# Pleasurable cycling to work

## Urban spaces and the aesthetic experiences of commuting cyclists

**Gleden av å sykle til jobb**
Byrom og syklisters estetiske opplevelser

Philosophiae Doctor (PhD) Thesis

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# Preface

Every planning ideology involves an idea on lifestyle. To what extent and in what way the physical fabric of a city influences peoples´ way of living is a growing debate related to the sustainable development ideology. As an architect, I believe the character of the environment has great influence on what attracts people and, thus, affects our most important choices for where we want to stay and where we want to go. Lifestyle choices may be based on the best possible alternatives available at any time, while seeking some kind of happiness likely is an important driving force. Transportation is perhaps one of the most influencing factors on land use and character of the physical fabric. The physical environment certainly influences travel mode choices and thus concurrently how and what characteristics we may experience in the city while we move. Meanwhile, there is a certain denial, maybe lack of interdisciplinary insight and interest for discussing the character of the environment in terms of aesthetics. My thought, before going into the theme of this thesis, was that the beautiful urban spaces, where cycling is a popular activity may somehow have been taken for granted as a part of the quality of commuting by bike

The driving force behind the choice of the theme of this PhD study is more complex than that cycling is a sustainable transport mode and that it has, for this reason, become a kind of fashionable issue. From the viewpoint of the planning and design of cities, I think knowledge about the experience of cyclists is a new way to understand the city from a perspective that is different from that when walking, driving a car or looking at a map or drawing.

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All photos in the thesis are taken by the author.

# Acknowledgments

An important period of rethinking critical values of life quality, sustainability and the role and possible fields of activities among design professions developed at the start of the financial crisis in Iceland in 2008. At that time, after about 15 years of being a practicing architect in Reykjavík, I experienced the need to contribute to knowledge-based planning. My first step into the field of this thesis was taken by a grant from the Icelandic Road Administration for a small study in cooperation with a colleague, Hildigunnur Haraldsdóttir. This was followed by a larger grant from the Icelandic research fund for a study called Betri Borgarbragur [Better Urbanity], in cooperation with several architectural offices (ASK, Gláma-Kím, Kanon, Tröd, Hús og skipulag) in Reykjavík, the University of Iceland and the Innovator Centre in Iceland. I would like to use this opportunity to thank my colleagues for their interest in discussing the fundamental issues on how to create better cities and for involving me in their inspiring team. I also want to thank Hlökk Theodórsdóttir, planner and director of the Icelandic National Planning Agency, for all her support and help when applying for a PhD research fellowship.

From the autumn of 2010 to 2014, I have been a PhD candidate at the Norwegian University of Life Sciences. From the beginning, my supervisor has been Professor Inger-Lise Saglie, who has guided me with both pleasure and critical discussions about fundamental parts of my study. I want to thank her for supporting me in this very challenging theme of my work, in which the aesthetic approach involves finding my own ways of conducting the work and believing in me when using adaptive, innovative methods. I also want to thank Professor Einar Lillebye for his supervision the first year. I thank Professor Petter Næss, who has been my co-supervisor since the autumn of 2012, for always being ready to guide, discuss and critique me in an unusually qualitative way. At our daylong seminars in the Sustainable Urban Development research group, which Petter leads, I learned how discussion and sharing of knowledge in planning may occur in an instructive, challenging and friendly atmosphere. Also, thanks to opponents on my three PhD seminars, Ivar Arne Devik, at the Norwegian Public Road Administration, Caroline Hagerhall Professor SLU Sweeden, Elin Børrud Professor at ILP and Gitte Marling Professor Aalborg University.

This PhD work involves case studies in three Nordic cities: Reykjavík, Trondheim and Odense. Many institutions, firms, organizations and individuals have contributed to make this

data collection possible. In this relationship, I want to thank the Planning and Development Division of the city of Reykjavík for their interest and willingness to help whenever needed and for offering meals for the "bike-through" participants during group interviews. In addition, I want to thank Trondheim municipality office of urban planning for their generosity; for helping with meeting rooms for a similar group interview and for offering meals for participants. I want to thank the cycle to work offices, the bike-clubs and Árni Davídsson, who led the Saturday commuting cycling group. Also, Richard Sandnes, Trondheim Syklistene and other members of the clubs who have been willing to meet me for discussions or who helped with information. I want to thank all the firms and people that took part in the studies; without these people, there would not be any data. My friend, Sigrídur Radomirsdóttir in Copenhagen, offered great help in translating all letters and questionnaires into Danish.

During the PhD period, I have taken part in many courses and seminars at Aas, Copenhagen, Malmø and Alnarp in Sweden. I have met, learned from and become friends with many people, both PhD students and researchers. When staying in Malmø, I was lucky to be invited by Leif Jønsson (whom I would like to call the father of the cycling city Malmø) on bicycle tours around the city. I met researchers of the Bikeability research group at Copenhagen University several times during the PhD period. I want to thank them for the friendship and, particularly, for planning the PhD seminar on Cycling and Society. It was fabulous to be able to meet and spend a week with all the people doing research on bicycling in one place.

Thanks also to all the colleagues and PhD candidates at ILP for the discussions, friendship and welcoming atmosphere at the institute. Thanks particularly to Renata Aradi, who was always ready to help with technical problems relating to the online questionnaire, the Google route drawings and the work of the Google linked data. I want to thank my father, Stefán Arnórsson, Professor in Geology at the University of Iceland, for all the days we spent sitting and discussing English writing and dissemination of the study in the papers.

Finally, I want to thank my husband, Sigurjón, and my two daughters, Sóley and Ástrós, for always being patient and understanding whenever necessary and for moving with me from Iceland to Norway for two years.

Reykjavík, 10th June 2014

Harpa Stefánsdóttir

# Summary

The aesthetic experiences of cyclists in urban spaces have received limited attention in academic research and have not been studied as related to commuting before, but the valuation of aesthetics in this relationship may provide important knowledge of how to design urban spaces that stimulate pleasurable cycling to and from work.

The purpose of this PhD study has been to investigate the way the physical features of urban space influence the experience of commuting bicyclists in terms of aesthetic meaning, identify these features and find out how such experience is of importance for their evaluation of the quality of their commuting routes. The study consists of three papers.

The first paper gives a theoretical perspective on how bicycle commuters can be expected to experience features of urban space with an aesthetic meaning. For this purpose a conceptual framework of the components of importance was laid out for the complex study of the aesthetic experience of commuting cyclists. The definition of components in the framework was based on three theoretical fields: 1) phenomenology of sensory perception and experience, 2) urban design theory, and 3) environmental aesthetics. Interpretation of the aesthetic quality and meaning of the results from the study is proposed through applying theories within the field of environmental aesthetics, including a verbal scaling system on affective qualities proposed by James A. Russell and colleagues.

The second paper explores the physical features of urban spaces that affect the aesthetic judgment of commuting cyclists, how other features influence their aesthetic experience and what "urban space types" include the identified features. A new qualitative mobile method was used, called a "bike-through" evaluation, in order to explore cyclist's perspectives on their experiences of urban spaces. This evaluation included four pre-planned "bike-through" tours, cycled through up to eight defined "space types" with invited participants, and a qualitative group interview after each tour. Four tours were conducted within central areas in Reykjavík and Trondheim, which were chosen as cases to study.

The third paper involves a study of how aesthetic experiences of urban spaces are involved in the perceived quality of commuting routes. For this investigation an online survey, with respondent's embedded Google sketches of commuting routes, was conducted in Odense, Trondheim and Reykjavík.

The results from the study showed that vegetation, proximity to the natural environment and quietness were the most important aesthetically pleasant features. The urban

spaces that could be interpreted as lacking aesthetic quality were described in the appraisals as “boring” or “ugly” and referred to human-made environments constructed of concrete and overwhelmingly car-oriented landscapes. The priority given to the private car, reflected in the character of the environment, was found to symbolise the way in which the environment meets the needs of motorised transport before cyclists, causing cyclists to feel unwelcome.

The motivational factors for a cyclist influence his/her valuation and definition of aesthetically favourable features. Aesthetically favourable urban spaces for commuting cycling include one or more of the aesthetically favourable features at close proximity, fulfil an acceptable functional quality, such as the ability to remain in a constant pace on the bicycle, and do not require attention that reduces perception of possible aesthetic features. Such urban spaces are of high importance for the quality of a bicycle route and the longer part of the total route length, the better. However, moderately changing characteristics in urban spaces also seem to have value in stimulating curiosity about and attention to the surroundings.

# Oppsummering

Syklisters estetiske opplevelser av byrom har fått begrenset oppmerksomhet i akademisk forskning og har ikke tidligere blitt undersøkt med henblikk på pendling. Verdsettingen av estetikk kan i denne sammenhengen gi viktig kunnskap om hvordan man skal utforme byrom som stimulerer lystbetont sykling til og fra arbeid.

Formålet med dette doktorgradsarbeidet har vært å undersøke hvordan fysiske egenskaper i byrom påvirker estetisk betydningsfulle opplevelser hos personer som sykler til og fra arbeidsstedet, identifisere disse egenskapene og finne ut hvordan slike opplevelser påvirker hvordan de vurderer kvaliteten av den ruten de sykler. Studien består av tre artikler.

Den første artikkelen gir et teoretisk perspektiv på hvordan sykkelpendlere kan forventes å oppleve egenskaper med en estetisk betydning i byrom. Med dette som formål ble det bygget opp et teoretisk rammeverk med komponenter av betydning for estetisk opplevelse blant sykkelpendlere. Definisjonen av komponentene i rammeverket er basert på tre teoretiske felt: 1) fenomenologi av sansebasert persepsjon og opplevelse, 2) urban design-teori og 3) miljøestetikk. Tolkning av hva som oppleves som estetisk kvalitet og hvordan den har betydning bygger i avhandlingen på teorier innen miljøestetikk, blant annet et verbalt skaleringssystem på følelseskvaliteter definert av James A. Russell og kolleger.

Den andre artikkelen utforsker de fysiske egenskapene i byrommene som påvirker syklisters estetiske vurdering, hvordan andre egenskaper har innflytelse på syklistenes estetiske opplevelse, og ulike "byromstyper" som inneholder de identifiserte egenskapene. En ny, kvalitativ mobil metode, kalt "sykle-gjennom" evaluering, ble benyttet for å utforske syklisters perspektiver på hvordan de opplever byrom. Denne evalueringen omfattet fire forhåndsplanlagte "sykle-gjennom"-turer og et kvalitativt gruppeintervju etter hver tur. Inviterte deltakere syklet gjennom opptil åtte definerte "byromstyper" i løpet av hver sykkeltur. Fire turer ble gjennomført innenfor sentrale områder av Reykjavik og Trondheim.

Den tredje artikkelen dreier seg om en studie hvor det utforskes hvordan estetisk opplevelse av byrom er inngår som en opplevd kvalitet av sykkelpendlernes ruter. En spørreundersøkelse ble sendt ut til firmaer i Odense, Trondheim og Reykjavik hvor respondentene også ble bedt om å tegne sin sykkelrute mellom hjem og arbeid i et Google-program.

Resultatene fra studien viser at vegetasjon og nærhet til natur, til sammen med stillhet, var de viktigste estetiske egenskapene. Omgivelser med mangel på stimulerende estetiske

egenskaper ble beskrevet som "kjedelig" eller "stygt". Disse betegnelsene henviste til menneskeskapte miljøer dominert av betong, og overveldende bil-orienterte landskap. Den prioriteringen av privatbilen som egenskapene ved omgivelsene reflekterte, ble oppfattet som symboler på hvordan omgivelsene imøtekommer behovene for motorisert transport framfor syklisters behov. Dette fikk syklistene til å føle seg uvelkomne.

Motivasjonsfaktorer, som f. eks. hensikten med å sykle til arbeid, har innflytelse på verdivurdering og definisjon av estetisk stimulerende egenskaper i omgivelsene. For de som sykler til og fra arbeidet inneholder estetisk stimulerende byrom en eller flere av de estetisk gunstige egenskapene i nærheten av sykkelruten, som samtidig må ha akseptable funksjonelle egenskaper. Det siste innebærer blant annet mulighet til å beholde jevn hastighet på sykkelen og fravær av kompliserte trafikksituasjoner som trekker oppmerksomheten vekk fra mulige estetiske kvaliteter i omgivelsene. Estetisk stimulerende byrom har stor betydning for kvaliteten på en sykkelrute, og jo større del av den totale rutelengden disse utgjør, jo bedre. Moderat skiftende egenskaper i byrom synes også å ha verdi for å stimulere nysgjerrighet og oppmerksomhet overfor omgivelsene.

# 1. Introduction

## 1.1 Theme and objective of the thesis

Bicycling in a city provides a serial experience of changing urban spaces with different scenery, architecture, vegetation, people, smells and sounds. The cyclist rides along congested roads, through narrow paths, even natural areas and vegetated fields. In this sense, the cyclist's route environment can go through urban spaces wherever it is possible to cycle. Mainly due to their speed of travel, cyclists can experience larger areas then persons walking and in more detail than persons driving a car. The concept of aesthetics is, in this thesis, found to be a key to understanding how a person values the visual characteristics of urban spaces, as well as sounds and smells.

The features in the environment that are of interest and catch our attention when cycling may be related to the purpose of travelling. This may also influence where we choose to cycle. Bicycling, as a recreational activity, often involves a wish to experience a beautiful environment for its own sake, at chosen times and places. The main aim of commuting, on the other hand, involves daily transport from home to work, a movement between two fixed places, where the travel time, and not least the arrival time, is also of importance. Commuting cycling, which is the theme of this thesis, takes place most often in the morning and afternoon on weekdays, when traffic is generally at its highest level.

The bicycle as a transport mode supports visions of achieving sustainable cities in many ways. One is that the bicycle is space efficient compared to the car, so transforming car-oriented to cycling-oriented environments creates space for new land use possibilities such as mixed use development, densification and urban design with human scale characteristics. Conversely, a sprawled character, large-scale and zoned development, and disconnected public spaces are typical characteristics of urban environments that involve high car use (Carmona et al. 2010). Urban design on the so-called human scale has tended to focus on the needs and experiences of pedestrians rather than cyclists.

Urban design can be described as a professional practice that uses architectural elements and ambient space to create better public places. It focuses on connections between social interactions and physical elements, movement and urban form, nature and the built fabric. An important part of urban design, in addition to function and technique, is to give urban public spaces form. This includes the creation of aesthetic quality in public spaces (Carmona et al. 2010). Buildings, natural landscape and vegetation all form the urban spaces

and affect their character, as determined by, for instance, their scale and proportions, and their relationship to each other (Porteous 1996). The aesthetic character of public spaces has been seen as a positive factor in making them attractive for human experiences, and at the same time as encouraging outdoor activity (see e.g. (Fleming 2012; Gehl 2010; Marling & Jespersen 2013).

Although cyclists' aesthetic experiences might be important for the design of cycling-oriented urban spaces, little attention has been paid to this theme in academic research. It includes features such as the level of visual complexity, which elements or forms of the urban space are best perceived, and which are found to be aesthetically stimulating given the cyclists' height on the bike, its position and speed.

Individual benefits of bicycling include aspects related to both body and mind. The physical health benefits are well known physical aspects (see e.g.Garrard et al. 2012b). Those of the mind involve the environmental influence on emotional well-being, of which aesthetic experience is an important part. Aesthetic experience refers to a complex relationship between a person's sensuous perception, cognitive understanding and interpretation of the physical environment, which ends with responses to subjective thoughts and feelings during the course of an experience (Cold et al., 1998; Gobster & Chenoweth, 1990; Markovic, 2012). Aesthetic experience is emotional and can be associated with, for example, enjoyment, but has nothing directly to do with function. The meanings and values that a person might associate with certain environments or objects can be strongly powerful and so influence aesthetic judgment (Gjerde 2010). Aesthetic judgment encompasses a wide range of emotional and critical responses, from positive to negative (Russell 1988). Meanings are important, because they underlie the drive for environmental planning (Porteous, 1996).

The purpose of my PhD study has been to investigate the way physical features of urban space influence commuting cyclists' experiences in terms of aesthetic meaning, identify these features and discover how such experience is of importance in cyclists' evaluation of the quality of their commuting routes. For this purpose, case studies were conducted in three medium-sized Nordic cities: Odense, Reykjavík and Trondheim.

The structure of the thesis is as follows: In this introduction (Chapter 1), I explain the background of the study and status of knowledge within the field. In Chapter 2 I present the theoretical framework of the study. In Chapter 3 the methodological approach is explained, followed by the research design. Elaboration of sub-questions formulated for each paper is discussed in Section 3.1 (p. 51). The project was conducted in steps via 3 papers that are presented with short summaries in Chapter 4. In Chapter 5 the results from the papers are

discussed, and finally in Chapter 6 the main findings of the thesis and their theoretical and practical implications are reflected upon.

The papers in full length are presented in Chapter 8.

Paper 1:
A theoretical perspective on how bicycle commuters might experience aesthetic features of urban space

Paper 2:
Features of urban spaces and commuting bicyclists' aesthetic experiences

Paper 3:
Urban routes and commuting bicyclists' aesthetic experiences

## 1.2 Background

### 1.2.1 Commuter bicycling and the environment

The term 'urban space', as used in this thesis, refers to the surrounding space of a person in which he/she moves in any environment that belongs to a city. In this sense it also includes urban spaces with natural characteristics. There are two main aspects of the interaction between a commuting bicyclist and the urban space: the benefits the urban space gains from stimulating cycling (instead of, for example, car use) and the impact the urban space has on cyclists.

In recent years, policies have been implemented worldwide to help realise the potential of increasing the share of cycling substantially in order to improve the overall sustainability of our transportation systems and the liveability of cities (Pucher & Buehler 2012). The bicycle has few negative external effects, such as noise and emissions, it is space-efficient, both while moving and while parked, and investments in cycling infrastructure are usually comparatively cheap (Börjesson & Eliasson 2012). The bicycle is additionally available to almost everyone and can in many cases compete with the car in travel time. This is the case when distances are short and access to cars is for some reason limited, because of, for example congestion, scarcity of parking places or the time taken to park.

Land use patterns and densities are among the most important determinants with an impact on the share of cycling (Heinen et al. 2010; Krizek 2012; Pucher & Buehler 2010). A

well-planned, dense land use pattern will create short distances between origins and destinations.

One environmental benefit of increased bicycle share is that it provides the possibility of gaining more attractive public spaces through building bicycle-oriented instead of car-oriented environments. An urban space crowded with commuting cyclists is, for example, a much quieter environment than one congested with cars (Parkin 2012).

The environment can have impact on: 1) the decision to bicycle to work or not, 2) the choice of route; and 3) the level of satisfaction about the quality of this route. The theme of this thesis involves the third issue.

The environmental impact of the decision to ride or not to ride is highly complex and is additionally influenced by other factors, both socio-economical and psychological, including attitudinal aspects, in addition to those of cost, time, effort and safety (Heinen et al. 2010).

Whether people choose one route instead of another does not increase the number of commuting cyclists. Route choice always involves an evaluation of many factors in which the route chosen is the perceived best overall alternative among those available and is related to the cyclist's personal attitudes at a particular time (see in e.g. Hochmair 2004; Hochmair 2005; Pucher et al. 2010; Stinson & Bhat 2003). It can therefore be concluded that route choice is highly complex phenomenon involving different parameters. It may, for example, be influenced by travel purpose and cycling experience. Knowledge about highly valued route characteristics can, however, make investments in infrastructure better targeted toward making cycling a pleasurable activity (Su et al. 2010) and thus perhaps also stimulate cycling as such, not least for commuter cycling.

To what extent and in what way a bicyclist is satisfied with the quality of the route he/she chooses to cycle (or not) involves judgment about both its functional and aesthetic qualities. Whether and how the aesthetic features of a cycle route could influence choice of the bicycle as travel mode, or the frequency of cycling to work, has, however, not been documented by research so far. Both mode choice and route choice are very complex tasks and influenced by many factors. This thesis neither examines the likelihood of increasing the number of commuting cyclists, or the number of trips cycled to work, nor does it make any forecasts about route choice. This would expand the scope of the thesis far beyond what is manageable within a three-year PhD study.

The viewpoint of the commuting cyclist on the aesthetic attractiveness of urban spaces of all kinds and their importance when cycling to and from work is, however, important for

knowledge about how to build urban spaces that favour aesthetic experiences among commuting bicyclists.

### 1.2.2 Official aims and commuter bicycling in Nordic cities, with a focus on Reykjavík, Trondheim and Odense

All over Scandinavia cities are working on possibilities for promoting cycling as a mode of transport, for instance through policies, special bicycle strategies (see e.g. Espeland & Amundsen 2012; Hjólaborgin Reykjavík [Reykjavík cycling city] 2010; Odense_kommune 2009) and campaigns (see *Hjólad í vinnuna [Cycle to work]* ; *Sykle til jobben [Cycle to work]* ; *Vi cykler til arbejde [We cycle to work]*). The main objective is to increase the use of bicycles, instead of cars, particularly for short trips. In this way, CO2 emissions will be reduced and at the same time people are encouraged to follow a healthy lifestyle (see e.g. *Nordiske cykelbyer, 11 byer på 2 hjul i 3 år.* 2009; Sykkelby 2005). The possibilities of increasing the share of cycling as a mode choice by building a special bicycle infrastructure are emphasised.

The share of cycling varies among the Nordic cities and is highest in Denmark. In Copenhagen cycling accounted for 26% of all trips in 2013 (*Cycling Embassy of Denmark*). This has roots in the history of cycling culture in specific cities as well as in the different countries. The image of Denmark as a cycling nation was already shaped in 1920-1950, before cars were in common ownership (Pedersen & Jørgensen 2001). Denmark is internationally recognised as an exemplary cycling nation (Carstensen & Ebert 2007) and now "The Cycling Embassy of Denmark" introduces cycling solutions and know-how to encourage cycling all over the world (*Cycling Embassy of Denmark*).

Odense was chosen to be the official National Cycle City of Denmark for 1999-2002 through a special project that aimed to gather experience and new knowledge of bicycle traffic in one place in Denmark. Odense is now regarded as a good example for other cities, both in Denmark and other countries. During the four years, 50 projects were developed and implemented in Odense involving physical improvements, changes in regulations, and campaigns (Troelsen et al. 2003). This is in line with the overall goal of the cycle strategy of Odense (Odense_kommune 2009) which is to increase the share of cycling as a mode choice by, for instance, improving cyclists' accessibility at intersections, their possible speed, and their safety.

