?

12. Denkt u dat de realisatie van het Stadspark in Dordrecht invloed zal hebben op het sportgedrag van mensen in die omgeving?

Beleidsmaker b&g:

1. Allereerst, kunt u zich voorstellen? Hoe lang werkt u al bij de gemeente Dordrecht en wat doet u daar precies?

2. Wat is de huidige focus van het beleid op het gebied van b&g infrastructuur? Hoe kwam dit tot stand? (problemen, uitdagingen van provincie of rijk)
3. Hoe was de situatie 10/20/30 jaar geleden in de gemeente Dordrecht? Is er veel veranderd? (ook qua beleid?)

4. Is de gemeente Dordrecht een geschikte plek om veel b&g infrastructuur toe te passen? En heeft dit dan ook vaak het gewenste effect? Voorbeelden?

5. Wat zijn belangrijke elementen van b&g infrastructuur voor het maken van beleid? En hoe kunnen deze het beste geïmplementeerd worden?

6. Wat zijn b&g elementen die het vaakst gebruikt worden? Welke zijn het meest succesvol, in welke situatie?

7. Welke gezondheidsaspecten spelen volgens u een rol in de besluitvorming rondom b&g infrastructuur in Dordrecht?
   (Op welke manier worden b&g elementen gebruikt om de algemene gezondheid van inwoners te verbeteren?)

8. Door met b&g infrastructuur een gezondere leefomgeving te creëren, zou het goed zijn als ook in tijden van hittestress mensen in beweging blijven. Kent u voorbeelden van hoe b&g infrastructuur wordt ingezet om sportgedrag te stimuleren in het algemeen? En in tijden van hitte? Hoe wordt dit dan precies gedaan?

9. Denkt u dat de realisatie van het Stadspark in Dordrecht invloed zal hebben op het sportgedrag van mensen in die omgeving? Op welke manier?

Ontwerper Stadspark:

1. Allereerst, kunt u zich voorstellen? Hoe lang werkt u al bij … en wat doet u daar precies?

2. Wat was de motivatie om op dit specifieke project; het Stadspark, in te schrijven? (Waarom eraan meewerken?)

3. Hoe is het ontwerp van het stadspark tot stand gekomen? Met welke aspecten wordt er rekening gehouden?

4. Op welke manier wordt er gekeken naar/gezorgd voor groen- en watervoorzieningen in het stadspark? Hoe belangrijk zijn deze aspecten ten opzichte van andere aspecten van het park?

5. Op welke manier wordt er gekeken naar voorzieningen om te sporten?
6. Wat zijn de meest opvallende maatregelen die binnen het park genomen worden om ervoor proberen te zorgen dat mensen meer gaan sporten?
7. (welke rol spelen de reeds bestaande sportparken bij het realisatie van het park?)

8. Op welke manier denkt u dat het Stadspark een bijdrage kan leveren aan het verbeteren van de gezondheid van inwoners van Dordrecht?
9. Zijn er bepaalde elementen in het park die speciaal bijdragen aan het tegengaan van hitte stress?

10. Denkt u dat de realisatie van het Stadspark in Dordrecht invloed zal hebben op het sportgedrag van mensen in die omgeving? Op welke manier?

Inwoners:

1. Hoe zou u uw wekelijkse sportgedrag omschrijven in een normale situatie? (Vaak, weinig, niet, etc.)

2. Hoe zou u uw sportgedrag omschrijven in tijden van hitte stress (zomer)? Is dit minder of blijft het gelijk?

3. Op welke manier speelt uw leefomgeving een rol in uw sportgedrag? Zou de leefomgeving een reden kunnen zijn niet te gaan sporten? Of juist wel?
4. Op welke manier spelen (sport)faciliteiten een rol bij het sportgedrag? Zou dit een reden kunnen zijn om niet te sporten? Of juist wel?

5. Zijn er voor u nog andere redenen om te gaan sporten? Waardoor wordt u gestimuleerd om te gaan sporten?
6. Welke maatregelen zouden hierbij kunnen helpen?
7. Wat zou juist niet helpen?

8. Wat zijn voor u (andere) redenen om juist niet te gaan sporten? Wat zijn aspecten die u tegen houden in het algemeen?
9. En hoe zit dit in tijden van hitte stress (*zomers, als het heel warm is*)? Is dat iets wat u tegenhoudt om te gaan sporten?

10. Denkt u dat het realiseren van meerdere sportplekken in de regio uw sportgedrag zou stimuleren?