Reykjavík, the capital city of Iceland, took the initiative for other towns in the country and in 2010 published a new bicycle strategy (Hjólaborgin Reykjavík [Reykjavík cycling city] 2010), with similar aims as mentioned above. Cycling in Reykjavík has, over recent decades, become a popular recreational activity. The city has a long and continuous infrastructure for cyclists and pedestrians, along the coast and through green structures from the suburban areas.

An attractive environment is mentioned as an important stimulant of cycling. In the Norwegian cycling strategy, which was first published in 2003, the aim was to build an "attractive, functional and safe" bicycle infrastructure (Espeland & Amundsen 2012). It is noted that architecture is an important tool in the planning and design of the infrastructure. Development of the environment of good architectural quality can help to strengthen the achievement of objectives in the policy. The National Road Administration in Norway has a special architectural strategy, where it is emphasised that good architectural quality should be used in order to make it easy and attractive to bicycle (and also to walk and use public transport) instead of using a car (Espeland & Amundsen 2012; Statens_vegvesen 2012). "The Municipality of Trondheim's Environmental Package for Transport" project aims to develop programmes for new building investments in the city of Trondheim, through for example building bridges and new bicycle lanes (*Miljøpakken - åpner nye muligheter*.).

Reykjavík city has, in recent decades, grown extensively as a car dependent city. Studies on land use in the city of Reykjavík from 2004 show that nearly half of the land is covered by traffic facilities (Sigurdsson 2004). This means that many urban spaces are dominated by car use, have a sprawled character, large areas for car parking and areas covered with road infrastructure. As noted in the bicycle strategy of Reykjavík, an increased proportion of cyclists in the city is thought to have a good effect on the urban environment and public health. Future visions of the Reykjavík traffic strategy will emphasise reducing the negative effects from motorised transport by improving the character of public spaces (Reykjavik transportation policy 2006). Hverfisgata in the city centre of Reykjavík is an example of the resurgence of a street which attempted to generate street life by, among other things, removing car parking and implementing a separate bicycle track instead. How the cyclists experienced the changed atmosphere in the street was not the focus of this project however (Hverfisgatan 2010).

It is possible that cycling solutions and know-how from Copenhagen are not always valid in all kind of Nordic cities. Conditions for cycling are found to differ according to the size of a city (Pucher & Buehler 2012). Bicycle culture and various characteristics of the urban spaces in different places may also have an impact on the experience of cycling.

It is remarkable how little attention the importance of attractive urban spaces receives in Danish strategies on cycling issues. It has been emphasised, until quite recently (see *Green Cycle Routes*), that cycle infrastructure should be built along main streets. Steven Fleming (2012), however, points out in his new book "Cycle Space", that across almost half of Copenhagen the senses are stimulated positively by attractive public spaces such as former docklands and an endless list of beautiful architecture. Perhaps these qualities are taken for granted.

Nordic cities have received limited attention in academic research on bicycle commuting, particularly those of medium size. Research on cycling has mainly been conducted in the USA, Canada, UK, Australia, the Netherlands and Germany. Far fewer studies have been made in Nordic countries. The majority have been conducted in Denmark and Sweden, and some in Finland. Norway and Iceland seem to have received very little attention in academic research into commuting cycling issues, if any at all. Most studies on route preferences have been undertaken where the environment has different characteristics than those of medium-sized Nordic cities, such as in USA and Canada. Medium-sized cities (about 100-300,000 inhabitants) are very common in Nordic countries and therefore this size is of importance for academic research.

### 1.2.3 Cycling and urban design of public spaces

Cities around the world have sought to change the character of urban roads, to re-discover them as streets, avenues and boulevards (Carmona et al. 2010), and to design streets as places. Janet Rowe (1996) writes about the street as the unit of urban sustainability where the space between buildings provides a sense of place and identity and is the forum for many activities, of which only one is access. She notes that good street design includes function as well as aesthetics.

Critiques of modernist urban space design, where the car and the urban highway were symbols of the new age, became an important theme in several writings from the early 1960s. Jane Jacobs (1961), Kevin Lynch (1960), Gordon Cullen (1971), Alexander et al. (1977), Alexander (1979), Gehl (1987) and others, wrote about how to make better places for people, for instance through mixed use, dense urban structures, streets with social qualities and architecture with an identity of place. Urban values of density, walkability and diversity have been a growing force, challenging the suburban car culture, towards redesign of urban public spaces that envisage the predominance of cyclists and pedestrians instead of cars. Urban

renaissance policies became a defining feature of contemporary urban policy from the early 1990s (Carmona et al. 2010).

The perception and experience of "place" has been found to be an essential dimension of urban design. A sense of place has often been used in relation to those characteristics that make a place special or unique, and evokes belonging. It is a location with a distinctive atmosphere and meaning (Norberg-Schulz 1980). Placeless landscapes, on the contrary, have no special relationship to their location; they could be anywhere (Relph 1976). Relph (1976) noted that experience is dependent on attitude, which differs from one travel mode to another. A street is, for instance, a different place to a pedestrian than to a car driver – they do not attend to the same objects and signs and they certainly have quite different experiences and purposes.

The focus in previous writing has been on pedestrians and street life. Until very recently (in e.g. Fleming 2012; Forsyth & Krizek 2011; Timms & Tight 2010) cyclists have received limited attention in writing on the urban design of public spaces. Steven Fleming (2012) argues in his new book "Cycle Space" for discovering the full potential of the bicycle as a transformative force in the design of our cities. For this purpose he considers the way the urban spaces in several cities, such as Amsterdam, New York, Copenhagen and Paris, may be experienced from the bicycle.

Cycling-oriented environments may be assumed to make cities more attractive than car-dominated environments, with less use of space, less noise and no pollution. In addition, cyclists can easily jump off their bicycle and become pedestrians, and so enjoy street life.

Marling and Jespersen (2013) have studied the role of the new bicycle environment in New York as a mobility space for recreational activity. They suggest that the architectonic and spatial qualities are a framework for urban life and cultural interaction. They call the urban spaces where people cycle "urban bikescapes" and see them as a strategy to connect new urban parks, buildings and installations, while at the same time new zones for new kinds of interaction are created.

## 1.3 Status of knowledge

### 1.3.1 The field of urban design and the experience of cyclists

The field of urban design has been little concerned with the experience of cyclists, with the previously mentioned exceptions: Fleming (2012), Timms and Tight (2010) and Marling & Jespersen (2013). Many studies have, on the contrary, been carried out on how pedestrians experience the urban space (e.g.Cullen 1971; Gehl 1987; Gehl et al. 2006; Gehl 2010) and some from the viewpoint of car drivers (Appleyard et al. 1966; Venturi et al. 1972). These studies have, however, limited relevance to cycling since both car drivers and pedestrians have different needs and expectations with respect to the environment (Blanco et al. 2009; Forsyth & Krizek 2011). This might particularly be the case with respect to commuting cyclists, who may have different needs and expectations of the environment than when cycling for other purposes (Heinen et al. 2010). When cycling from home to work, a person has, for example, to be at a fixed end point (the workplace) at the right time and may also have limited time available for the total trip. Cycling for recreational purposes, on the other hand, does not necessarily have any fixed end point and thus no fixed travel distance.

### 1.3.2 Emotional well-being and sensory aspects in bicycle research

Cycling confers multiple health benefits, among other things for emotional well-being, and provides an excellent opportunity for individuals to incorporate physical activity into their daily life (Garrard et al. 2012b). Aesthetic experience has a relationship to emotional well-being. Several studies conducted in Britain and Australia have indicated that enhanced emotional well-being is an important motivation force when commencing and continuing cycling, involving relaxation, stress reduction, pleasure, excitement, fun and enjoyment (Garrard et al. 2012a; Gatersleben & Appleton 2007; Gatersleben & Uzzell 2007). Enhanced well-being has, however, rarely been studied in relation to commuter cycling, but is most often related to recreational cycling (Garrard et al. 2012b).

Spinney (2006; 2007; 2009) and Jones (2005) have studied, as an embodied practice, sensory perception and kinaesthetic factors when cycling. Spinney (2007) suggests that when riding a bike, the street is a place where visual sense is important, but here it no longer works in isolation from the other senses. Cycling in the urban environment requires part of the cyclist's concentration to be on controlling his/her balance, the cycling rhythm and his/her

own safety as a result of interaction with other travellers. Consequently, as pointed out by Spinney (2007), there is a limit to the amount of sensory input the cyclist can handle.

Which sensory information from the environment might be interpreted into meaning in the mind of a bicyclist might be limited to the features to which he/she pays attention in the environment. It is assumed in this thesis that this also includes aesthetic features, although the studies of Spinney and Jones do not consider cyclists' aesthetic experiences of urban space. Spinney (2009) also discusses the use of methods when studying people's interactions with (urban) space and the sensory aspects of their experiences, and suggests that the existing methodological toolkit has to be broadened to catch the meaning that arises through cycling as an embodied and sensory practice.

### 1.3.3 Instrumental aspects of cycling-oriented urban environment

Great emphasis has been placed, in academic research, on the possibilities for increasing the share of cycling as a travel mode choice in general, including for leisure and all trips made. For an overview of the literature see Heinen et al. (2010). Environmental influences on the bicycle as a mode choice and frequency of cycling have also been particularly addressed in many quantitative studies (ibid). Although this thesis does not consider cycling as mode choice, some of the existing literature on environmental influences on bicycle use gives insight into aspects of what constitutes a good cycling-oriented urban space from a functional viewpoint. This viewpoint could thus be included in a cyclist's judgment of the quality of urban spaces and routes for commuting by bike.

Distance (commuting distance or distance between activities) results in time and effort needed for travelling and is therefore one of the most important influences on the decision to ride (Parkin et al. 2008). A compact urban form, bringing origins and destinations closer together, is consequently found to stimulate the share of commuting cycling (Blanco et al. 2009; Næss 2005; 2006).

Season is another important influence on the share of cycling as a travel mode, depending on location, weather conditions and hours of daylight (Stinson & Bhat. 2004). Darkness is found to have a negative effect on commuter cycling, particularly for women (Gatersleben & Appleton 2007; Stinson & Bhat 2004). People cycle less in wintertime and the distance cycled decreases, according to a Swedish study (Bergström & Magnusson 2003). Commuting, which is the subject of this study, usually takes place in the morning and in the

afternoon. In the north it therefore is dark during commuting hours in mid-winter. This thesis does not focus on winter cycling.

Segregated infrastructure for cycling includes tracks, paths or marked lanes designated for use by cyclists and from which motorised traffic is generally excluded. The presence of a segregated cycle infrastructure is highly valued and found to stimulate cycling (for all purposes) (see e.g. Abraham et al. 2002; Heinen et al. 2010; Hunt & Abraham 2007; Larsen & El-Geneidy 2010; Pucher & Buehler 2009; Pucher et al. 2010; Tilahun et al. 2007) and the type of infrastructure matters (Heinen et al. 2010). Many researchers have hypothesised that perception of safety could influence cycling and think this increases with the segregation of infrastructure for cyclists from car traffic. This might be connected to frequently mentioned reasons for not cycling, which include safety concerns (Heinen et al. 2010; Parkin et al. 2007). For an overview of the literature on infrastructure programmes and policies to increase cycling see Pucher et al. (2010), where it is suggested that an increase in cycling requires an integrated package of many different complementary interventions. Aesthetics are, however, not mentioned in Pucher et al.'s (2010) overview of polices to increase the use of cycling.

Bike lanes, special intersection modifications and priority traffic signals (see Fig.1) are found to be the key to pro-cycling policies in countries with a high share of cycling, such as the Netherlands, Germany and Denmark (Pucher & Buehler 2009). Accordingly, many cities have focused on the design of bicycle infrastructure and the functionality of cycling-oriented urban environments (Forsyth & Krizek 2011). For instance, in the Cycle City project of Odense (see Troelsen et al. 2003) better access was given to cyclists through several improvements. It was made easier to cross traffic lights and junctions. Green waves (flow system) to improve continuous cycling, were established. The time savings were small but cyclists had a strong feeling of improved accessibility (see also Odense_kommune 2009). Typical solutions to improve cycling routes from an instrumental viewpoint are shown in Figure 1.


Figure 1: Instrumental features

*1 Access signal, here two-way travel for cyclists on a one-way street in Trondheim*
*2 Marked cycle lane to improve access at an intersection in Odense*
*3 Bike path in Malmö*
*4 Priority traffic light for cyclists at an intersection in Malmö*
*5 Off-street path in Trondheim with an underpass at an intersection.*
*6 New segregated bike lane (on-road) in Kongens gate in Trondheim.*

### 1.3.4 Cyclist groups and their different preferences

Cyclists' needs vary according to their trip purposes and their skill levels (Land_Transport_Safety_Authority 2004). Cycling purposes have often been divided in two main groups, utility and leisure. Leisure riding is done for the journey itself, for instance in sport and recreation. Utility cycling involves making a journey in order to undertake an activity at the journey's end, such as shopping or work. This thesis involves journeys to and from work. As will be demonstrated in this thesis cycling purposes may be a combination of different kinds of purposes, which all can be achieved by using the bicycle as a mode of transport, such as a combination of physical exercise and commuting to work. In this sense cyclists may have secondary purposes.

Commuter cyclists can be divided into different skill groups. Experienced cyclists bicycle often and have used their bikes for a long time. They may also make longer trips than those with basic competence and are able to defend their lane when interacting with motorised traffic (Land_Transport_Safety_Authority 2004), which cyclists with basic skills (called basic skill cyclists in this thesis) cannot. Heinen et al. (2010) suggest that different groups of cyclists may be categorised in terms of cycling frequency. In this thesis I talk about infrequent and regular cyclists.

Different purposes may generate different attitudes towards the environment and so towards the value of aesthetics. The likelihood of valuing the importance of aesthetic features highly may, for example, be greater in recreational purposes than in commuting, since recreational cycling seeks experience for its own sake. Cycling experience may also influence purposes and attitudes. A segregated bicycle infrastructure is more important to medium-experienced cyclists than experienced (Abraham et al. 2002; Hunt & Abraham 2007; Pucher & Buehler 2009) and more important to women than to men (Garrard et al. 2008). Experienced cyclists are less likely to use segregated paths and lanes for cyclists and some look at it as exciting challenge to battle with car drivers (Larsen & El-Geneidy 2010) and choose to ride the shortest routes in motorised traffic (Pucher & Buehler 2009). Experienced cyclists tend also to have a more negative perception of stop signs and value travel time more highly than basic skill cyclists (Stinson & Bhat 2003). Larsen and El-Geneidy (2010) suggest that this is the group that already cycles in cities with a low bicycle share and think that longer and continuous paths and lanes could attract more users.

Commuting involves movement between two fixed places. It is possible that commuter cyclists do not always choose the same route every time. It is, however, most

likely that with increased experience of commuting by bike to work, a cyclist becomes familiar with his/her route(s) and what he/she can expect to experience on the way. In this sense, the cyclist may be expected to generate an attitude towards the environment which can develop through learning. A particular route or route part may therefore not always be experienced exactly the same way as it was when cycled for the first time.

### 1.3.5 Attitudes towards cycling as a mode of transport

People's motivational factors for using the bike as a mode of transport might have important influence on their expectations and attitudes towards the environment and so affect their experiences. Reasons for choosing the bicycle as a mode of transport include: health reasons, exercise/fitness, fun and enjoyment, environmental concerns, flexibility and convenience (Bergström & Magnusson 2003; Gatersleben & Appleton 2007; Gatersleben & Uzzell 2007; Stinson & Bhat. 2004). Compared to other commuter modes, cyclists in the UK were more likely to report that their journey to work was pleasant, interesting and exciting. A recent study from Portland, USA shows that people who cycle to work enjoy their commutes the most (Schmitt 2013).

Scenery and experience of urban spaces have shown to be an important part of the quality of travelling by bike. Gatersleben and Uzzell (2007) found, in a quantitative study, that the most pleasant aspect of the daily commute by bicycle was related to scenery. In Copenhagen about 30% of cyclists are of the opinion that cycling is a pleasant way to travel through the city landscape, although the most important motivational force in the city for choosing the bike as a mode of transport is improved travel time and flexibility, in addition to fitness reasons (Skov-Petersen et al. 2012). In Odense, a connection was found between cycling as a form of transport and a vision for a combination of health, physical well-being and experience of rural- and urban spaces (Troelsen 2008).

Attitudes and perceptions differ between groups of cyclists (Skov-Petersen et al. 2012), and purposes and frequency of cycling (Bergstrøm & Magnusson 2003; Gatersleben & Appleton 2007). A parent carrying a child may, for instance, value safety more highly than a person on a racer-bike (Skov-Petersen et al. 2012). Cycling attitudes and perceptions also seem to differ between men and women (Garrard et al. 2006; Garrard et al. 2008; Garrard et al. 2012a) and from one city to another. Heinen et al. (2011) found that when a commuting trip intensifies, either in terms of distance or frequency, attitudes toward cycling became more positive, such as towards mental- and physical relaxation and pleasantness.

### 1.3.6 Route environment and route preferences

Route choice preferences give insight into the features that are of importance for the quality of different route environments. Sener et al. (2009) suggested, based on a stated preferences survey in Texas, that travel time and motorised traffic volume are the most important attributes in route choice preferences. However, Larsen and El-Geneidy (2010) suggest that people are willing to add greater distance to their trips for infrastructure that is segregated from motorised traffic. Other studies find that people may also be more likely to cycle (for all purposes) where there are connected bike routes, fewer motor vehicles, minimum slopes and aesthetically pleasing environment conditions such as more greenery, less pollution and less noise (Hochmair 2005; Su et al. 2010; Winters et al. 2011). How an aesthetically pleasing environment might have influence on route choice or route behaviour, and in what way, is not dealt with in these studies. It is, however, suggested by Hochmair (2004) that route choice behaviour might change, for example under pressure of time.

Network layout can affect distance, travel time and average speed. A denser network layout is found to generate smaller travel distances and therefore stimulate walking (Southworth 2005). This is not necessarily the case for cyclists. Stop signs, traffic lights and other traffic controlling systems can cause irritation among cyclists due to delays, and cause them to avoid such situations (Fajans & Curry 2001; Sener et al. 2009; Skov-Petersen et al. 2012; Stinson & Bhat 2003). Car parking facilities can also lead to dangerous situations for cyclists when car drivers need to cross bicycle facilities in order to park or to reverse the car (Stinson & Bhat 2003). Cyclists are therefore expected to dislike such situations or even avoid them.

Hochmair (2004) has observed and analysed cyclist's route choice preferences in urban areas (for tourists) in order to design an online route planner. The resulting route attributes in studies conducted by Hochmair (2004; 2005) were classified into four main groups according to importance of selecting the most desired route from an online route planner. The categories were: 1) simple (number of turns, functionality), 2) fast (includes short, few traffic lights and avoid pedestrian areas), 3) safe (segregated infrastructure or side street) and 4) attractive/ aesthetic. The last includes, among other things, architecture and sights. Internet route planners have been developed to help cyclists and are used in many cities. Such route planners have been made for Metro Vancouver in Canada (Cyclingincities_team 2010) and a similar one has recently been adopted in Reykjavík

(Kungys & Anderson 2010). The program for Reykjavík includes only criteria for fast and safe routes and the route planner in Odense shows only the shortest route (*Ruteplanlægger* ).

Wahlgren (2011) is interested in stimulating cycling as a physical activity and has studied people's perceptions of environmental factors in their active commuting route environments. The purpose of her study is to understand which factors may be of importance for creating a stimulating route environment for commuting cycling.

According to several quantitative studies, certain route environments are found to have a positive impact on cyclist experiences, such as a beautiful, green and safe environment in inner urban areas (Wahlgren 2011), off-street and low-traffic residential roads (Abraham et al. 2002; Tilahun et al. 2007), or a negative impact, for instance, high levels of exhaust fumes and traffic congestion (Wahlgren 2011). Aesthetics have also been found to be important for the quality of the bicycle route environment (Hochmair 2005; Næss 2005; Su et al. 2010).

### 1.3.7 The knowledge gap

The experience of urban spaces from the viewpoint of cyclists has received little attention in academic research, with few exceptions, and has not been studied for the purpose of commuting before.

Spinney (2006; 2007; 2009) and Jones (2005) have studied sensory and kinaesthetic experience when cycling. They have, from this viewpoint, explored the cyclist's interactions with the urban space and other travelling people/cars, mainly using their own experiences as a recourse for data collection. They have, however, not studied cyclists' aesthetic experiences. Marling & Jespersen (2013) and Fleming (2012) have focused on the aesthetic experience of urban spaces. As Spinney and Jones, they also used their own experiences when collecting data. None of these qualitative studies have taken commuting into account as a purpose nor studied experiences among multiple persons. Aesthetic experience is related to subjective thoughts and feelings and could therefore be different from one person to another.

Aesthetic experience is emotional experience and is related to sensory perception of the environment. Enhanced emotional well-being has been demonstrated as an important motivation force for commencing and continuing cycling for all purposes, according to several studies conducted in the UK and Australia (Garrard et al. 2012a; Gatersleben & Appleton 2007; Gatersleben & Uzzell 2007), but has received little attention in relation to commuter cycling. When cycling, the senses work together and the visual experience cannot be isolated from other sensations (Spinney 2007). Kinaesthetic experience in particular is

found to be important when cycling (Spinney 2006, 2007, 2009; Jones 2005). Additionally, Spinney (2007) has suggested that there is a limit to the amount of sensory input the cyclist can handle. This may affect awareness of features other than safety issues and the controlling of balance and cycling rhythm. Although Spinney and Jones have not studied cyclists' aesthetic experiences, it is expected, for this study, that attention to features that may influence aesthetic experience can have limits in complex urban situations. As also pointed out by Spinney (2009) it is important to take the specific issues of sensation when cycling into account when evaluating relevant methods for investigating commuting cyclists' experiences of urban spaces. Most of the studies mentioned in this section (1.3) are based on quantitative methods, while qualitative methods have received limited emphasis in research on commuting cycling.

A segregated bicycle infrastructure, special intersection modifications and priority traffic signals have proved to be highly valued according to earlier research on cycling (see Section 1.3.3). Conversely, cyclists are expected to dislike traffic controlling systems and closeness to car parking facilities (Fajans & Curry 2001; Sener et al. 2009; Skov-Petersen et al. 2012; Stinson & Bhat 2003). These viewpoints could thus be included in the judgment of commuting cyclists about the quality of urban spaces and routes. The extent to which these functional aspects are valued in comparison to aesthetic values has not been studied, however.

Different purposes, such as commuting, may generate different attitudes towards the environment and thus towards the value of aesthetic features. It is important to be aware that different groups of cyclists, according to cycling experience, frequency of cycling and gender, may value certain features in the environment differently (cf. Section 1.3.4). Motivational factors for using the bicycle as a mode of transport may also have important influence on cyclists' expectations and attitudes and thus on their experiences. Attitudes and perceptions have shown to differ from one cyclist group to another, between men and women, and from one city to another (cf. Section 1.3.5).

Former studies that have addressed the impact of aesthetic features for the quality of a cycling route environment in one way or another (cf. Section 1.3.6), have found that such features are important, at least when the purpose of cycling is not taken into account or when the purpose is tourism or leisure cycling.

Most of the studies of route preferences were made where the environment has different characteristics than in medium-sized Nordic cities, such as in the USA and Canada. The studies have addressed the impact of aesthetics as one of the factors involved in route

preferences, in relation to all purposes, or/and from the viewpoint of both cyclists and pedestrians together.

Conditions for cycling in large cities are found to be quite different from those in small cities (Buehler & Pucher 2012) and efforts to promote cycling differ (Heinen et al. 2012). Also, the likelihood of the bicycle route of a given length running through urban spaces with variable characteristics is often greater in small or medium-sized cities than in large ones.

None of the studies mentioned have focused on the impact of aesthetics when commuter cycling is the main purpose. In what way or how certain features of urban space influence the aesthetic experience of commuting cyclists and their value of this for route quality remains unexplored.

# 2. Theoretical framework

The main theoretical perspective of this thesis involves the study of aesthetic experience and the value of aesthetics in urban environment. This includes three main issues that will be discussed in this chapter: 1) the environment that may be perceived, 2) how aesthetic experience occurs and what influences such an experience, and 3) the basis on which empirical knowledge can be placed when investigating people's aesthetic experiences.

Issues that are important when approaching aesthetic experience of the urban environment will be considered in Section 2.1 in this chapter. What may be perceived within the environment requires a definition of the characteristics of the environment (urban space) where a cyclist may move, both as distinct features and as total environments (typologies), and a definition of the relationship between the cyclist and the urban space.

What is involved in aesthetic experience is explained in Section 2.2. The components considered to be involved in aesthetic experience are the basis for the way cyclists´ aesthetic experiences may be identified and so make an empirical base for this study. How aesthetic experience may differ when cycling compared to when moving in another way, how different senses work when cycling, and what each of them may perceive are essential questions for this study.

Particular features of the environment may, however, not be experienced the same way by everyone. In this chapter the influence of personal and cultural background, in addition to interest and attitude, will be discussed. Interest and attitude are influenced by both cycling as a way to move around, and by the purpose of cycling. Theoretical viewpoints for the empirical basis of this study are explained in Section 2.3.

## 2.1 Approaching aesthetic experiences of the urban environment

### 2.1.1 The field of environmental aesthetics

The aesthetic field is broad and includes philosophical viewpoints of both the appreciation of art and environment. Different focuses have been discussed, the relevance of which depend on what there is to appreciate and how this appreciation might occur. The appreciation of beauty in art and aesthetic value have been theorised among philosophers since the ancient Greeks (Kristeller 2008). The term 'aesthetics' derives from the Greek "aisthanesthai" which means "to perceive" and "aistheta" - "things perceivable" (Porteous

1996). The environmental aesthetics that emerged in the second half of the twentieth century focussed on the aesthetic value of the public environment, both natural and human environments, including human-influenced and human-constructed environments (Carlsson 2012; Porteous 1996). When theories of beauty and aesthetic value are directed to the environment, they involve a multitude of meanings and practices within various disciplines (Berleant). The field represents the merging of the philosophy of the art and environmental psychology (Nasar 1988). Aesthetic appreciation of the environment is, however, more difficult to define than that of art. Art is created by artists and meant to be appreciated with specific senses and from particular distances and positions (Carlsson 2012). The everyday environment with its events and activities, and which is not necessarily the work of any artist, is on the contrary just there, independently of our interest in particular objects or features within it. No specific senses are privileged and we simply see, hear, feel and smell while we move around (ibid).

The experience of environment includes such factors as space, mass, volume, time, movement, colour, light, smell, sound, tactility, kinaesthesia, pattern, order, and meaning. Consequently, environmental experience is not exclusively visual but actively involves all the senses and both positive and negative value judgments of an environment (Berleant).

The field of environmental aesthetics incorporates various kinds of empirical work concerning the human aesthetic experience of environments. The field uses scientific methodologies to help explain the relationship between physical stimuli and aesthetic response (Nasar 1988). There are a number of different approaches in this kind of research. For example, one is linked to environmental design and planning disciplines, such as architecture and landscape architecture, and attempts to analyse and assess aesthetic experience in terms of the design features recognised and valued by these disciplines (ibid). Attempts have also been made to apply to aesthetic theory a wide range of aesthetic experiences based on, for example, environmental psychology (e.g. Bourassa 1991; Kaplan 1988a; Kaplan 1988b; Russell & Pratt 1980; Russell 1988; Ward & Russell 1981). Theoretical approaches within the field of environmental aesthetics have been found relevant for interpreting the aesthetic meaning of cyclists' experiences in this study.

### 2.1.2 Urban space and its characteristics

The concept of "experienced space" which captures the inherent characteristics and the identity of a place and includes the lived experience (discussed in Section 2.3.3) of the observer (Norberg-Schulz 1980; Næss 2008; Tuan 1977) is well suited for an analysis of the physical environment, as it is experienced when moving. According to this concept, space is experienced as being room in which to move (Tuan 1977). The objects of orientation are distributed according to such relationships as inside and outside; far away and close by; separate and united; and continuous and discontinuous (Norberg-Schulz 1971). The subject of this study deals with spaces in urban situations, which are therefore called 'urban spaces' in this thesis.

An urban space where people travel from one place to another has often been associated with streets or roads. Jane Jacobs (1961) talks about streets as the bases of the circulation of proper working cities. A street has different characteristics than a road (Carmona et al. 2010; Selberg 1996). The definition of a street has been advocated by some urban design theorists as being a spatially enclosed area with a fixed building line that clearly shapes the urban space with walls. The primary function of a road is that of a thoroughfare for motorised traffic, it is usually not spatially enclosed and the road network is hierarchically designed, as with main street/road, collector street/road, access street/road and pavement (Selberg 1996). Kevin Lynch (1960) calls this street/road element in the city a 'path'. He describes paths as channels along which an observer moves. In this thesis I call all streets, roads and paths 'urban spaces' and am generally referring to urban spaces where cyclists may in principle cycle or be able to cycle.

Every path is also characterised by its continuity and direction. It has a beginning and an end. A street's directional expression has to do with its different degrees of continuity (Thiis-Evensen & Nybø 1999). Thiis-Evensen and Nybø (1999) suggested that physical characteristics should be applied in order to give a street the feeling of continuity. For instance, regularity may have a rhythm in the way repetitions occur in, for example, space openings, monuments or corner shops. This leads to what Thiis-Evensen and Nybø call visual hierarchy, a unification of continuous perceptual elements.

The formal structure of urban spaces involves such definitions as shape, proportion, rhythm, scale, complexity, colour, illumination, shadowing, order, hierarchy, spatial relations, incongruity, ambiguity, surprise and novelty (Nasar 1994). Several researchers, (e.g. Herzog et al. 1976; Nasar 1988; Nasar 1994; Ward & Russell 1981) have considered the following

definitions of the formal structure prominent in the human experience of the physical environment: 1) enclosure (includes, for example, openness, spaciousness, density and mystery), 2) complexity (includes for example, diversity, visual richness, ornamentation, information rate) and 3) order (includes for example, unity, order, clarity). Order refers to the degree to which a scene is coherent or makes sense (Kaplan & Kaplan 1989).

Urban spaces can also be analysed in terms of a number of polar qualities (see Fig. 2), such as: being visually dynamic or static; enclosed or open; long or short; wide or narrow; straight or curved (Carmona et al. 2010). To these might be added other considerations, such as the scale, proportion and rhythm of a street's architecture and its connections to other streets and squares.

Figure 2: Polar qualities

*To the left: Narrow urban space/enclosed /organic and ever changing vegetation dominates/limited sight length ahead. From green route in Copenhagen*

*To the right: Wide urban space/open/grey asphalt landscape dominates/good sight length ahead. From Malmø.*

### 2.1.3 Typologies - streets, roads and paths

In spite of any definition of different features that constitute the character of an urban space, the composition of features is more important for aesthetic experience than single features (Markovic 2012). This composition can be categorised in different typologies.

Streets have, through planning history, been given numerous architectural forms according to functional requirements and dominant planning ideologies. Street typologies can include both architectural and functional significance. In his example of the plan of Greater

Oslo of 1929 Harald Hals (1929) introduced a street hierarchy of five street types: main streets, residential streets, industrial streets, park streets and stair streets. The function of the main street was to connect various urban areas, and the town itself, to outer suburbs. The residential street had the function of leading the short distance from the main street to the door step. The industrial street had the dimensions and design to adapt to heavy traffic. These three types can be classified within a functional street typology. The park street and the stair street can however be classified according to their urban and architectural characteristics (Lillebye 1996).

Thiis-Evensen and Nybø (1999) defined four main street-space types for the city centre of Oslo, based on their formal architectural significance: the cut-through street is the one which most clearly underlines movement forward; the goal street, the one which most clearly underlines the goal in the street end; the edge street, the one that is between different domains; and the sequence street divides the space into rhythmical sequences.

Street terms also sometimes refer to the formal characteristics of urban space, such as size, shape or hierarchical importance. In English we have, for instance, lane, alley, avenue and boulevard. An alley is a passage, as through a continuous row of houses enclosed with hedges or shrubbery. On the contrary a boulevard is a broad avenue in a city, usually with areas at the sides or centre for trees, grass, or flowers. An avenue is usually described as a wide street or main thoroughfare (Dictionary.com 2013). In Reykjavík street names have also different endings, for instance -gata, -vegur, -sund, -stræti, -stigur, -braut and -trod. The names refer to the size or the hierarchical importance of the street. Trod is for example similar to track or path, which could be marked by the footprints left by an animal or a person. Some of the street names in Trondheim have the endings -bakken, -enda, -grensen and -svingen. These names refer to how the street is located in the landscape or its relationship to the landscape.

When defining space types in order to study how commuting cyclists might experience them in terms of aesthetic meaning the approach to this definition must include cycling-specific issues, such as all the features of paths, streets or roads where cyclists would possibly move around. As was pointed out above (Section 2.1.1) environmental experience is not exclusively visual but actively involves all the senses and both positive and negative value judgments of an environment. In addition, when cycling, the different senses work together (cf. Section 1.3.2). Therefore definition of space types for the study of cycling experience cannot be limited to visual characteristics.

The street typologies discussed above are limited to the rather narrow definition of "street", which is mainly valid only for enclosed inner-city streets in old city centres. When defining space types for this study it was necessary to look at the typical characteristics of all urban spaces within the case areas chosen for study. The characteristics of paths and roads are also likely to be typical in most cities. The relevant definition of space types for studying how cyclists experience aesthetic features must also be related to plans for bicycle routes, existing routes, routes people choose but which are not defined as such, and routes that may not be used, but where it is possible to cycle. The features of the formal structure discussed above describe the static and visual characteristics of the urban space. Neither the formal features of urban space nor the street typologies discussed above take into account the dynamics of urban space, such as how other people or cars travel in the space, which could change its visual characteristics.

## 2.2 Aesthetic experience

### 2.2.1 Components of aesthetic experience

In order to develop an instrument to empirically assess people's aesthetic experiences in urban space it is useful to define how aesthetic experience occurs, how it is characterised and which phenomena may be involved.

The English word 'experience' has two different meanings in the Nordic languages. The two words "opplevelse" and "erfaring" in Norwegian (words with equivalent meanings also exist in Icelandic, Danish and Swedish) are both translated as 'experience' in English. The former word, "opplevelse", describes something that this person has seen, heard or felt in relation to an event in which they have taken part. The latter word involves insight or knowledge about former experience of any kind, such as that from an earlier work situation. 'Experience' in this thesis refers to the former meaning of the word.

In the philosophy of aesthetics, different definitions have been used through history, about what is involved in aesthetic experience. It is considered relevant for this study to take into account the following definitions and characteristics of aesthetic experience: aesthetic experience refers to a complex relationship between a person's sensuous perception, cognitive understanding and interpretation of the physical environment, which ends with responses to subjective thoughts and feelings during the course of an experience (Cold et al. 1998; Gobster & Chenoweth 1990; Markovic 2012). Aesthetic experience is a process that starts with

stimulus input through the senses (sensation) and is continued by a complex process of cognitive understanding and interpretation of the stimulus input (perception) (Carmona et al. 2010). The process ends with an evaluative judgment of the perceived feature(s) from the environment and/or aesthetic emotion (Markovic 2012).

Markovic (2012) discusses three characteristics of aesthetic experience: 1) motivational aspects for paying attention to an object, 2) cognitive aspects, that is semantic, symbolic or imaginative aspects, and 3) affective aspects of aesthetic experience.

The first characteristic refers to interestingness, which plays an important role in the way a person pays attention to an object, feature or an event. Elements of interest for commuting cyclists are discussed in Paper 1, Section 2.2. The physical elements that shape the urban space and might catch a cyclist's attention depend on which elements meet their expectations of the route ahead. This is influenced by cycling as a means of moving around and the purpose of cycling. Different purposes may generate different attitudes towards the environment and so towards the value of aesthetics within a particular context. The purpose of commuting may, for example, have sub-purposes - additional reasons for choosing to cycle to work. Cycling experience and former experiences of the environment may also influence purposes and attitudes.

The second characteristic refers to the way a person appraises aesthetic objects and events as parts of a symbolic or virtual reality and transcends their everyday use and meanings (Markovic 2012). Individuals from different places, cultures and subcultures are expected to develop different symbolic meanings towards the environment (Nasar 1994). The extent to which aesthetic experience may be an individual matter, common to us all, influenced by culture or the society we live in or by the character of the environment, has been the central focus of philosophers for a long time and is also an important question for this study.

The third characteristic refers to the emotional experience when a person has a strong and clear feeling of unity with an object. According to Markovic (2012) stimulus input through the senses, cognition, and finally the evaluation process, ends with two outputs, an aesthetic judgment and aesthetic emotion (e.g. feeling of pleasure).

To gather and interpret environmental stimuli are two processes, sensation and perception. Sensation refers to the biological experience of the human sensory system and may be independent of cultural or social background. Perception (from the Latin perceptio, percipio) is the organisation, identification, and interpretation of sensory information in order to represent and understand the environment (Schacter et al. 2012). Perception may be structured by associative forces, and may be focused by attention. According to Merleau-

Ponty (1962) attention itself does not create any perceptions, but may enable conscious perceptions which include sensing as well as reasoning (Merleau-Ponty 1962).

Cognition involves that which comes to be known, as through perception, reasoning, or intuition, and includes aspects such as awareness, reasoning, and judgment (Dictionary.com 2013). Different philosophical positions have been generated of aesthetic experience, and classified as either non-cognitive or cognitive approaches (Carlsson 2012). The former position stresses emotional and feeling-related responses while the latter involves cognitive interpretation of the meanings of aesthetic appreciation (ibid). Feeling-related responses are important for this study, as will be demonstrated later, because such responses can be identified within people's descriptions of their environmental experiences and thus define an empirical base.

In a way, it may be a valid statement to say that aesthetic quality is a matter of taste. Aesthetic judgment (sometimes called aesthetic response) encompasses a wide range of emotional and critical responses which can go from extreme pleasantness to unpleasantness (Russell 1988). Aesthetic judgment (Scruton (2009) uses judgment of beauty) involves a claim about the aesthetic quality of an object. According to Kant (2008 (1790)) aesthetic judgment is an individual judgment that cannot be other than subjective. All judgments about the character of the environment may be seen as valid for the person who made them; they are never wrong and do not describe the experience of another person, the person is describing only their opinion about some quality. However, if many people experience the same feature of urban space in a similar way or relate their experience to a similar meaning, a repetition of common experience may be confirmed. Common experiences confirm the importance of the particular quality.

Aesthetic experience, which can focus on a wide spectrum of objects, such as urban scenes, natural scenes and events, can be induced by both pleasurable and dis-pleasurable objects (Markovic 2012). Aesthetic feelings themselves (e.g. admiration, delight etc.) are, however, basically positive (ibid). Scruton (2009) writes about beauty, which produces a perceptual experience of pleasure, as a means of aesthetic success. The adverse of aesthetic experience, such as ugly view or foul-smells are thus not defined as aesthetic feelings, but are nevertheless involved in aesthetic judgment.

In summary: aesthetic experience can focus on a wide spectrum of objects and be induced by both pleasurable and dis-pleasurable features. In the thesis I talk about stimulating and discouraging features for aesthetic experience. Such features are able to produce aesthetic experience directly, or stimulate the perception of aesthetic features. Conversely,

discouraging features reduce perception of aesthetic features. Both dis-pleasing features and a lack of aesthetic features may influence negative aesthetic judgment. Also, certain features may increase the perception of dis-pleasurable features.

### 2.2.2 Environmental experience with the different senses

The four most valuable senses in interpreting and sensing the environment are vision, hearing, smell and touch. The three first are assumed in this study to be the most important for cyclists' aesthetic experience. These are not the only senses, however. We also have, for example, senses of heat, balance and pain. Scruton (2009) notes that it is important to distinguish sensation related to emotional response from other kind of sensations. He points out that this emotional response occurs through connection of the senses to the mind.

Porteous (1996) discusses tactility (touch) as an important sensory organ for possible aesthetic experience. Tactility is not found to be important for this study. Cyclists are mainly in physical touch with their own bicycle when they are cycling. One could say that raindrops, snowflakes or wind are also related to touch. Weather conditions are assumed in this study to have a relationship to bodily comfort rather than direct emotional experience and are therefore excluded from the study. Heat on the skin is, for example, not an emotional experience.

To ease the identification of the features in the environment that might stimulate a cyclist's aesthetic experience, I find it, however, important to look at what each sense could focus on within the environment, and in which way. In addition, it is pointed out in Section 1.3.2 that cycling is a multisensory phenomenon. This makes it even more important to study separately what each sense may perceive.

In western culture, vision has been regarded as the dominant sense and provides more information than the other senses combined (Pallasmaa 1996), including for example orientation (Carmona et al. 2010). Vision has been extensively studied, for example in relation to environmental perception and meaning. Visual perception is highly complex and involves space, distance, colour, shape, texture and contrasts (Carmona et al. 2010). Vision is, however, limited to what is in front of us, compared to sound, vision isolates, and is directional (Pallasmaa 1996).

Sound is also extensively studied in environmental aesthetics (Porteous 1996). It contrasts strongly with vision in many ways. Sounds have no boundaries, they are more transitory, more fluid and lack context, and are less possible to capture than things that are

seen. There is no end to traffic roar, machine hum and the rustling of leaves (same ibid). Sound incorporates, and is omni-directional (Pallasmaa 1996).

Although very little has been written about environmental smells it can be said that smell is diffuse, inchoate, transient and emotional. Odours arouse feelings of pleasure, well-being, nostalgia, affection and so on (Porteous 1996). Particularly in the urban environment, smells may also arouse feelings of displeasure (e.g. emissions from cars). Scruton (2009) suggests that smell is less capable of systematic organisation than sight and sound and therefore has limited value when approaching aesthetic experience, at least compared to vision and sound.

Weather conditions, such as temperature, wind, sun and rain certainly have an effect on bodily sensations, not least when cycling. Of course nice sunny weather can stimulate forms of well-being and indirectly affect aesthetic experience. The sun in itself, however, is not the object of attention for aesthetic experience. Aesthetic experience involves an attention of interest to an object capable of the aesthetic stimulation (Scruton 2009). The sun also perhaps makes other things in the environment more beautiful than they are in rainy weather, in the way that sunrays shine and put new light and shadows on the objects in the city. Those objects might then become those that stimulate the aesthetic experience, the objects of attention, not the sun. The objects might then gain a new aesthetic character within the context of sunshine, compared to the context of shadow.

### 2.2.3 The influence of cycling on environmental experience

The confrontation between a person cycling and the environment includes such things as how they perceive with the different senses with regard to movement, and how they experience the urban space when moving, including the sequence of changing urban spaces of all kinds, through both static objects and dynamic, both aesthetic qualities and ugliness.

The phenomenology of perception and experience approaches the way a person relates to the environment and perceives it, in theory. In phenomenology it is assumed that perception starts with the body (Merleau-Ponty 1962). In this way, perception has an integral somatic dimension. Kinaesthesia, sight and touch are the sensory organs that enable the human body to experience urban space and to give strong feelings to spatial qualities (Tuan 1977) in addition to hearing (e.g. echo). Accordingly, a key factor in understanding the relationship between perception and the urban environment involves the engagement of the human body in a spatial sense, as the perceivers sense the various objects in the environment

through their relative position. Forward, backward and sideways are experienced differently in the act of motion (ibid).

Spatial experience is therefore different when riding a bike than when walking, driving or standing still. A person sitting on a bike has a different viewpoint of the surroundings than one sitting in a bus. A pedestrian can easily turn around, while a cycling person looks more or less at what is ahead, sometimes quickly to the sides. Spatial engagement is also affected by travelling speed and the interaction with other bodies. A crowded urban space has different characteristics from one with no people or cars and therefore an urban space in the peak hours of the day, when commuting occurs, is experienced differently than when travelling in less traffic. Such circumstances can also vary from one place to another. High levels of crowding may, for example, be more common in big and compact cities than in medium-sized cities. It is important to bear in mind that a person who cycles slowly probably perceives their environment differently from one who cycles at high speed. Speed, however, depends particularly on travel mode and, therefore, affects the readability of the environment differently as perceived by cyclists, compared to, for example, pedestrians and car drivers. The influence of travel speed on the way elements perceived visually are organised in the mind of the travelling person is discussed further in Paper 1. The perceiver locates moving objects and spaces and organises them into an overall structure in their mind in order to orientate themselves and interpret what is perceived in a meaningful way in relation to their objectives. Over a longer time, identifiable objects, motions, spaces, orientated structures and meanings are organised into complex sequences (Appleyard et al. 1966). This is particularly so for commuters, since they have cycled the same route many times.

## 2.3 Theoretical viewpoints as the empirical basis of this study

### 2.3.1 Capturing cyclists' aesthetic experiences

Environmental experience may be of various kinds, and only some may be defined as aesthetic experience. Bicycle infrastructure and the functionality of cycling-oriented urban environments have been shown in earlier research to be very important for cyclists (see Section 1.3.3) but knowledge of the importance of aesthetic features is limited. When cycling, the senses work together and the visual does not work in isolation from the other senses (cf. Section 1.3.2). Each sense receives different impulses from the different features of the environment. Part of the cyclist's attention goes to controlling his/her balance; the cycling

rhythm and his/her own safety in relation to other travellers. An urban space which requires much attention from cyclists, for example to ensure their own safety in heavy traffic, is therefore expected to occupy the cyclist's attention and at the same time reduce his/her awareness of features that are of lower importance. For this study, this means that cyclists may not always experience or be aware of features that have the potential to produce aesthetic experience. People may be expected to sometimes say nothing about their aesthetic experiences or perhaps not experience anything at all with an aesthetic meaning. The aesthetic experience of commuting cyclists is also expected to be endowed with other kinds of experiences, such as those related to instrumental values. It is therefore considered a challenge for this study to capture responses on aesthetic experiences.

There may be different kinds of experiences, and the researcher has to be able to distinguish between many things that are involved. When trying to find out whether at all, and in what way, features of the environment could influence a person's aesthetic experience, it is important not to instruct participants in a study to comment particularly on their aesthetic experiences. It is also important that the individual makes his/her own evaluation without being inspired by views from other participants or the researcher.

According to Gadamer (2004), knowledge in the human sciences always involves some self-knowledge. This means that during interviews and discussions with participants it is important that the researcher who leads the discussion tries to be open-minded and lets the participants explain their experience without leading their thoughts. Phenomenologists all accept that researcher subjectivity is inevitably implicated in research and concur about the need for researchers to be open to the "other" and to attempt to see the world freshly, in a different way (Finlay 2009).

Bicyclist's aesthetic experiences of the environment can be expected to be related to an immediate experience which may influence subsequent reactions. It was a challenge for this study to capture experiences as closely as possible to the moment when it occurred in order to ensure that it was remembered in detail.

### 2.3.2 Theoretical viewpoints for interpretation of the data

Aesthetic meaning may be related to the significant quality of an object and its relationship to the perceiver, and its psychological force to produce emotional feeling (Garvin 1947). The meanings and values that a person might associate with certain environments or objects can be strongly powerful and so influence aesthetic judgment (Gjerde 2010).

Aesthetic theory (see Berleant 1970, p. 16) has to be, according to Berleant (1970), based on what he calls “distinguishable kinds of facts”. This means that a framework of aesthetic considerations has to be based on statements that describe the characteristics of aesthetic experience and under which situations the aesthetic experience occurs. Such statements are, for example, related to interest and attitude. For this study, it is important to note that the purpose of travelling and attitudes towards the mode of travelling can thus have influence. Berleant (1970) refers to statements about the objects which are involved in the aesthetic experience, and which are the central focus of our attention, as “objective facts”. Russell (1988) terms the objects involved in aesthetic experience the “affective component”. Berleant (1970) refers to the words people use to describe what they have experienced (such as aesthetic judgment) as “judgmental facts”. Our choices of places to visit, the things we do there and whether we go there again may be determined by a judgment, which Russell (1988) terms “affective appraisal”. An affective appraisal occurs when a person judges something as having an affective quality, such as being pleasant, likeable, exciting and so on, and thus involves both emotions and cognitions (Russell 1988). Affective appraisals reflect emotions in the sense that they concern affective feelings and cognitions in that they are one aspect of how someone interprets something. Affective appraisal is always directed towards an object or an environment. Affective appraisal is one way to describe (Russell uses affective descriptor in relation to the diagram, see below) an affective quality of an object or of an environment (ibid). This particular environment or object is thus the affective component. It was assumed relevant to this study to focus on participating cyclist’s aesthetic judgments and the affective components involved in order to approach their aesthetic experiences.

Russell and Pratt (1980) proposed a verbal scaling system with a circular order, the validation of which was further confirmed in a factor-analytic study (Russell et al. 1981). With this approach, the terms to describe affective qualities of places (the affective appraisals) can be systematically interrelated. The network of these interrelationships has been illustrated with a diagram or, according to Russell (1988), a ″spatial metaphor″ (Fig. 3). It consists of two bipolar dimensions. The horizontal axis ranges from extreme unpleasantness through a neutral point to extreme pleasantness. The judgment of an element (through use of affective appraisal) or feature of urban space that is found neither to be pleasant nor unpleasant can go to two opposite directions. The vertical axis concerns the arousing quality of a place, and ranges from sleepy towards extremely arousing. The diagram has been separated into four main areas or affective categories by the affective descriptors ‘Exciting’, ‘Gloomy’, ‘Distressing’ and ‘Relaxing’ (Fig. 3). These four categorical affective descriptors are located

at specific points in the diagram (Russell & Pratt 1980). The diagram in Figure 3 shows eight variables of possible affective descriptors. Russell (1988) presented a more detailed layout including 40 affective descriptors within the four categories (Fig. 4). The methodological approach of Russell and his colleagues has been applied in this study in order to systematise cyclists' judgments of the aesthetic qualities of different environments, and to find the categorical position of their judgments within the diagram.

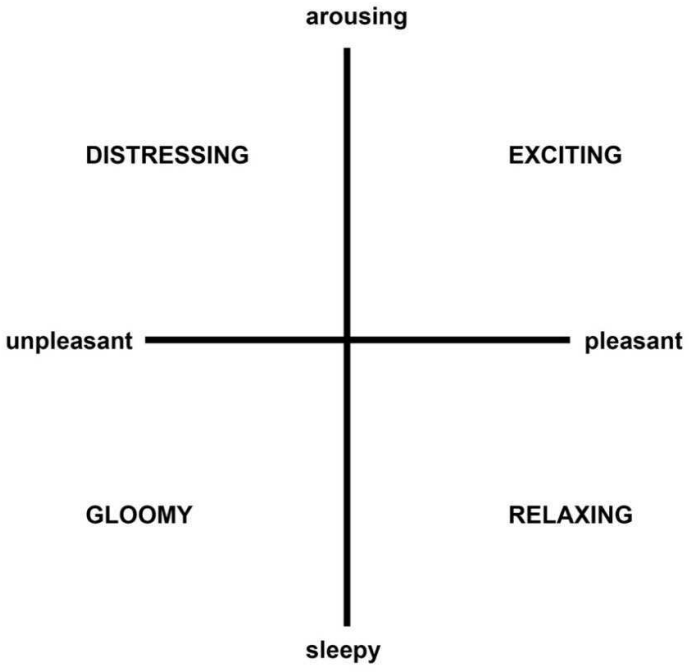


Figure 3: A spatial representation of descriptors of the affective quality of environments

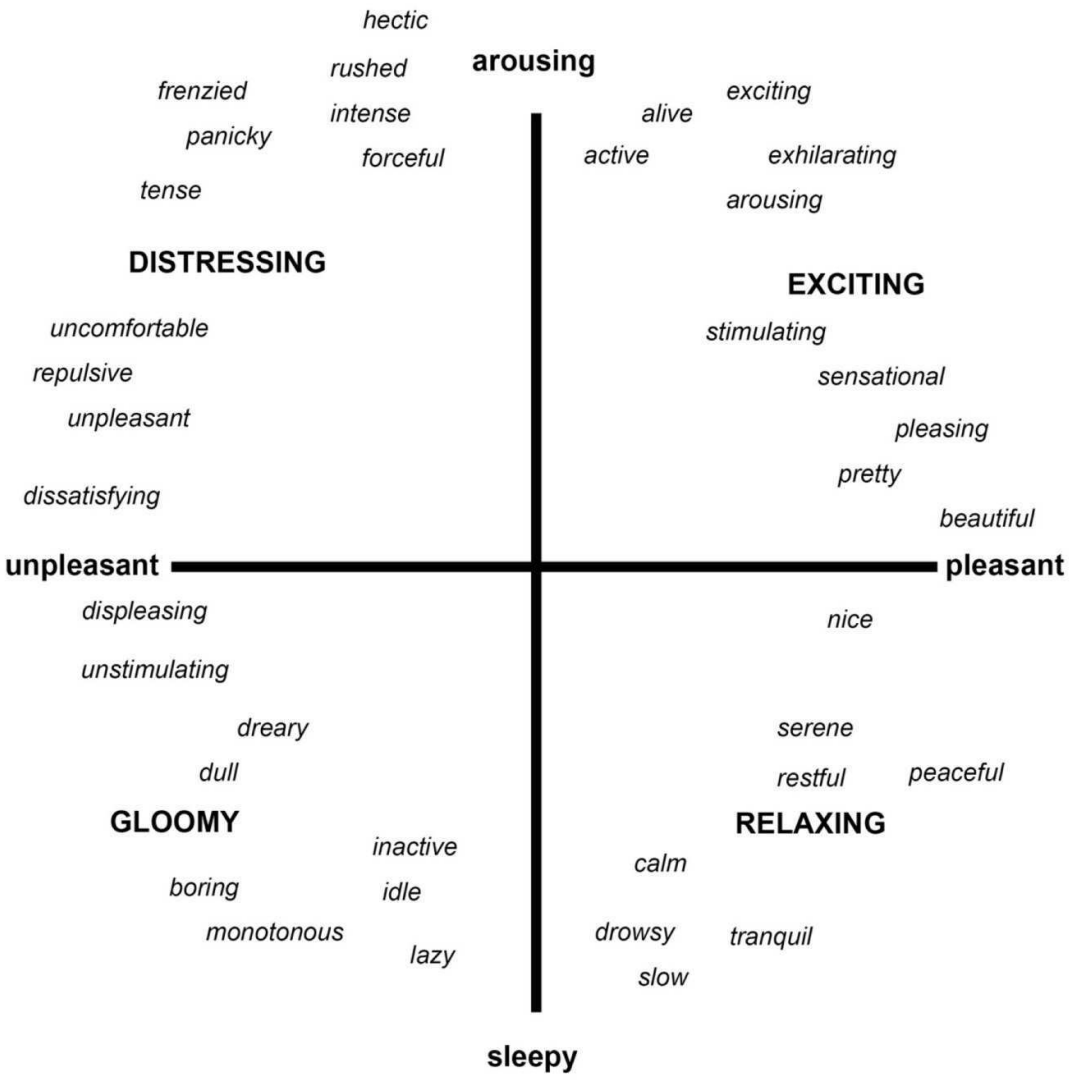


Figure 4: Russell's (1988) 40 descriptors of the affective quality of environments located in the diagram of Figure 3

Theories that deal with aesthetic appreciation are important in explaining how, why and for what reason commuting cyclists might interpret the perceived elements or features of urban space in terms of aesthetic meaning and so influence aesthetic judgment. In this study, three theories have been considered relevant for explaining different aesthetic meanings for commuting cyclists: 1) theory on the notion of visual distance, 2) theory on symbolic meaning, and 3) theory on instrumental determinants.

The first theory is on the notion of visual distance, which is seen as an important feature in visual perceptual experience. The “visual landscape” at distance and the

"participatory landscape" in close proximity result in two distinct modes of experience (Berleant 1988). The former has only a visual value and the latter draws on several senses.

The second theory, on the symbolic meaning of the environment, gives an insight into how the environment can express an associational meaning with respect to, for instance, the shape and proportions of volumes, degree of enclosure (Lang 1988) and in the dominating use of the space.

The third theory reflects on the influence of instrumental features on aesthetic experience. In this theory Heath (1988), by applying Maslow's (1943) hierarchy of needs, suggests that the aesthetic experience of a path or transportation network can be reinforced if instrumental quality is as expected, and reduced if a path lacks such a quality.

### 2.3.3 Ontological and epistemological viewpoints

There are two different viewpoints related to the ontological issues of this study, the philosophical belief of what constitutes reality. What constitutes the reality a person may experience is not necessarily the same as the reality composed of physical elements.

Space perception is a complex process, where many variables are involved. People do not simply experience the same environment in the same way. We have to distinguish between the reality perceived with immediate response and the physical environment composed of physical elements. This physical environment certainly exists independently of the perceiver and has characteristics of its own (Norberg-Schulz 1971).

What can be learned from phenomenology for the purpose of this study is that what cyclists experience as aesthetically attractive is influenced by lived experience. The concept of 'lifeworld' (German Lebenswelt) in phenomenology was first introduced by Edmund Husserl in his book "Crisis of European Sciences" (Husserl 1954 (1970)). The lifeworld is a dynamic background that can change and can affect both perception and experience. Perception is not the passive receipt of sensory signals, but can be shaped by learning, memory and expectations (Goldstein 2007). Nothing can appear in our lifeworld except as lived. This is affected by the particular life conditions of an individual and includes both material and immaterial living circumstances such as employment situation, availability of material resources, and a person's physical conditions. The lifeworld describes the subjective perception of these conditions (Dahlberg et al. 2001). This means, for the purpose of the study, that it is important to be aware of the influence of persons' lived experience when interpreting what could affect their opinion of interesting features that are of aesthetic

importance. This opinion might be influenced by, for instance, the cycling culture in the city where the person is used to cycling, the physical environment there and the person's cycling skills and experience. This study is, however, not considered a purely phenomenological study and exploring the different sides of cyclists' lifeworld conditions has not consequently been emphasised.

For this study it is considered important to be aware that the valuation of aesthetics may vary between cities with different bicycle cultures or different groups of cyclists, such as experienced or less experienced. Lived experience might change with the increased establishment of bicycle culture and better facilitation of cycling. By changing attitudes towards cycling as a travel mode, expectations of the environment might also change. From this logic, aesthetic features may not have the same importance in a city with limited bicycle culture as in a city with an established one.

The study aims to gather an in-depth understanding of why and how the individual experiences some elements or features within the urban space in terms of aesthetic meaning. An attempt has been made in this study to find similarities in the individual experiences so as to define general experiences. According to Giorgi (1997) a sufficient number of variations and a minimum number of participants, are needed in order to make it easier to discern the individual experience from the more general experience of the phenomenon.

For the epistemological level of this study, the nature and scope of knowledge, there are two important viewpoints for the validity of the empirical data. One is the influence of the lived experience on the individual opinion about what has aesthetic value. The other is that an aesthetic response is only valid for the person who responded and for their immediate response. This includes the character of the environment when the response was made, which is specific to that particular moment, such as time of day, daylight conditions and people moving in the place at that moment. For knowledge to be produced from the data, this means that each response is valid for the particular person that has participated in this research and the particular environments under study, including the circumstances in those environments at each time. The possibility of generalizing beyond this particular context depends on a qualitative judgment of the extent to which the new context is similar to or radically different from the original context.

# 3. Methodology

## 3.1. Elaboration of research questions

The purpose of this PhD work has been to identify and explain how the physical features of urban spaces influence commuting cyclists' experiences in terms of aesthetic meaning, and to investigate how such experience is of importance for their evaluation of the quality of their commuting routes. One of the main challenges of this study has been related to the question of methods that are capable of capturing empirical data about sensual stimulation that might be related to cyclists' emotional responses. In addition, as has been explained in Section 1.3.2, there are several things that make perception when cycling different from other ways of moving around, and which also have to be captured in the investigation. This involves travel speed, how the senses work when cycling and what a cyclist may pay attention to. In addition, motivational aspects, both cultural and personal, may influence the individual opinion about what has aesthetic value in urban space. Commuting as the purpose of cycling and motivations for this mode choice may in this sense influence attitudes towards the environment and guide attention to features of interest. For the knowledge pursued from this study the context of cyclists' aesthetic experience is therefore of main importance, both social and environmental. Context always points to surrounding circumstances and can refer equally to the surrounding physical fabric as attitude or debates regarding this fabric (Isenstadt 2005). In this way physical context is as much when as where, and does not stand still, it changes (ibid).

As has been demonstrated here, very many things are involved in commuting cyclists' aesthetic experience. The meanings or values associated with certain features or characteristics that influence aesthetic experience are also important to this study, because the underlying reasons for the aesthetic experiences are important for environmental planning. The methodological approach that is needed to empirically elucidate commuting bicyclists' aesthetic experience needs to cover the complexity of this phenomenon as described above (see sub-question 1 below, the research question of Paper 1).

The empirical investigation of this study reflects the ontological viewpoint of two sides of reality (see Section 2.3.3), reality as perceived with immediate response and the physical environment composed of physical elements. Both should be studied to illuminate potential features for aesthetic experience and the influences that cause them to be experienced or not. Professionals, such as architects and urban planners, usually try to measure and describe the physical environment as composed by physical elements

(independent of the perceiver) in a systematic or analytic way. The environment as experienced is always the subjective opinion of an individual.

Environmental experiences that are of importance to this study, as explained above, include two main sides. The first side has to do with what people wish to experience from an aesthetic viewpoint, as an isolated phenomenon, which perhaps does not exist on their way between home and work, or is for some reason thought not worth pursuing. The other side involves the environmental context of the particular features, which influences what we choose among possible alternatives and what a person thinks is worth pursuing within a particular context. This is dealt with in sub-question 2, the research question of Paper 2.

Route choice preferences have been studied before and it is, in principle, possible that aesthetics are one among many important preferences influencing route choice. However, people can only choose routes among alternatives that exist on their way between home and work, and perhaps these alternatives do not fulfil their wishes. They have to choose the best alternative among existing possibilities. Therefore the other main question is related to the way aesthetic features of urban spaces may be involved in the perceived quality of routes people have chosen to cycle between home and work. This is dealt with in sub-question 3, the research question of Paper 3.

Based on the above considerations, in addition to the main research question of this study, and as a specification and elaboration of the overall research question, 3 sub-questions have been formulated and are described below.

**Main research question:**

**How do the physical features of urban spaces influence commuting bicyclists' experience in terms of aesthetic meaning, what are these features, and how is such experience important to their evaluation of the quality of their commuting routes?**

**Sub-questions:**

1. How can commuter cyclists be expected to experience features of urban spaces with aesthetic meaning?
2. What physical features of urban spaces affect commuting cyclists' aesthetic judgment, how do other features influence their aesthetic experience and what "urban space types" include the identified features?
3. How are the aesthetic features of urban spaces involved in the perceived quality of routes chosen to bicycle to and from work?

## 3.2 Evaluation of methodological approaches

In this section I will discuss how and why case studies and mobile methodologies are important methodological approaches for this study.

### 3.2.1 Case studies

To answer research sub-questions 2 and 3, case studies are relevant because they encompass important contextual conditions. As described by Yin (2009) a case study involves an empirical enquiry, and an investigation of a contemporary phenomenon in depth and within its real-life context.

This study is what Yin (2009) has defined as a multi-embedded or multiple case study. Three Nordic cities, Reykjavík, Trondheim and Odense were used as cases at one level. At another level, predefined space types within the central areas of Reykjavík and Trondheim were chosen as cases to study via "bike-through" tours. Participants of the "bike-through" tours (a focus group) were selected as cases. Finally, routes chosen by cyclists within the three cities were studied as cases. Companies were chosen as cases and their employees invited to participate in a survey.

There are several reasons for the choice of the three cities as cases to study. Nordic cities have received limited attention in academic research on bicycle commuting (see Section 1.2.2), particularly those of medium size, which are very common in Nordic countries. The three cities have all populations that could be regarded as medium-sized in a Nordic city context (approximate populations 2013: Reykjavík city 120,000 inhabitants (Reykjavík capital region 200,000) (Wikipedia), Odense 160,000 (Wikipedia) and Trondheim 180,000 (Wikipedia)). All three have their main employment areas around their city centres and may be regarded in this respect as mono-centric. This means for this study that most people can be expected to commute to and from the same area. The companies chosen and invited to participate were located within central areas of the cities.

The three cities chosen as cases to study were used to compare the importance of aesthetics for commuting cyclists between cities with different bicycle cultures (see Section 2.3.3). The cities have different shares of cycling which I believed would reflect differences in cycling culture. I expected that motivational factors for choosing to bicycle to work, and attitudes and expectations of the environment would differ, at least from a functional viewpoint. The percentage of cycling, measured as shares of the total number of trips, was lowest in Reykjavík (4%, Capacent_Gallup 2011) and a little higher in Trondheim (7%, Trondheim_kommune 2010), but highest in Odense (25%, DTU 2011). As the share of cycling indicates, bicycle culture is most established in Odense. Through a special project (Odense National Cycle City of Denmark) in the years 1999 to 2002, knowledge of bicycle use was also gained and documented. Odense is now regarded (Odense_kommune 2009) as a good example for other cities both in Denmark and other countries, and Denmark is internationally recognised as an exemplary cycling nation. Reykjavík city has, on the contrary, only recently issued official aims to improve conditions for commuting by bicycle. Trondheim can be regarded as a Norwegian city with an established bicycle culture where students have cycled to university for many decades. Trondheim is often compared to Reykjavík since it has, in addition to size and culture, similar weather conditions and is located at the same latitude.

The purpose of the “bike-through” tours was to explore the way a focus group experienced different characteristics of urban spaces. Having variety in the characteristics of the urban spaces within the area chosen as cases to study was fundamental to the objectives of the “bike-through” tour. Contrasts in urban spaces may appear as different uses of space or polar qualities (see Fig. 2 p. 36) such as wide or narrow, open or closed. Different kinds of elements also shape the urban spaces, such as buildings or vegetation. The contrasts in the

urban spaces are great in central Reykjavík and Trondheim. As an example, they consist of large, car-dominated urban spaces, narrow spaces shaped by historical houses and natural environments and human made green urban spaces. The contrasts are less in Odense than in the other two cities. Odense is totally flat and vegetation is quite evenly distributed throughout the city landscape.

It should be noted that the contextual condition of the same urban space can change from time to time. Not only can the physical fabric change in the long run, the contextual conditions are continuously changing in one day, so the time of day and season chosen for the study are of importance.

The role of the focus group was to investigate how commuting by bike, as a way of travelling to and from work, influenced their experiences. In this sense, the influence of the participants' social context on their opinions was studied.

### 3.2.2 Mobile methodologies, data collection on the move

As was pointed out in Section 2.3.1, a bicyclist's aesthetic experiences of the environment can be expected to be related to an immediate experience which may influence subsequent reactions. To capture the immediate sensory experience as closely as possible to the moment when it occurred is a question of method.

The advantage of collecting data on the move, as an approach, has received increased attention the last years. Discussion of this kind of research started with the 'mobilities turn' in sociology (Cresswell 2006; Sheller & Urry 2006; Urry 2007). This turn involves studies of everyday mobilities that emphasise new forms of sociological enquiry, qualitative explanation and spatial engagement. Empirical mobility research focuses on, for example, the travel of people to work (Büscher & Urry 2009). According to Büscher and Urry (2009) travel always involves the movement of bodies and forms of pleasure and pain, notions of movement, nature, taste and desire.

They suggest that traditional methods have difficulty dealing with the sensory – that which is subject to vision, sound, taste and smell, with the emotional, pleasure, desire and the kinaesthetic, the pleasure and pains which follow the movement (Law & Urry 2004). In order to deal with this, Law and Urry (2004) suggest that it is convenient to develop research methods where the researcher is mobile and travels with the research subject. In this way, mobile methodologies focus on the sensing of places when moving in real urban spaces (Sheller & Urry 2006). There are several ways of participating in patterns of movement while

simultaneously conducting research, such as walking with people (see e.g. Evans & Jones 2011; Hein 2008; Jones et al. 2008).

The usefulness of mobile methods lies in the gathering of important qualitative data from informants. These methods focus effectively on features in the places under study (Evans & Jones 2011). As pointed out by Hein et al. (2008) the walk-through interview offers great potential to explore environmental perception. It is a fast and easy way to get an indication of what is positive and what is problematic in a specific environment, and is a simple method of obtaining viewpoints, experience and dialogue (De Laval 2006). De Laval (1997) studied walk-through evaluation in her doctoral thesis. In a PhD course at Malmö University in 2011, in which I took a part, called "Urban Studies and Urban Theory - Encountering Public Space"; De Laval introduced a walk-through evaluation method. The method consisted of a pre-planned route followed by a focus group invited to participate. At certain places they stopped and wrote down individually what was good and bad at each place. After the walk the group went indoors and the notes were summed up through discussion (ibid).

A method where the researcher rides with participants enables him/her to ask the participants qualitative questions about their immediate sensory experiences while they move in urban space. A mobile method was considered appropriate for the first part of the data collection in my study (sub-question 2) to identify the elements and features that are of importance for bicyclists' aesthetic experience in relation to commuting.

## 3.3. Research design

The study was carried out by means of a combination of qualitative and quantitative research methods, within the context of a multi-embedded (or multiple) case study (Yin 2009). It is a case study containing more than one sub-unit of analysis and where the identification of sub-units allows for a more detailed level of enquiry (see Section 3.3.1). The qualitative approach involved a mobile methodology with qualitative interviews. The quantitative method involved a survey. Embedded in the survey were open ended questions which aimed at qualitative replies. In this section the research design will be explained with a detailed exploration of the information needed to answer the three sub-questions presented in Section 3.1 and the methods/sources needed to answer each part.

### 3.3.1 Part 1

To answer the first sub-question it was necessary to define what was important in the studies of commuting cyclists' aesthetic experience. There was not much previous research to build on for an empirical investigation. It was therefore considered important, before going into the empirical part of the study, to explore the different aspects of the theme through a literature study and to lay out a conceptual framework for the components involved. For this purpose three theoretical approaches were considered: 1) phenomenology of sensory perception and experience, 2) urban design theory, and 3) environmental aesthetics. In addition, existing literature on cycling was studied for relevant insight into the sensory aspects of cycling and other cycling-specific issues, which could be put in context with the theories. The components involved in the aesthetic experience of commuting cyclists, laid out in the conceptual framework, are the basis for the empirical studies prompted by sub-questions 2 and 3. In the framework, components of importance for the investigation, and how perceived features may have aesthetic meaning in the mind of a commuting cyclist, are defined.

### 3.3.2 Part 2

To answer the second sub-question, to capture the way people may have experienced urban spaces and their particular features in the most sensible way within their real-world context (Yin 2011), a qualitative approach was assumed to be appropriate. It was also considered important to rely on qualitative interviews and open questions. Such questions in qualitative interviewing require intense listening on behalf of the researcher and a systematic effort to really hear and understand what people say (Rubin & Rubin 1995).

To identify the physical features within different urban spaces that bicyclists experience as aesthetically meaningful in relation to commuter cycling called for bicyclist's subjective evaluations of their cycling experiences in real urban spaces. In addition, reflections of cyclists' former experiences and opinions in similar contexts when commuting by bike were important. Here, questions about stimulating and discouraging experiences, and preferred and disliked urban spaces in relation to commuter cycling, were considered relevant. In order to identify cyclists' aesthetic experiences, it was found suitable for this study to rely on cyclists' aesthetic judgment (see Section 2.2.1). Descriptions then had to be made by cyclists on their environmental experiences, oral and written.

When trying to find out whether at all, and in what way, features of the environment could influence a person's aesthetic experiences (see Section 2.3.1), it was considered

important not to instruct participants to comment particularly on their aesthetic experience. Bicyclists' descriptions of their environmental experiences in this study were therefore expected to be of various kinds, for example related to instrumental and functional issues which have proved to be very important for the quality of bicycle routes according to earlier research (see Section 1.3.3). Only some of the experiences were expected to be related to aesthetic features. It was therefore necessary to distinguish aesthetic experiences in the data collected from other experiences. In this study, the aesthetic experiences were identified by looking at participants' use of affective appraisals (aesthetic judgment, see Section 2.3.2). Different experiences were also grouped by theme into aesthetic, instrumental and kinaesthetic phenomena.

A qualitative mobile method, with embedded qualitative group interviewing, was found convenient for capturing the emotional experiences of the environment when cycling and discussing in depth the influence of commuting as the purpose of cycling in participants' experiences. For awareness of factors that could influence their values, it was necessary to collect information about the former cycling experience of participating cyclists, and motivational factors for commuting. The experience in real urban spaces with different characteristics calls for case studies and analyses of the different characteristics that can be defined through categorisation of urban spaces in space types.

### 3.3.3 Part 3

Sub-question 3 involves the combination of a qualitative and a quantitative approach. It involves a request for a qualitative explanation of the way in which aesthetic values are involved in a chosen route compared to other values. The quantitative aim was to identify repetitions in experiences with similar characteristics, and similar or different reasons for these replies.

To identify the routes cyclists had chosen for their commutes between home and work, route drawings, linked to Google Map and Street-View, were collected from the cities chosen as cases to study. In connection with each drawing, it was considered important to obtain information about the particular cyclist's evaluation of the qualities and disadvantages of his/her commuting route and his/her preferred and disliked environmental features for route quality. Information about the particular cyclist's former cycling experience and motivational factors for commuting that could influence his/her values and expectations towards the cycling route environment were collected. For this purpose a survey was found to be

convenient, where the listed issues could be quantified through multiple choice questions. Not all questions were relevant for respondents who were non-cyclists or infrequent cyclists. Separate questions were therefore needed for this group about attitudes towards commuting by bike and towards the cycling environment.

To find out how aesthetic features may be involved in the perceived quality of routes, open ended questions were used to obtain qualitative descriptions of the best and worst route parts. Open ended questions for verbal responses, in a survey, unlike multiple choice questions, do not suggest possible answers. The participants were therefore given the option to describe their opinions in their own words. Such a description may involve different kinds of experiences, related to both instrumental as well as aesthetic qualities of the route environment. It was therefore necessary to distinguish aesthetic experiences in the data collected from other experiences (see above).

Russells' (1988) diagram with descriptors in affective categories was found appropriate for interpreting the aesthetic quality of features as judged by the cyclists, both from the qualitative evaluations and the open-ended survey questions. Theories within the field of environmental aesthetics, presented in the theoretical framework, were used to interpret the aesthetic meaning of the results.

Table 1: Research sub-questions, information required and data sources

| | *Types of information required* |
|---|---|
| 1 | Define what is important for the studies of commuting cyclists aesthetic experience:<br>• The influence of motivational factors on perception and experience.<br>• Cycling-specific issues for experience.<br>• Definition of the kind of physical features that may be regarded as valuable for the studies of commuting cyclists' aesthetic experience.<br>• Theoretical viewpoints on how, why and in what way the perceived elements may be interpreted into an aesthetic meaning. |
| 2 | • Identification of physical features within the different urban spaces that have been aesthetically judged by cyclists with commuting in mind.<br>• Approach to categorising urban spaces with different characteristics.<br>• Approach to distinguishing aesthetic experience from other experiences.<br>• Approach to interpreting the aesthetic meaning of the identified physical features.<br>• Information about the participating cyclists' former cycling experience and motivational factors for commuting. |
| 3 | • Information about the routes cyclists have chosen to bicycle between home and work.<br>• Information about the participating cyclists' former cycling experience and motivational factors for commuting that could influence their values and expectations towards the cycling route environment.<br>• Information about preferred and disliked environmental features for route quality<br>• Approach to distinguish aesthetic experience from other experiences.<br>• Approach to interpret the aesthetic meaning of the identified physical features. |

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| *Methods/sources for acquiring the information* |
|---|
| Literature-studies, comparison of 3 theoretical fields and existing literature on cycling:<br>• Phenomenology of sensory perception and experience<br>• Urban design theory<br>• Environmental aesthetics<br>• Existing literature on cycling-specific issues for sensual experience. |
| • Theoretical framework from 1 for the studies of the aesthetic experience of commuting cyclists.<br>• Define urban space types<br>• Case studies in Trondheim and Reykjavík<br>• Cyclist's subjective evaluations of their cycling experiences (with commuting in mind) in real urban spaces with questions about stimulating and discouraging experiences and preferred and disliked urban spaces.<br>• Qualitative interviews with commuting cyclists (about their evaluation) including discussion about the influence of commuting for their opinions.<br>• Questionnaire about basic motivational factors for the bicycle as mode choice.<br>• Identify affective appraisals and affective qualities from bicyclists' oral/written evaluations. Make use of Russell's (1988) diagram. |
| • Theoretical framework from 1 for the studies of the aesthetic experience of commuting cyclists.<br>• Case-studies in Reykjavík, Trondheim and Odense<br>• Survey: multiple choice questions about motivational factors for commuting and attitudes towards the cycling route environment, preferred and disliked environmental features. Open ended questions about best and worst route parts<br>• Collect route drawings linked to Google Earth and survey questionnaire.<br>• Separate questions for respondents that are non-cyclists or infrequent cyclists.<br>• Group different experiences by theme.<br>• Identify affective appraisals and affective qualities from open ended questions. Make use of Russell's (1988) diagram. |

## 3.4 The “bike-through” evaluation

### 3.4.1 The method

In order to explore commuting bicyclist’s perspectives of their experiences of urban spaces, I used a mobile method which I called the “bike-through” evaluation. The method is similar to walk-through methods (see Section 3.2.3), but here I (the researcher) used a bicycle and rode with a focus group who I invited to participate. The method consisted of two parts, a cycling tour on a pre-defined route and a qualitative interview with the focus group after the tour. The aim of the method was to capture both participants’ immediate responses to the experiences of features of different urban spaces and opinions towards the value of these features when commuting.

For the purpose of this study I pre-planned tours through urban spaces with different characteristics. In order to clarify the differences of urban spaces in the case study areas, space types were defined (see Table 2). An attempt was made in Paper 2 (see Section 4 in Paper 2) to divide the varied and complex urban spaces into types on the basis of their main physical characteristics, both static and in motion, in order to facilitate analysis of the features judged as of importance for aesthetic experience. Eight types were defined. The definitions of the space types for this study were first based on the characteristics in the urban spaces in the central part of Reykjavík. Similar urban spaces were identified within the case area in central Trondheim.

The focus group of this study included people who were interested in bicycle commuting. For a participant to complete the “bike-through” tour it was required that he/she was physically able to cycle 10km and had 2.5 hours available at the times suggested. It was therefore found to be a challenge to find people who would show an interest in participation. This influenced the way participants were selected.

Table 2: Urban space types as defined in Paper 2

| **Name of space type** | **Characteristics**<br><br>Upper bullet: main physical characteristics of the urban space (static)<br>Lower bullet: dynamic characteristics (moving) |
|---|---|
| **Cars only** | separate very large buildings, road size for auto-capacity/<br>0 direct main route, few details, continuous open space<br>0 no street life, maximum flow of cars with high speed |
| **Traffic street** | 0 often large separate buildings, few details,<br>0 motorised traffic has priority over other users in e.g. crossings |
| **Low-density auto-oriented zone** | single-use elements, big car parking areas,<br>0 unclear definition of streetscape, zoning<br>0 motorised traffic has priority, unclear pattern of movement |
| **Hidden route** | 0 a street, trail etc. that is not generally used<br>0 no users at all |
| **Urban greenery** | 0 public green space, human-made<br>0 no motorised traffic, recreational activity |
| **Residential streets** | 0 often vegetated, quiet<br>0 calm traffic |
| **Natural space** | 0 within or by the edge of the city, view to nature<br>0 no motorised traffic, recreational activity |
| **Enclosed streetscape**<br>pedestrian priority<br>motorised traffic priority | relatively narrow, dense, inner city streets, buildings in row define clear<br>0 streetscape, frequently changing rhythm in streetscape<br>0 diverse use, activities contribute to street-life |

*The table lists eight space types typical to Reykjavík and Trondheim. The definition of the space types is based on their main physical characteristics, both static and in motion. The street names/route part names cycled in the "bike-through" tours and evaluated are listed in Appendix 9.1.3.*

I decided to send an invitation for participation to bike-clubs, organisations and several Face-book groups with interests in bicycle-commuting or sustainable transportation (see invitation in Appendix 9.1.1). The invitation letter included information about the study, such as the estimated time needed and requirements for completion. The Norwegian Social Science Data Services was also notified of the study. Participants were therefore informed that any use of data from the study was made anonymous. This included noting that participants were not photographed during the tours.

There proved to be many more bicycle groups and clubs in Reykjavík than in Trondheim and Odense. The invitations in Reykjavík were sent out in spring 2011 and were additionally advertised on the webpage of the Cycle to Work Campaign (*Hjólad í vinnuna [Cycle to work]*) which was ongoing at the same time. Two afternoon tours were organised immediately after working hours and one tour on a Saturday morning to give those who could not come after work the opportunity to participate. Invitations were sent out in autumn 2011 in both Odense and Trondheim for a tour on a Saturday morning in Odense and an afternoon tour in Trondheim. . Not enough people showed interest in participating in Odense, causing that the tour to be cancelled. Three tours approximately 10km long took place in Reykjavík (May 2011) and one in Trondheim (September 2011) with 5-7 participants each. This was considered to be the maximum number of participants for a qualitative group discussion after each tour.

Generally cycling to and from work occurs in the morning and in the afternoon. It was therefore important to choose commuting hours for the study. The timing of the afternoon tours was selected to test how congestion affected cyclist experiences. No morning hours were used since it was assumed that it would be difficult to find participants for 2.5 hours in the morning. It is, however, possible that morning experiences may have been different from afternoon experiences.

Before each cycle tour began, the people who were invited to participate (everyone who showed interest was invited) were asked to answer a few background questions (about their age, sex, frequency of cycling and reasons for cycling to work) and replied by email (see invitation letter and questionnaire in Appendix 9.1.2). The questions were asked in order to gain information about how different attitudes and experiences may have affected the individual evaluations.

The cyclists arrived at the planned starting point. There they received a map of the pre-planned route with planned stops for evaluation. They also received an evaluation form made for this study with short guidelines about what to do and a list with names of the streets/

route parts which they were asked to evaluate (see example of evaluation form in Appendix 9.1.4). I briefly explained the delivered map, the structure of the form and what they were asked to do before we went away. I cycled the route with the group and led the cyclists in a row. The evaluation was done individually at the stops. There was no conversation during the tours.

In the "bike-through" tour participants first did their evaluations individually, in order to not influence each other. The form requested that participants give an overall evaluation of both stimulating and discouraging features of their experiences on each route part where stops were made, with commuting cycling in mind. In addition, the participants could comment on what improvements could be made. At the end of the tour, each participant was asked to note on the evaluation form which street or route part (space type) they liked the most, which they disliked the most, and for what reasons.

After the cycle tour, which lasted about 70 minutes including the stops, the notes written on the evaluation forms and commuting-specific issues related to the experiences were discussed further, and in depth at an indoor meeting. During this qualitative group interview a light meal was served for the participants who were both tired and hungry. I moderated the group discussion and organised it in such a way that each route part (space type) on the form was discussed at a time around a table, where everyone explained what he/she had experienced. Experiences were also discussed in a dialogue between the participants who had both agreements and different opinions. In addition, previous experiences were discussed, of both the same streets or route parts or similar contexts. In order not to instruct the participants, my questions were directed as: "why did you think that?" or "what do you mean by what you wrote?". The overall goal was to gain clear and detailed explanations for each participant's experiences. All the interviews were recorded and transcribed afterwards and were studied together with the written evaluations.

### 3.4.2 The pre-planned routes

One of the main challenges of using the "bike-through" evaluation method was the time management of both the tour and the qualitative group interview. An additional aim was to include a sufficient number of space types in each pre-planned route. To begin with, the distance of each route was limited to 10km. I thought this was a maximum requirement for participation. At an average speed of 20km/hour, which can be seen as the usual speed in a city, this length can in principle be cycled in 30 minutes. I decided to limit the total duration

of the cycle trip with stops to about 70 minutes. Each stop lasted about 5 minutes. I therefore limited the maximum number of stops in each trip to eight. The same number of space types was defined. It was therefore of importance to choose an area for the cycle route where different urban spaces could be found and where a route could be planned within the length limit. The route of each trip was therefore not necessarily considered a logical cycling route as a whole. All the routes were located in central areas in the cities, because within these areas there were many enough distinct urban spaces that could be defined as types.

Three different routes were planned in Reykjavík, in accordance with the number of cyclists that showed interest in participating. Before planning the routes in Reykjavík I organised a meeting at a cycle club in the city and discussed different route possibilities. The routes for each group with the planned stops are shown in Appendix 9.1.3, but Table-A in the Appendix shows the route part names that were evaluated in each tour. All trips started at the same place at Hlemmur, a central bus station in the city centre. They ended at the Cafe Flóra in the Botanic Garden where the qualitative group interview took place in a closed pavilion. This end location was suggested by the Planning and Development Division of the city of Reykjavík, who offered a light meal for all participants at the cafe.

Routes One and Two in Reykjavík (see Appendix 9.1.3) were rather similar. The first street cycled in each group and the first stops are parallel alternatives, but are streets with distinct characteristics.. Because of the limited length of each tour not all the routes reached all space types within one tour. The different space types were located in different areas of the cities. Therefore Tour Three in Reykjavík is quite different from the first two, as it includes the space type “Low density auto oriented zone” at Skeifan.

One route was planned in Trondheim (see route in Appendix 9.1.3). Before the planning of the route, I met a representative from a cyclist’s association in Trondheim who gave me some advice for the choice of a convenient route for the study. The tour in Trondheim, which generally has a hilly landscape, was made through a rather flat area. Slopes require more effort from cyclists and certainly affect their experiences. Avoiding the hilly landscape in Trondheim was done in order to concentrate on the effect of the aesthetic experience and limit experience related to the effort required. It was also important to cover the planned distance within the time limit. The tour in Trondheim ended at the Trondheim municipality office of urban planning where a dinner was offered during the qualitative group interview.

### 3.4.3 Methods for interpreting the "bike-through" data

The very rich qualitative "bike-through" data of the overall experiences of every participant was great challenge for the later interpretation and presentation of the results. It was also necessary to distinguish between the different kinds of experiences.

A preliminary study was made in order to both ease the interpretation and define a terminology to describe the results. The words used by the participants, both from written notes and oral discussions, were first grouped broadly by theme into aesthetic, instrumental and kinaesthetic phenomena. The participant's uses of words were studied for each street/route part evaluated in the "bike-through" tours. Affective appraisals were identified and then linked to specific affective qualities and senses (see list of affective qualities linked to affective appraisals identified from the data in Appendix 9.3.1). In line with the themes that arose from the data, three categories were formed: 1) the ability to move, 2) visual stimuli (or lack of such stimuli), and 3) hearing and smelling stimuli.

Affective appraisals (aesthetic judgments) were identified from the data selected (see Section 2.2.1). The affective components (also called affective qualities in Section 2.3.2), and the physical feature that caused people to make the particular aesthetic judgments were also identified. The instrumental issues were identified through a comparison to the themes shown in Figure 2, Section 1.3.3.

An assessment was made as to which physical features were of significance for the participants' aesthetic experience by looking at how they judged them. The affective appraisals indicate where the linked physical features (affective quality) may be located in Russell's (1988) diagram (see Fig. 4, p. 47). The appraisals were translated by the author from Icelandic and Norwegian to English. As the participants used many of the appraisals with the same meaning as those represented in Russell's diagram, it was easy to do the positioning. In order to adapt Russell's diagram of descriptors in affective categories to the results of the "bike-through" evaluation, the original four affective categories were fine-tuned into eight.

Theoretical approaches within the field of environmental aesthetics were finally used to interpret the aesthetic meaning of the results. Three theories were used (cf. Chapter 2); the theory of instrumental determinants, the notion of distance and symbolic meaning.

## 3.5 The survey

### 3.5.1 Objectives and implementation of the survey

The objective of the survey was to explore how the aesthetics of urban spaces are involved in the perceived quality of routes that cyclists have chosen for their commutes between home and work. The objectives of, implementation and results from the survey are presented in Paper 3.

The survey conducted in this study may be seen as a combination of quantitative and qualitative approaches (see Section 3.2.1). A qualitative explanation is needed for a description of the way aesthetic values are involved in a chosen route compared to other values. The quantitative aim was to identify repetitions in experiences of similar characteristics in urban spaces of routes cyclists have chosen for their commuting. The objective was also to explore the reasons behind those experiences.

Companies were selected within the three cities, Reykjavík, Trondheim and Odense, to which invitations were sent to participate in an online survey. The survey in Reykjavík and Trondheim was open from early in June to beginning of September 2011. In Odense, the survey was open from the middle of September to the end of November 2011. An email (see invitation letter in Appendix 9.2.1) was sent to a contact in each company with a request to send information regarding the survey to all employees (not only those who were registered in the campaign). In some bigger companies or institutions, the survey was announced only on a webpage. The companies were reminded to respond 2-3 times during the period. I did not generally receive information about the number of employees who received the invitation. Participation in the survey was anonymous and the Norwegian Social Science Data Services was notified of the study.

The choice of companies was based on both their location and likeliness of showing interest in participation. First, I contacted representatives of the Cycle to Work Campaign (*Hjólad í vinnuna [Cycle to work]* ; *Sykle til jobben [Cycle to work]* ; *Vi cykler til arbejde [We cycle to work]*) in all the cities. I received from them a list of companies that were registered with participating teams in the campaign. To enhance participation in the survey I decided to select and invite companies (about 15 in each city) that had teams registered in the campaign with at least 5 employees. It proved to be more difficult in Odense to find companies willing to participate than in the other two cities. Companies in Odense were therefore not limited to participants in the "cycle to work campaign" project.

The companies chosen were located within about 3km from the inner city centre, the same area as the "bike-through" tours. The areas where the companies were located differed in their environmental characteristics, such as proximity to the city centre, proximity to natural landscapes and greenery, and proximity to traffic-dominated roads and streets. The companies chosen were also of different sizes and represented firms with few employees as well as big institutions. I assume that all of them represented knowledge enterprises and had fairly well-educated employees.

### 3.5.2 Multiple-choice and open-ended questions

Questions were formed in relation to three main themes, as the objective of the survey indicates; background questions, questions related to the importance and influence of various physical features in respondents' commuting routes, and questions about best and worst route parts. The first two question themes included 22 multiple-choice questions and the third theme three open-ended questions (see questionnaire in Appendix 9.2.2). In the background questions respondents were asked about former cycling experience, travel routines, frequency of cycling and reasons for choosing to cycle to and from work (see Section 2.3.3 about the importance of being aware of a person's lived experience). Because of the time needed to finish the survey, the background questions were limited to the listed issues. Questions related to social classes, economy, education and so on, were not asked.

Multiple choice questions were formulated in the survey, built on former studies of bicycle commuting. Several multiple choice questions were asked related to the importance and influence of various physical features in the respondent's route environment between home and work on their experiences, and attitudes and habits involving route choice. Participants also gave their route a rating from 1-6 (6 is the highest grade), in which they evaluated how good they thought their route was.

Limited knowledge exists about cyclists' aesthetic experiences. It was therefore assumed important that the survey relied on open ended questions. The questions about best and worst route sections were shown to be useful in the "bike-through" evaluation and stimulated participants to explain clearly the most distinctive differences and the reasons for their evaluations of the different space types. I therefore decided to include three open ended questions in the survey. In the first two, the respondents were asked to describe the street, the part of their route or the area on the way between home and work they liked the best when commuting, and the part they disliked the most. They also were asked to briefly describe the

reason for their reply. In the third question they could comment on additional aspects that were of major importance regarding their choice of route. The questionnaires and all the letters were made in the three languages.

### 3.5.3 Route drawings

One of the main challenges of the survey was being able to identify two sides of the reality. The routes cyclists had chosen themselves had to be identified with the possibility of afterwards studying them as a reality composed of physical elements and independent of the respondents' opinion (cf. the importance of distinguishing between two sides of reality Section 2.3.3). This was solved by collecting route drawings along with the questionnaire. Participants were asked to make a sketch of their most frequently used bike route between home and work in an online programme, "WalkJogRun.net" (WalkJugRun.net), which is linked to Google Earth. The link to Google Earth made it possible to discover the characteristics of the routes using its "Street View" function. In order to study the route chosen in relation to the respondent's attitudes and motivations it was important to link the route sketch to the individual respondent answers to the questionnaire.

I provided guidance on how to make the sketch in the programme and included this with the invitation letter for participation (see guidance in Appendix 9.2.3). The respondents were informed about the link to the WalkJogRun programme in the invitation letter as well as being given my email address. At the end of the questionnaire the respondent was asked to include his/her email address (the address that they were going to use in the next step). This was in order to link the sketch that was to be made in the next step to the questionnaire. The respondent then had to leave the questionnaire and open the WalkJogRun programme in order to make the sketch according to the guidance, and send it separately to my email address. The sketches were linked to the answers of the individual participants through the given email addresses and after that the answers were made anonymous.

The Street View device is now available for most streets used for car traffic in the case cities. In Reykjavík, this opportunity arose in 2013. Street View did, however, not exist for paths (where it is not possible to drive). The choice of such paths as cycling routes proved to be a very important part of the results, therefore I decided to explore some of the routes of the respondents in Reykjavík and in Trondheim in reality.

Invited participants were informed that the time needed to finish both questionnaire and sketch of the route was estimated to be about 15 minutes for those who cycled and only 2

minutes for non-cyclists. I considered it likely that some people would not finish the questionnaire within the given time, particularly those who were not used to following data programme instructions, using data programmes or making computer based sketches. I was aware of the problems that could occur as a result of this and looked for possibilities to make it easier to finish the questions and make the sketch by opening only one survey link. This is technically possible and has been done before, for example on behalf of the city of Reykjavík, however, this possibility proved to be too expensive for this study, because it required much work on behalf of people with specialised data programming skills. In addition, if the study had been carried out in cooperation with, for example, Reykjavík city, I estimated that the requirements for data storage of this PhD study and the security of the anonymous treatment of the data might become problematic.

### 3.5.4 Methods for interpreting the survey data

Very few multiple-choice questions gave decisive answers for the purpose of this study. Apart from that, the open-ended questions showed some very clear results. In this section, I will describe the methods for the interpretation of the results from the open-ended questions and the work with the route drawings.

The answers to the qualitative open-ended descriptions were first divided into two groups. One group included answers that were clearly related to aesthetic features and the other those answers that were related to instrumental features. The answers that fell in the aesthetic group included descriptions of best or worst route parts, where the respondents' evaluation of environmental quality or disadvantages was based on visual perception, hearing or smell. The answers that fell in the instrumental group included descriptions in which the quality of different parts of the route was evaluated on the bases of instrumental or functional qualities or the lack thereof.

The answers to the open-ended questions were compared to the route drawings. The location of the best and worst route parts sketched on the Google map was looked at. The contrasts between the best part of the route, the worst part of the route and the rest were studied. This procedure showed the most obvious different characteristics clearly (of the reality composed by physical elements).

To interpret the aesthetic meaning of the results, three theories were used from the field of environmental aesthetics (cf. Chapter 2); the theory of instrumental determinants, the notion of distance and symbolic meaning. Finally, the affective appraisals were identified

from the open-ended questions and the linked affective qualities were positioned on the modified Russell (1988) diagram. In this way, the categorical aesthetic quality within the diagram (see Figs 6-7, Section 2.3.2) was found for each physical feature that had been aesthetically judged.

# 4. Summary of papers

## 4.1 Paper 1

Stefansdottir, Harpa (manuscript March 2014). A theoretical perspective on how bicycle commuters might experience aesthetic features of urban space. *Journal of Urban Design*, accepted March 2014.
Estimated publication date in special issue titled 'Spatial Quality'
– 09 Jul 2014 (Online), 31 Jul 2014 (Print)

In this paper a conceptual framework was laid out for studies of the aesthetic experience of commuting bicyclists. The definition of components of the framework was based on three theoretical fields: 1) phenomenology of sensory perception and experience, 2) urban design theory, and 3) theory of environmental aesthetics. None of these theories can by themselves elucidate the aesthetic experience of commuting cyclists in a satisfactory manner but, when put together, the theories complement each other and explain various aspects involved. Relating earlier studies on cycling to the above-mentioned theories revealed the ways in which cycling may affect how the senses work and how perception of the environment can be interpreted in terms of aesthetic meaning. In particular, speed affects this perception.

Theories of perception and experience as phenomena gave insight into sensory perception and aided the interpretation of sensory information into meaning, explaining how perception is shaped by both cultural and individual motives. Such motives may include commuting as the main purpose of cycling as well as other reasons for choosing the bicycle as a transport mode. The phenomenology of sensory perception and experience also describes the relationship between a person's perception and the environment by looking at the spatial engagement of the body. From this viewpoint the perceiver senses the various objects in the environment through their relative position. The extent to which cyclists are conscious of potentially interesting aesthetic features in urban space is affected by other features in the environment that demand attention from the person cycling.

Theories within the field of urban design are instructive with respect to the manner that travelling speed affects the readability (visual perception) of the physical environment by the traveller and how elements can be organised into a total structure in the mind of the person travelling.

In the paper it was suggested that aesthetic features in urban space experienced by commuting cyclists bear strong relation to their expectations and attitudes towards their trip.

Neither phenomenology nor the urban design theory focused specifically on aesthetic experience. For this purpose three theories were considered within the field of environmental aesthetics, those of; 1) the influence of instrumental determinants, 2) the notion of distance, and 3) symbolic meaning. From the viewpoint of the first theory it was expected that a satisfying instrumental quality in bicycle routes is a precondition for the pleasurable aesthetic experience of a cyclist. From the second viewpoint it was suggested, based on the idea that cycling is a multisensory phenomenon, that the *participatory landscape* (at close proximity) is more likely than the *visual landscape* at distance to stimulate cyclists' aesthetic experience in a positive manner.

The features in urban space that influence the commuting cyclists' aesthetic experience constitute a complex combination of the different variables discussed in the paper, as shown in the conceptual framework in Figure 5.

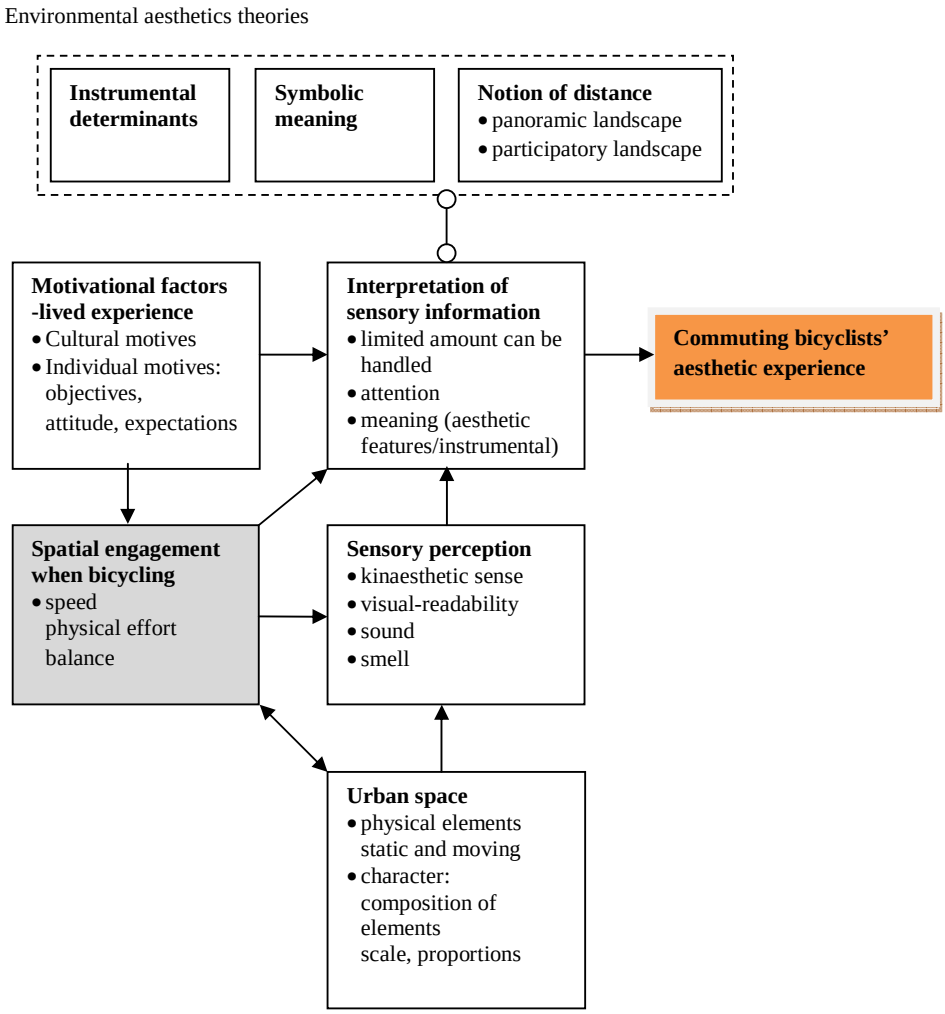


Figure 5: The aesthetic experience of commuting cyclists, a conceptual framework

*The figure provides an overall scheme for evaluation of the commuting cyclist's aesthetic experience and how this evaluation is linked to theories of symbolic meaning, instrumental determinants and notion of distance. Boxes represent themes. Black arrows that point from one theme box to another indicate that the themes at arrow heads are influenced by the themes at arrow tails. The theories represent the tool used to evaluate the interpretation of sensory information by the commuting cyclist into aesthetic meaning.*

## 4.2 Paper 2

Stefansdottir, Harpa (version April 2014). Features of urban spaces and commuting bicyclists' aesthetic experiences. *Nordic Journal of Architectural Research*, accepted July 2013. [1]

In this paper new insight was provided into how features of urban spaces stimulate cyclists' aesthetic experiences when commuting, which features are experienced as aesthetically pleasant and which have the opposite effect. In addition, the study explores the most preferred and disliked space types and their categorical position within the Russell (1988) diagram of descriptors of the affective quality of environments (see Fig. 4).

The paper introduces a new method called "bike-through" evaluation. The results are based on data from four bike-through tours conducted with invited participants who cycled pre-planned routes in Reykjavík and Trondheim. An attempt was made in this paper to divide the varied and complex urban spaces into types on the basis of their main physical characteristics, both static and moving, in order to facilitate analysis of the features judged to be of importance for aesthetic experience (see Table 2, p. 63). Up to eight of the different urban space types were evaluated in each tour. The data consists of both individual comments from the participants, written on special evaluation forms made for this study, and qualitative group interviews undertaken after each of the cycling tours.

The interpretation of the "bike-through" data was based on theories within the field of environmental aesthetics, mainly using the methodological approach of Russell and colleagues to affective quality (Russell & Pratt 1980; Russell et al. 1981; Russell 1988). By identifying affective appraisals in the cyclists' evaluations an assessment was made as to which physical features were of significance for their aesthetic experience and how the different physical features were judged. The affective appraisals indicated where the linked physical features (affective quality) may be positioned in Russell's (1988) diagram (see Fig. 4, p. 47). A modified Russell (1988) diagram, divided into eight affective categories instead of four, represents a simplified summary of the physical features most frequently mentioned and linked to the participants' aesthetic judgments (see Fig. 6, p. 84)

The results clearly demonstrate that the most important features in urban space, as

[1] The article was published in September 2014: Stefánsdóttir, H. (2014). Features of urban spaces and commuting bicyclists' aesthetic experience. *Nordic Journal of Architectural Research,* No. 1 (2014), Vol. 26

considered aesthetically pleasing, include vegetation, views of nature, historical buildings and places, clearly defined streetscapes, and seeing other people at some distance. In comparison, features that have the opposite effect are related to car-dominated places and congested streets with car traffic. Most of the urban space types investigated included features that influenced aesthetic judgment in more than one category of the modified Russell diagram (Fig. 8, p. 88). Of the eight urban space types (listed in Table 1, p. 60), those that were considered most attractive in every respect were “Urban greenery” and “Natural space” while the space type “Low-density auto-orientated zone” and the “Enclosed streetscape” with congested traffic were regarded as the worst overall.

The study shows that the aesthetic experience of commuting cyclists is a complex phenomenon. The urban space that stimulates best aesthetic experience has at the same time features judged as being aesthetically stimulating and features that do not reduce pleasant aesthetic experience. In essence, an acceptable instrumental quality of a bicycle route favours experiencing aesthetic qualities. Also, overwhelming dominance of motorised traffic and an obvious priority of cars clearly had negative visual, sound and smell influences as well as aesthetically negative symbolic meaning.

## 4.3 Paper 3

Stefansdottir, Harpa (version January 2014). Urban routes and commuting bicyclists' aesthetic experiences. *Form Akademisk,* in review since January 2014. [2]

The objective of the study presented in this paper was to examine whether, and in what way, aesthetic experience is involved in the judged quality of the routes that bicyclists have chosen to ride between home and work. For this purpose an online survey was conducted in Odense, Trondheim and Reykjavík. The innovative method used to interpret the survey results involved connecting the participants' answers to multiple-choice and open-ended questions with sketches of their route, the characteristics of which could be viewed in Google Street View.

Replies to open-ended questions about the best and worst route sections and the reasons for these opinions were the focus of the interpretation of the survey data. In this respect it was important to distinguish aesthetic experience from experiences related to the influence of instrumental features. For this purpose, the replies were divided into groups by the two themes, aesthetic and instrumental. An assessment was also made of the extent to which the different physical features were of importance for the cyclists' aesthetic experiences, based on how these features were judged by the respondents. This was done by abstracting affective appraisals from the open-ended questions and determining their categorical position within the modified Russell (1988) diagram (Fig. 4, p. 47). An interpretation of the aesthetic meaning of the results is proposed through the application of theories within the field of environmental aesthetics.

The results of the survey indicated that aesthetic experience was of value to most of the respondents and constituted an important contribution to the quality of a cycling route for commuting in all three cities. For approximately half of the respondents in all cities, the perceived best part of the route turned out to be related to aesthetic features. The worst parts were, conversely, most often related to the lack of instrumental qualities such as safety or the presence of too many forced stops because of traffic lights. Approximately one fifth of the

[2] The article was published in July 2014: Stefánsdóttir, H. (2014). Urban routes and commuting bicyclist's aesthetic experience. *FORMakademisk,* 7(2).

answers about the worst parts were however related to aesthetic experience, including features that produced negative sounds and smells.

Vegetation and vicinity to the natural environment were the most important aesthetically pleasant features. In general, proximity to traffic seemed to be the most negative factor affecting cyclists' emotional well-being. Examination of the route sketches showed that the cyclists tended to move away from uncomfortable sensual experiences caused by proximity to motorised traffic into an environment characterised by vegetation and the possibility of experiencing nature, fresh air, quietness or positively valued sounds.

The results showed that the cyclists' choices of the best and worst route parts included features associated with the affective categories 'Pleasant' and 'Relaxing' on the modified Russell diagram, while the worst ones include characteristics associated with the affective categories 'Distressing' and 'Gloomy' (see Fig. 8, p. 88). No urban space fell into the category 'Unpleasant', potentially because the cyclists may have avoided such routes.

Finally, three theories from the field of environmental aesthetics were used to interpret the aesthetic meaning of the data (cf. Chapter 2): the theory of instrumental determinants, the notion of distance and symbolic meaning. The results indicated that a satisfying instrumental quality in bicycle routes is a precondition for the choice of an aesthetically pleasing route. In areas where overwhelming priority given to the private car was reflected in the character of the environment, this was found to symbolise the way in which the environment meets the needs of motorised transport before cyclists, causing cyclists to feel unwelcome. Urban spaces visually divided from motorised traffic streets or roads with a row of trees, were experienced as aesthetically pleasant.

# 5. Results

All three papers contribute to answering the main research question of this study: How do the physical features of urban spaces influence commuting cyclists' experience in terms of aesthetic meaning, what are these features, and how is such an experience of importance for their evaluation of the quality of their commuting routes?

The main findings are presented in Section 5.1 and explained further in steps. First, the empirical results about the identified features of urban spaces that influence commuting cyclists' aesthetic experience are presented, then the aesthetic quality of their surrounding urban space types, and finally the importance of aesthetically stimulating urban spaces for cyclists' evaluations of route quality. The aesthetic meaning of the results is then discussed from the perspective of the theoretical approach chosen for this study and presented in Paper 1. The methods used in Papers 2 and 3 had different aims, but overlap and conclude with equivalent results.

In Section 5.2, the relevance of the theories and methods used in this study and their contribution to research in the field are discussed. In Section 5.3, dynamic influences and implications for planning policy are discussed. In Section 5.4, the limitations of the study are reflected on.

## 5.1 Main findings

The results of the study show that several features were judged as aesthetically favourable for commuting cyclists. For visual stimulation these features include vegetation, views of nature, historical buildings and places, clearly defined streetscapes, and seeing other people at a distance. For stimuli of sound and smell, either calm traffic only or no traffic at all close by are preferred. Quietness, sounds from leaves and birds, and the smell of vegetation were appreciated. A lack of the aesthetically favourable features mentioned as well as proximity to an overwhelmingly car-dominated environment was felt to create a boring urban space for commuting cycling. Aesthetically favourable features can alter the character of commuting by bicycle in a very positive manner when several other requirements are fulfilled.

Aesthetically favourable features have value particularly when they are experienced at close proximity, in a participatory landscape. Aesthetic stimulation occurs when the environment does not require too much attention on behalf of the cyclist for determining

further movement, such as those environments characterized by a lack of functional quality in the route, much traffic and unpredictable movement by other travelling people.

Aesthetically favourable urban spaces include one or more of the aesthetically favourable features and at the same time are of an acceptable functional quality, including, for example, the opportunity to remain in a constant pace on the bicycle and not requiring attention that reduces the perception of possible aesthetic features. Such urban spaces are of high importance for the quality of a bicycle route and the longer part of the total route length, the better. However, changing characteristics in urban spaces also have value. Too monotonous a route, where cyclists can cycle continuously with little stimulation or any need for attention, can become boring.

The data consists of "bike-through" evaluations and survey responses. The former include both written and oral data from 21 participants altogether in four "bike-through" tours in Reykjavík and Trondheim. The survey responses are from 276 employees from 29 companies altogether in the three cities, Reykjavík, Trondheim and Odense.

### 5.1.1 Features of urban spaces that influence the aesthetic experience of commuting cyclists

Aesthetically judged physical features were abstracted from the "bike-through" data. The visual features which stimulated a pleasant aesthetic experience included vegetation, views of nature, historical buildings and places, clearly defined streetscapes and seeing other people at some distance. For stimuli by sound and smell, either calm traffic only, or no traffic close by, were preferred. Quietness was valued as pleasant, sounds from leaves and birds were appreciated, as well as the smells from vegetation. An overwhelming dominance of motorised traffic and an obvious priority for cars clearly had negative visual, sound and smell connotations. The features that stimulated the perception of the aesthetically appreciated features were related to the functional quality of the route and the degree of attention needed to control oneself with respect to other travelling people.

The results from the two cities where the "bike-through" tours were conducted show similar outcomes. My experience, however, in discussion with the cyclists in Trondheim, was that they had higher expectations and demands of the instrumental quality of the routes than did the cyclists in Reykjavík, and that they were more restrictive in their opinions from this viewpoint. Norms and standards for instrumental improvements have likely been discussed and realised for a longer time in Trondheim than in Reykjavík.

Similar outcomes were reflected from the survey as in the “bike-through” evaluations. Replies to open-ended survey questions indicated that aesthetically appreciated features include quietness, vegetation and proximity to natural elements. Distance from heavy traffic was also important for a pleasant aesthetic experience. This was the case for all the three cities. Comments about the worst places, interpreted as lacking aesthetic quality, concerned proximity to motorised traffic, pollution and noise, and a car-dominated environment. According to the survey results, to stimulate the aesthetically pleasing experience during long-distance cycling from suburban areas, continuous green structures were important.

All the affective qualities (all the physical features) identified from the “bike-through” data were summarised in one diagram (see Appendix 9.3.3). This diagram became too detailed to present in a paper and would perhaps also be confusing to a reader. I therefore decided to summarise the most important affective qualities. The modified Russell diagram (Fig. 6) represents a simplified summary of the physical features most frequently mentioned by the participants in the “bike-through” evaluations, as linked to their aesthetic judgment. I consider the figure to be representative of the most important influential features, and therefore a valid illustration of the main results.

Aesthetically judged physical features were also abstracted from the respondents’ answers to the open-ended survey questions about the best and the worst parts of their routes. The modified Russell diagram (Fig. 7) represents a summary of the most frequently mentioned physical features from the survey. Both diagrams (Fig. 6 and Fig. 7) show that the judged aesthetic qualities of the urban spaces encompassed a wide spectrum of emotional responses that orient towards two of the vertical directions of the Russell diagram, ‘Arousing’ and ‘Sleepy’.

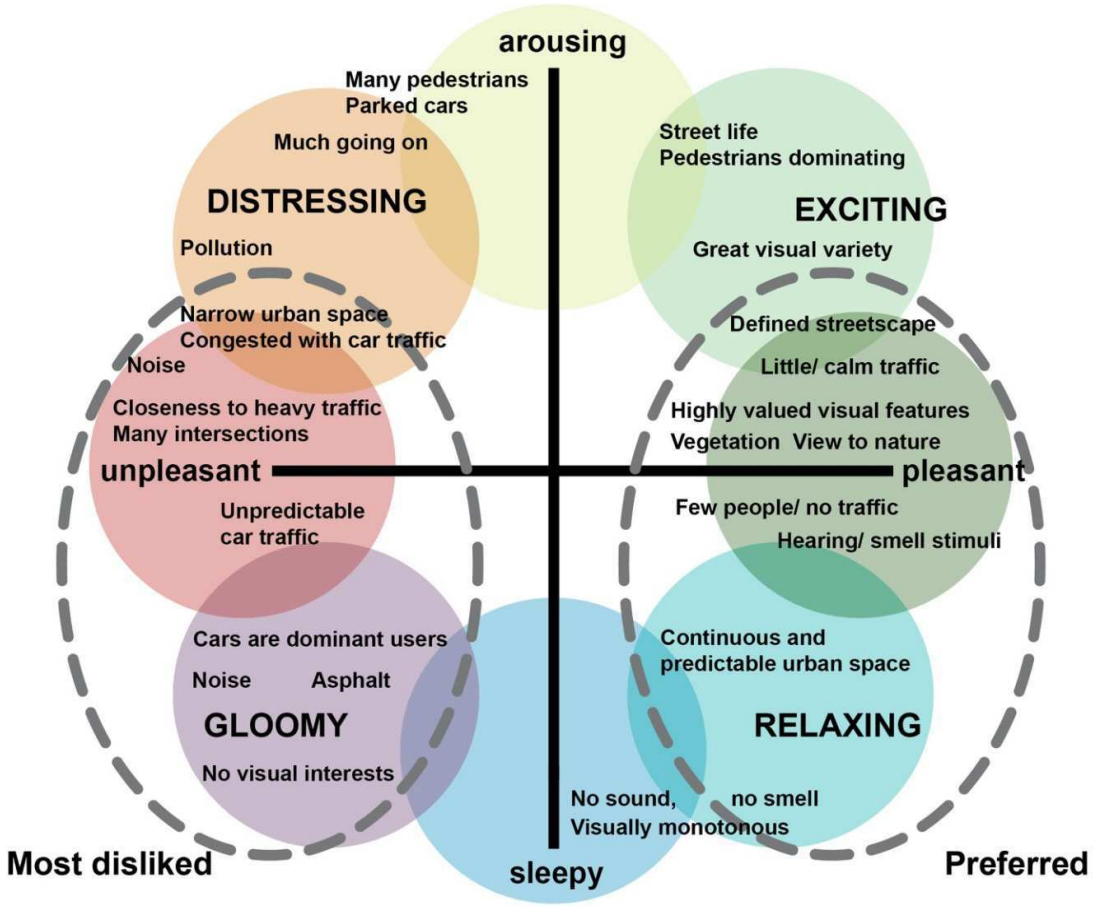


Figure 6: Modified Russell diagram of descriptors in affective categories, results from the "bike-through" evaluation

*The diagram shows the eight affective categories (coloured circles) used in this study. The categorical position of the most important physical features of the urban space obtained from the "bike-through" evaluation are shown on the diagram with small lowercase letters. The two grey circles embrace an important outcome of the "bike-through" evaluation. The circle to the left matches the results of the most disliked routes, ranging from Gloomy to Unpleasant, and to the right the preferred urban spaces ranging from Relaxing to Pleasant.*

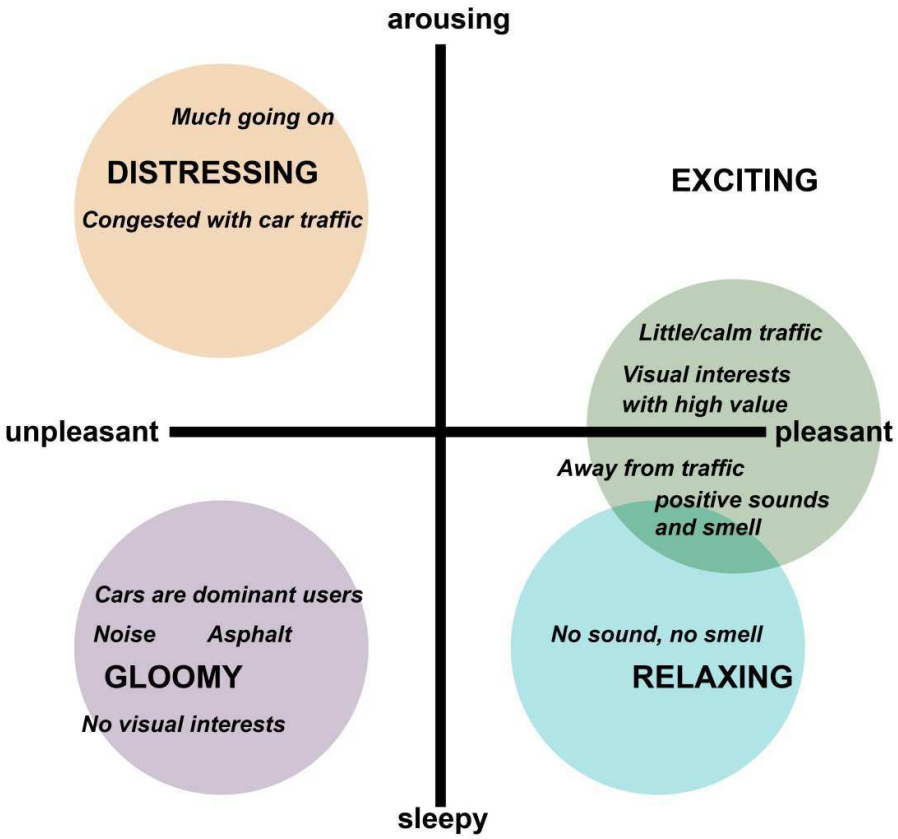


Figure 7: Modified Russell diagram of descriptors in affective categories, results from the survey

*The most important physical features of the urban space for aesthetic experience obtained from the open ended survey questions are shown in the diagram within their categorical position.*

Results about stimulating and discouraging features for aesthetic experience from the survey are equivalent to those of the "bike-through" evaluation, but less detailed. The "bike-through" results stem from a detailed evaluation (oral and written) of all kinds of urban spaces that cyclists would not necessarily have chosen themselves. The results from the survey (Fig. 7) stem only from evaluation of best and worst parts of the routes cyclists have selected themselves and used for their commutes. It is, for example, likely that the cyclists have avoided the most unpleasant routes, therefore such routes were not a part of their evaluation.

Of the 276 respondents of the survey, 109 made sketches of their commuting routes. Very few of the routes sketched were through city centres, which may be a reason for the absence of pedestrians and street life features from the diagram (Fig. 7). Many route sketches showed comparatively long distance routes from the suburban areas in both cities. The diagram also shows features of only the best and worst route parts. According to the "bike-through" results, pedestrians or street-life close by were not part of the most preferred or disliked features (they were closer to the 'Arousing' category). Features that are usual in inner city urban spaces with congested traffic and/or many pedestrians were often mentioned in the "bike-through" data as hindrances for continuous or predictable forward movement. Notably, the routes through the inner-city centres on the "bike-through" tours were seldom along segregated paths or lanes for cyclists only. Hindrances to continuous movement (constant pace) mentioned included many intersections, pedestrians who move in an unpredictable manner, speed bumps, bad surfaces and parked cars that could begin reversing. What all these features have in common is that they require much attention from cyclists to determine the space ahead for further movement. These are the discouraging features that reduce or hinder the experience of features that have in other cases, where the urban space require less attention, been judged as aesthetically pleasant.

Attractive scenery ranged from 'some' to 'high' importance for most of the cyclists participating in the survey, and it was slightly more important to women than men. The participants were asked which of the following elements in the environment they would prefer to experience while they bicycle to or from work: driving cars, quietness, view, buildings, vegetation/trees, pedestrians or other cyclists. Vegetation/trees were found by far to be the most favoured feature to experience in all three cities, or for 46% of the participants. Twenty two per cent of the participants in all cities thought quietness was the most important feature of their experience. View was also important to some people. Altogether, 16% of the participants in all cities thought view was most important in the experience. Vegetation/trees,

was most important to the respondents in Odense and quietness was least important to women in Odense, or to 4 %.

The results indicate that stimulation by highly valued visual features is of importance when commuting by bicycle. The high value given to vegetation may be related to hearing and smell stimuli in addition to vision. Vegetation produces stimulating smells and rustling in leaves and suggests birds nestling in the trees. The results from both the "bike-through" evaluation and the survey's open ended questions indicated the same things as the multiple choice questions, that quietness was appreciated while noise and pollution, which most often comes from driving cars, was found to be unpleasant.

### 5.1.2 The aesthetic quality of the urban space types

Generally, up to three distinct streets/route sections were tested in the "bike-through" evaluation for each of the eight space types listed up in Table 2 (p. 63). Diagrams of the affective qualities identified were first made separately for each street/route section. Examples from this preliminary study of the affective qualities identified can be viewed in Appendix 9.3.2. The results from each street/route section, defined within the same "space type" category, most often demonstrated similar results. The small differences (see Appendix 9.1.3, Table-A) may obviously be due to some variation within each category of streets/route parts tested and categorised as a particular space type for the purpose of this study. Some of the streets/route parts could, for example, belong to more than one "space type" category. Some of the spaces studied and defined within the same category received very distinctive evaluations (see Appendix 9.3.2). Notably, the evaluation of the streets/route parts visualised in the modified Russell diagram is based on aesthetic judgments only. Some street/route parts within the same "space type" category include important aesthetic qualities and some do not.

The results from each street/route part were summarised in one diagram. This summary was considered to give insight into the most important influential features for each "space type", as defined in this study, and their categorical position within the modified Russell diagram. Most of the urban space types investigated in the "bike-through" evaluation included features that influenced aesthetic judgment in more than one of the affective categories of the modified Russell diagram (see Fig. 8).

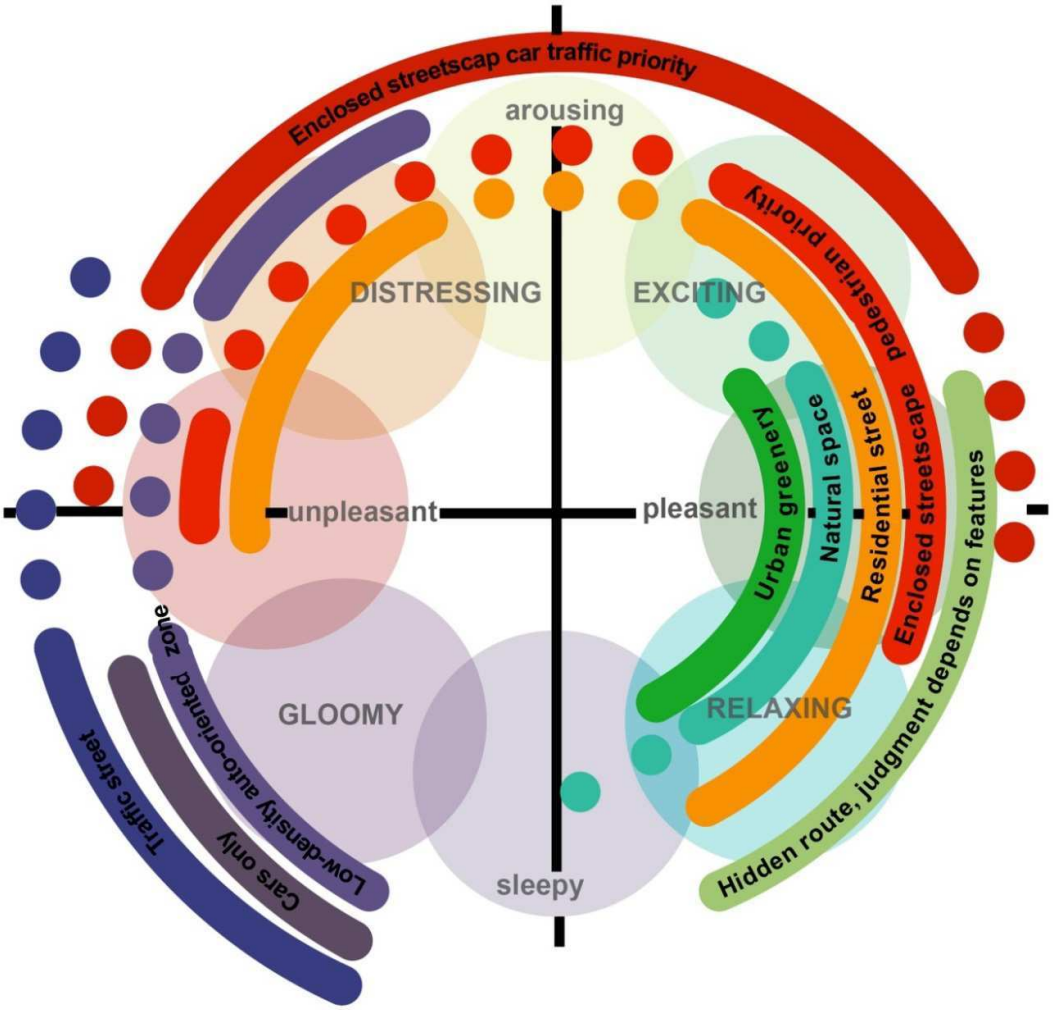


Figure 8: Commuting cyclists' evaluation of space types located in the modified Russell (1988) diagram of descriptors in affective categories

*Most of the urban space types investigated included features that influenced aesthetic judgment in more than one affective category (see the features in Figure 8). The text along the curves shows urban space types. When the curves are continuous the features that characterise each type are generally mentioned by the cyclists participating in the bike-through tours, and when broken into dots they are sometimes mentioned.*

Of the eight urban space types listed in Table 2 (p. 63), those that were considered most attractive in every respect were “Urban greenery” and “Natural space”. The “Residential street” also had many aesthetically stimulating features, but many instrumental disadvantages. Two paths defined as “Hidden routes” were tested in the “bike-through” tours. Most participants focused mainly on, and were sceptical of, instrumental quality, and nearly all

were cycling the two routes tested in Reykjavík for the first time. They appreciated the aesthetic qualities along the route. A participant who was familiar with one of the route parts investigated and classified as “Hidden route” developed a different and more positive experience of it (see Fig. 9, p. 91). The street types “Cars only” and “Traffic street” were regarded as discouraging from an aesthetic viewpoint, but often they were found to have positive functional features such as separate and continuous bike lanes. The “Low-density auto-oriented zone” lacked aesthetically appreciated features and was instrumentally unfavourable. It should be noted that the size and dominant use of the “Urban greenery” space type was important for its quality. The narrow paths of the “Urban greenery” type and routes shared with pedestrians (see the “Urban greenery” space type Fig. 9 (p. 91) tested in the tours in Reykjavík) were found to have disadvantages. Here most of the participating cyclists were sceptical and explained that their route ahead was not predictable for desired cycling speed when they felt that they could expect pedestrians to jump in the way. They emphasised that it was important to be able to depend on travel time, particularly when cycling to work. One woman said she chose the route along the university campus (the "Urban greenery” route to the right in Fig. 9), particularly because she preferred it in bad weather to a parallel route along a traffic street, because the vegetation and the buildings along the route protected her from the weather. She also appreciated the aesthetically pleasant character of the route.

The space types regarded as worst overall were the “Low-density auto-oriented zone” and the “Enclosed streetscapes” with congested traffic. The former zone lacked aesthetically stimulating features and was instrumentally unfavourable. The “Enclosed streetscape” was experienced in different ways depending on how it was occupied by different user groups and how crowded it was.

Some features in the urban spaces had a discouraging influence on the cyclist’s aesthetic experiences. The “Enclosed streetscape” suffered from the fact that the cyclist’s attention was so much focused on working out the space ahead for continuous movement that they lacked the opportunity to observe features that were in other cases judged as aesthetically pleasant (positioned within the category “Pleasant” within the modified Russell diagram in Figure 8). Here, there was a great difference between the reality perceived from the immediate response and the reality composed of physical elements (cf. Section 2.3.3 about the importance of distinguishing between the two sides of reality). A similar example occurred at the Elgeseter Bridge in Trondheim where there is a panoramic view to the Nidelva river. A woman in the “bike-through” group who had not cycled this route before said she did not think about the wonderful view to the river when she cycled along the river. In the qualitative

group interview she noted that she had been occupied determining the path, the functional part of the cycling route. The results of the "bike-through" evaluation indicate that participants cycling a route for the first time are focused on determining the instrumental qualities of the route, while those who were used to cycling the routes had more attention available to notice aesthetic features.

The survey did not aim to study space types, however, the answers from the open-ended questions about best and worst route parts can be compared to the results from the "bike-through" evaluation. The results are in this respect equivalent, concerning the most aesthetically stimulating space types, "Urban greenery" and "Natural space", and the most disliked space types where cars were the dominant users.

In the inner city, the bicycle routes running through urban parks or routes that were separated from motorised traffic by trees or green areas were found to be aesthetically pleasant. The division of urban spaces from motorised traffic roads with rows of trees as barriers had a positive effect on the cyclists' aesthetic experiences. Continuous green structures were important for stimulating a pleasant aesthetic experience in suburban areas. These urban spaces may be categorised as "Urban greenery" space types.

Paths along the Ellidaárdalur valley and along the coast in Reykjavík were also frequently described as the best route parts. The best part of the route in Trondheim was also frequently identified as being the stretch when the cyclist crossed or came close to the Nidelva river. These route parts may be categorised as "Natural space" types. The spaces mentioned here are generally at some distance from or away from motorised traffic.

Comments about the worst places concerned proximity to motorised traffic, pollution and noise. The places mentioned in this vein may have been categorised as "Traffic streets" or "Cars only" space types. The urban spaces that could be interpreted as lacking aesthetic quality were described in the appraisals as 'boring' or 'ugly' and referred to human-made environments constructed of concrete and overwhelmingly car-oriented landscapes. The survey's open-ended questions only considered the best and worst route parts. This may explain why space types other than those mentioned above were not considered in the replies.

Figure 9 shows several urban spaces from the study.

Figure 9: Examples of urban spaces from the study

**Cars only**

*New Hringbraut in Reykjavík is an example of a route which is instrumentally favourable (note, the space type name refers to the character of the urban space but not its instrumental quality). This route also represents an urban space that could be interpreted as lacking aesthetic quality, often described by the appraisal "boring" or "ugly" in the data. The appraisals refer to a human made environment constructed of concrete and an overwhelmingly car-oriented landscape that symbolises the priority of car use.*

**Traffic street**

*To the left: Sudurlandsbraut in Reykjavík was described in the appraisals as "boring" and "monotonous". The street has heavy traffic close by, many intersections and traffic lights and little for cyclists to experience at close proximity other than closeness to car traffic, pollution and noise. As the appraisals indicate, this traffic street is positioned in the category "Gloomy" within the diagram in Fig. 6A.*

*To the right: From the route along the Elgeseter Bridge in Trondheim there is a panoramic view to the Nidelva river. A woman in the "bike-through" group who had not cycled this route before said she did not think about the wonderful view to the river when she cycled along the bridge. The results from the "bike-through" evaluation indicate that more attention becomes available to notice aesthetic feature when participants are familiar with a route.*

**Low density auto oriented zone**

*The new cycling route at Brattøra in Trondheim also symbolises the priority of car use. As does Hringbraut, the route has a segregated lane for cycling, however, the cyclists in Trondheim commonly classified this route as the worst in the "bike-through" tour in Trondheim because they experienced their needs as not reflected in the recent design of the traffic system. Motorised traffic had first priority and cyclists were on the premises of pedestrians, being forced to cycle along the pavement and taking detours because of the many roundabouts through which the cars drove easily. Sometimes cyclists were also forced to dismount their bicycle and to walk over the walkways whilst pulling the bike along.*

**Hidden route**

*Old Njardargata in Reykjavík is no longer in use, but could serve cyclists well because it is more direct, quieter and calmer than the nearby planned routes along traffic roads. Considering the experience of a "Hidden route" aimed to explore whether the participants were familiar with alternative routes to those actually planned for cycling and how the unknown would influence their experience. This route was aesthetically appreciated, but participants were sceptical of its instrumental quality for commuting purposes. This may be related to the fact that most of the participants were cycling the route for the first time. A female participant who was familiar with the environment and was used to choosing this route developed a different and more positive experience of the route.*

**Urban greenery**

*To the left: Laugardalur Reykjavík. Of the eight urban space types listed in Table 2, those that were considered most attractive in every respect were "Urban greenery" and "Natural space". Vegetation was a highly valued aesthetic feature.*

*To the right: Tree-tunnel at the campus of the University of Iceland. The narrow paths of the "Urban greenery type", shared with pedestrians, were found to have disadvantages. Most participants said the route ahead was not predictable for desired cycling speeds because they felt that they could expect pedestrians to jump in the way.*

**Residential street**

*To the left: Gunnarsbraut Reykjavík.*

*To the right: Nedre Møllenberggate Trondheim.*

*The "Residential street" also had many aesthetically stimulating features (e.g. vegetation and quietness). At the same time it had many instrumental disadvantages such as speed bumps, many parked cars that could reverse at any time and many crossings where traffic could be expected from the sides. This reduced the opportunity of continuous and relaxed cycling.*

**Natural space**

*To the left: Ægissída Reykjavík. The view of nature was generally appreciated. The very open space was found to have disadvantages in windy weather, causing some people to avoid the route.*

*To the right: Nidelva River, Trondheim. Proximity to the river landscape in Trondheim was greatly appreciated according to both "bike-through" and survey results. Because of the gravel surface, a woman on the "bike-through" tour said she would avoid this route on the way to work in a rainy weather to ensure clean clothes. This is one example among many from the study that indicate the importance of instrumental values before aesthetic.*

**Enclosed streetscape dominated by pedestrians**

*To the left: Laugavegur shopping street, Reykjavík*

*To the right: Bakklandet, Trondheim.*

*The "Enclosed streetscape" generally suffered from the fact that cyclist's attention was occupied by determining further movement due to the pedestrians or cars that came from every direction. They thus did not always notice features that they had judged as aesthetically pleasant in other places. In Bakklandet the participants also complained about the cobblestones that covered the street surface and which they thought was very bad (from an instrumental viewpoint).*

### 5.1.3 The importance of aesthetically stimulating urban spaces for bicyclists' evaluation of route quality

It was the objective of the survey to discover how aesthetic experiences were involved in the perceived quality of the routes cyclists choose for their commutes.

Altogether 194 participants (of a total of 276 participants) answered the open-ended question about the best part of their route, and 192 answered the question about the worst part. Among approximately half the respondents in all three cities, the best perceived part of the route turned out to be related to aesthetic features (with about one quarter including both aesthetic and instrumental features). A smaller portion, about one fifth of the answers about the worst part, related to features that produced negative sounds and smells. Comments about the worst parts of streets, were, however, most often related to a lack of instrumental qualities such as safety or the presence of too many forced stops because of traffic lights.

Aesthetics therefore constituted an important contribution to the quality of a cycling route for commuting in all three cities in the survey. In all cities, the best parts of routes were often associated with moving away from motorised traffic into a more vegetated and quieter environment. In the inner city, bicycle routes running through urban parks or routes that were separated from motorised traffic by trees or green areas were contributing factors to stimulating an aesthetically pleasant experience for commuters. During long-distance cycling from suburban areas, continuous green areas were important. The results of the survey also indicated that participants with the opportunity to experience aesthetically pleasing urban spaces on a longer part of their routes, accompanied by a continuous infrastructure for cycling with few stops, rated the quality of their routes more highly than those having only brief parts through aesthetically appreciated urban spaces.

### 5.1.4 Motivational influences

The aesthetic meaning of elements perceived by a commuting cyclist is shaped by both cultural and individual motives. Such motivational factors may include, for example, cycling culture in the cities studied, the respondent's/participant's cycling experience, expectations of the environment, and purposes and reasons for cycling. Such purposes involve the reasons for choosing to use the bicycle as a travel mode, such as time saving or fitness.

The participants who attended the three "bike-through" tours in Reykjavík were 4 women and 10 men, from 33-56 years old. The participants in the single tour organised in Trondheim were 3 women and 4 men, aged 38-55. Participants were therefore middle-aged in

both cases and a few more men than women participated. The majority of the 276 respondents of the survey were middle aged, frequent cyclists who cycled to and from work for fitness reasons, because they like the lifestyle or because it is environmentally friendly. Many of the route drawings showed that many respondents cycled long distances, which indicated that they were in good shape.

I rarely received information about how many people received the invitation to take part in the survey, but it is clear that only a small number did respond. Most of the respondents were experienced middle-aged cyclists. A few more men than women responded.

Results from the background questionnaire for the "bike-through" groups (Appendix 9.1.2) and the survey questionnaire (Appendix 9.2.2) show similar reasons for choosing to cycle to and from work. The reasons were most often related to fitness aims and because participants liked the lifestyle. Some participants also related their choice to commute by bicycle to its environmental friendliness. Enforced reasons for choosing to cycle were seldom mentioned, such as limited access to parking or economic reasons. The above-mentioned attitudes may have influenced the cyclists' expectations of the environment and thus influenced their opinion of the value of a pleasant aesthetic experience when commuting, and which features were aesthetically appreciated.

No decisive differences were found when the results from the survey background questions (age, sex, cycling experience and frequency) were compared to attitudes towards the value of visual experience. No outstanding differences were found when the interpreted results of the open-ended questions, related to the valuation of aesthetics, were compared to the results from the background questions.

### 5.1.5 The aesthetic meaning of the results

Experience that has aesthetic meaning involves the meanings or values associated with certain features or characteristics that influence aesthetic experience. The underlying reasons for the aesthetic experiences are important for environmental planning. By applying theories within the field of environmental aesthetics to the results it may be possible to interpret how, why and for what reason the different features of urban spaces may have an aesthetic meaning in the bicyclists' minds and so influence their aesthetic judgments. Theories include the notion of distance, theory of instrumental determinants and theory of symbolic meaning (see Section 2.3.2).

Vegetation was the element most participants in all three cities preferred to experience when cycling. This is in line with the results of earlier studies which came to the conclusion that vegetation and objects in nature produce a pleasant aesthetic experience (e.g. Gobster & Chenoweth, 1990; Kaplan & Kaplan, 1989).

Symbolically, trees can be, among other things, important representatives of nature in the city. The pleasant aesthetic experience that trees and other vegetation can offer might play an important part in achieving mental restoration on the way between home and work. The characteristics of trees with their soft textured leaves filtering and reflecting light, producing an ever-changing pattern, provides a contrast to the grey, hard and statically constructed environment. The importance of nature, both for its ability to create emotionally relaxing environments and to be a symbol of nature in the city, may be strongly related to the motivations of the participants in the studies for choosing the bicycle for their commute. Recreation in nature is also a very integrated part in the culture of the countries of this study. With other groups of participants, such as young people who are interested in making stops at cafes and enjoying city street life on the way home, the results might have been different.

The participants indicated that spaces with overwhelming priority given to the private car were reflected in the character of the environment, in the amount of motorised traffic, in the size of the infrastructure reserved for cars and in the constructed environment. Comments from participants confirmed that this symbolised the priority of motorised vehicles and clearly reflected a story demonstrating how unwelcome transport modes other than cars were to use these environments.

Cyclists evaluate the quality of the environment in accordance with their expectations and attitudes towards it. If a cyclist's motivation for commuting to work is fitness and lifestyle quality, which is the most frequent reason given in this study, cycling in an overwhelmingly car-dominated environment with noise and pollution works against this aim. Conversely, the vegetated and continuous route, undisturbed, with stimulating visual experience, fresh air, nice smells and sounds, away from traffic supports it.

Many of the qualitative answers in the survey point in this direction. For example a male participant in Reykjavík said that he would ideally like to be able to cycle farther away from the main roads because of dust and soot pollution. Aesthetically pleasant features would make him happier as a cyclist, but because the instrumental conditions for cycling have not reached a satisfying level at the "wonderful" places, he can't use them.

The theory on the notion of distance (Berleant 1988) revealed how nearby elements were perceived differently than those further away. The theory suggests that the participatory

landscape draws on kinaesthetic responses as well as hearing, smelling and vision. Earlier studies have found that cycling is a multisensory phenomenon and that the kinaesthetic experience is of particular importance. It was therefore expected in this study that the nearby landscape would be more stimulating for a bicyclist's aesthetic experience. Experiences according to the different senses proved to be important for the respondents of this study. Examples from the sketched routes also showed that oversized urban spaces designed for high-speed motorised traffic may have been experienced as offering too slow a rhythm of change for the rather slow cycling speed that allows a detailed experience. At close proximity, there was little to experience other than the closeness of motorised traffic, pollution and noise. Examples where urban spaces were divided from car traffic with a row of trees, and where a cyclist riding along the path becomes part of another urban space on the opposite side (described by the concept of a view-shed) proved, on the contrary, to be stimulating for aesthetic experience. In such cases, the urban space was experienced nearby (participatory landscape) and stimulated not only the visual sense, but also other senses. The changing rhythm of urban spaces is also faster, and the variety in the visual stimuli becomes greater.

The space types studied in the "bike-through" tours that contained physical features in the category "Pleasant" (see Fig. 8, p. 88) were participatory landscapes and also included visually interesting elements that were highly valued. At the same time, the spaces belonging to the "Pleasant" category were described as being good for the ability to move continuously, to maintain a constant pace on the bicycle, meaning that a cyclist's attention was available for perceiving aesthetics in the environment.

## 5.2 Discussion of the theories and methods

A conceptual framework of the components of importance for the complex study of the aesthetic experience of commuting cyclists was laid out in Paper 1. The theoretical framework was useful for enhancing awareness of the different components that were of importance for the study of cyclists' aesthetic experience and for interpretation of the results. In Sections 5.2.1-5.2.3 I will discuss how the findings contribute to the existing literature in the field and the theoretical implications of the findings.

The advantages of the "bike-through" method and the survey, their relevance for this study, limits and contribution to research in the field, are discussed in Sections 5.2.4 and

5.2.5. Finally, in Section 5.2.6 I will discuss the relevance of the verbal scaling system proposed by Russell and his colleagues for interpreting cyclists' aesthetic experiences, theoretical implications of the findings and how they contribute to the existing literature in the field.

### 5.2.1 Phenomenology of sensory perception and experience

Theories on perception as a phenomenon illuminate that it is shaped by cultural and individual motives. Participants on "bike-through" tours and survey respondents were therefore asked questions related to their individual motivations for cycling to work. The aim was to test the influence of motivational factors on features that are valuable for aesthetic experience. Comparative case studies were also made between three cities with different bicycle cultures. This theoretical viewpoint was considered important for awareness about the extent to which culture or personal viewpoints might influence experience. The results did not, however, show any decisive differences in this direction. This may partly be due to the fact that the participants/respondents in both studies consisted of rather homogenous groups of cyclists. Since it is expected that motivational factors may exert influence on the results, the validity of the data has limits. This is discussed further in Section 5.4.

According to phenomenology, spatial experience is affected by travelling speed and interaction with other people travelling. This means that a crowded urban space will be experienced differently from an empty one. Spinney (2007) pointed out that cyclists can only handle a fraction of the sensory input in a complex urban situation. Based on this theory, I therefore expected the participating cyclists in the "bike-through" tours to be not always conscious of features that had the potential to produce pleasant aesthetic experience. This expectation proved to be true. In complex urban situations in the "bike-through" tours, the cyclist's attention was so much focused on determining the space ahead for continuous movement that they lacked the capacity to observe features that were in other cases judged as aesthetically pleasant.

The results also confirm Spinney's (2007) suggestion that cycling is a multisensory phenomenon. Stimulus through sound and smell was important, as well as through vision and the kinaesthetic experience.

### 5.2.2 Urban design theories

Theories within the field of urban design were instructive about the different physical elements of urban space (see Section 2.1.2) and how their composition and interrelationships constitute its characteristics, as well as how travel speed affects the manner in which these characteristics could be perceived visually. Based on studies conducted by Appleyard et al. (1966) and Gehl (1987) it was expected that a commuter cyclists would organise environmental elements into components of the general characteristics. Overall, in both "bike-through" and survey data, the cyclists focused on the large and dominating physical features that shaped the urban spaces. Small details, such as flowers, received less attention.

Tietjen's (2011) discussion about the importance of uncovering urban potential inspired me to focus on the relationship between the formal characteristics of urban space and the way that they may meet commuting cyclists' expectations. Such potential is not limited to formal or static features of the environment, but rather symbolises their ability to meet users' aims. In Paper 1 it was suggested that elements that strengthen orientation may be among those that gain particular attention. According to the results of this study, the features that influenced aesthetic experience did not have a direct relationship to orientation, however, the "Hidden route" types tested in the "bike-through" tours included appreciated aesthetic qualities while the routes were at the same time unknown to most of the participants. This indicates that way-finding is important for experiencing aesthetically pleasing routes.

The varied and complex urban spaces in the case areas chosen for study were divided into types on the basis of their general physical characteristics, both static and in motion. I considered former methodological treatments of street typologies (see Section 2.1.3) to be of limited relevance to this study since they were limited to visual and formal characteristics which may be valid only for enclosed inner-city streets in old city centres. Bicyclists' commuting routes may include all kinds of urban spaces. Former methodological treatments of street typologies did not take into account the dynamics of urban space, such as the way other people travelling in the space, pedestrians, other cyclists or cars, could change its visual characteristics. The studies showed that these dynamic features, in addition to sound and smell features, were very important for commuter cyclists' aesthetic experiences.

Theories within the field of urban design and architecture were of fundamental importance for this study for an understanding of what constitutes the physical environment, particularly from a static viewpoint. The interdisciplinary approach, to take into account the

dynamic features of urban space and also to uncover the potentials the environment may offer that meet user expectations, is an important step forward for the theoretical field.

### 5.2.3 Environmental aesthetic theories

The three theories within the field of environmental aesthetics were applied to interpreting the aesthetic meaning of the empirical data.

The theory of instrumental determinants (Heath 1988) was relevant for evaluating the importance of aesthetic features relative to functional features. The results of the survey supports Heath's (1988) hypothesis regarding instrumental determinants, which was based on Maslow's (1943) hierarchy of needs. The results show that a satisfying instrumental quality of bicycle routes is a precondition for the choice of an aesthetically pleasing route. Satisfying instrumental quality also seems to be a precondition for noticing the aesthetic qualities of the physical environment along a route.

The theory of symbolic aesthetics (Lang 1988) was valuable in interpreting the relationship between a cyclist's attitude towards their cycling tour and the way features in the environment can symbolise its ability to meet cyclist's aims. The results show that a car-dominated environment symbolises the priority of the private car and creates boring environment for cyclists. The priority given to the private car and reflected in the character of the environment was found to symbolise the way in which the environment meets the needs of motorised transport before cyclists, causing cyclists to feel unwelcome. Conversely, the results of this study indicate that a vegetated environment with continuous infrastructure and few forced stops meets their aims related to fitness, lifestyle quality and environmental care.

The theory of the notion of distance was useful for awareness of how spatial engagement and the notion of distance to elements in any urban space were linked with cyclists' sensual perception and how they are being stimulated. The results of this study confirmed that the landscape at close proximity (participatory landscape) stimulates all senses, while the landscape at a distance stimulates only the visual sense. The results also indicated that the visual landscape at a distance had limited aesthetic value when the participatory landscape lacked an expected quality of some kind.

### 5.2.4 The relevance of the "bike-through" method

As already pointed out (section 3.4.1), the aim of the "bike-through" method was to identify features of urban space that affect commuting cyclists' aesthetic judgment, the way other features influence their aesthetic experience, and to find which "urban space types" include the identified features. The two parts of the "bike-through" method, the cycling tour through a predefined route and the following qualitative group interview, proved to give together a very qualitative understanding of the stimulating and discouraging features of the different urban space types in relation to commuter cycling. The participants made notes of their overall opinions, with commuting in mind, of both stimulating and discouraging features on each route part where stops were made. In the afterwards group discussion their opinions of the value of these features when commuting were discussed further.

It was crucial for the study to explore the experience of urban spaces when cycling. This was related to, for example, travel speed and interaction with other travelling people and what could be seen and experienced when sitting on a bike. The arrangement, to ask the cyclists to make notes on the evaluation form immediately after they had experienced each of the urban space types by cycling through them, proved to be very important. During the qualitative group interviews, the notes from the evaluation form reminded the individual participants of what they had experienced of the different urban spaces and thus this facilitated an even more in depth discussion during the interview. Requests about choice of best and worst route parts and the reason for this choice proved to give very clear and qualitative descriptions of the distinct experiences. Detailed data, both oral and written, was received from all participants about the overall experiences of the different urban spaces.

As pointed out in Section 3.1, the context for cyclists' aesthetic experience is of main importance for the knowledge that can be pursued from this study, both social and environmental. The intention of the method was to explore the way the focus group experienced different characteristics of the predefined urban space types.

The definition of the space types in the "bike-through" tours proved to be useful to ensure the qualitative evaluation of distinctive features within different urban spaces (defined as space types) that may have had importance for the participants' aesthetic experiences. It was not the aim of this method, however, to explore the urban space types in different route contexts. The routes were predefined and did not represent logical commuting routes as a whole. The method did not explore what cyclists do or do not choose within their daily environment. In this sense the routes had no particular relation to commuter cycling over

cycling for other purposes. The study focused only on the qualitative experience of distinctive features and their context within space types. However, the participants were asked to evaluate those features with commuting in mind during the "bike-through" tours. The impact of commuter cycling on this evaluation was further discussed in depth in the qualitative group interviews. Here the participants based their comments on former commuting cycling experiences, either in the same urban spaces or similar situations. Because the participants were generally experienced commuter cyclists and were often familiar with the route parts in the "bike-through" tours, they generally seemed to have preconceived opinions of most situations. Because the participants were most often familiar with the different parallel alternatives it was also possible to discuss and better understand how the space types were experienced differently. The choice of two mono-centric cities may also have been important to ensure that participants were familiar with the case areas under study. The majority of work places were located in the central areas of both cities, the same area as was chosen for the "bike-through" tours.

Sometimes, participants were cycling a route part for the first time. Cycling for commuting purposes involves repetition of cycling trips on one or a few routes between a fixed start point and fixed destination. It seems that most often the participants who had cycled the route parts in the "bike-through" tours for the first time generated partially different experiences than the participants who were familiar with the route parts. Generally it can be said that the first time cyclists were more focused on the instrumental quality of the route.

Context also includes time, such as time of day and season. Three tours were made in the afternoon during peak traffic hours and one on a Saturday morning. Morning hours on weekdays were not included. Weather conditions varied from one tour to another. The influences of congestion and weather on the experiences were discussed in each group after the tours. Many of the participants pointed out that bad weather influenced their route choice. On the way home in bad weather they preferred the quickest route while in nice weather they would instead choose the aesthetically pleasing one. The way in which the dominant use of the urban spaces varied according to commuting hours was also discussed and was found to have an impact on route choice.

The planning of the "bike-through" routes required close examination of the case areas beforehand. It was necessary to be, or become, familiar with the case areas, get advice from cyclists or other people familiar with possible routes, examine the case areas by bicycle and study the possibilities closely in Google Street View.

The "bike-through" groups had 5-7 participants each. It proved, however, to be difficult for time management to deal with seven participants in a group and at the same time give each participant enough time to explain their experiences in the discussions. The ideal number of participant in a group proved to be 5-6 persons.

I consider the new "bike-through" method to be very relevant for qualitative research into cyclists' environmental experiences, for positive and negative experiences, instrumental as well as aesthetic. Very detailed data can be gained regarding the quality of different kinds of features and their context within space types. Part of the method involves cycling a predefined route. The value of aesthetically appreciated urban spaces for the perceived quality of a commuting route which cyclists may have chosen themselves are thus not involved in this method.

### 5.2.5 The relevance of the survey and the route drawings

In section 3.5.1 the aims of the survey were outlined. One of the main challenges of this study was to capture the two sides of the reality (cf. Section 2.3.3): the reality composed of physical elements and the experienced reality. This was solved by collecting information through both a questionnaire and through Google route sketches. What is new in the method, as far as I know, is that each respondent's answer to the questionnaire was linked to his/her sketch.

In the open-ended questions of the survey, respondents described the best and worst route parts of the route which they most often cycled between home and work, and gave reasons for their replies. This was particularly useful for gaining insight into the features that stand out in the respondents' experiences of their route environment and why they do so. The linking of the individual participant answers to the questionnaire and the route drawings made in the Google programme proved to be very useful for an understanding of the way aesthetic experience was involved in the judged quality of the cyclist's chosen route. Background questions (about former cycling experience, travel routines, frequency of cycling and reasons for choosing to cycle to and from work) gave some information about possible influences on individual opinions.

Google Street View made it possible to look closely at the route environments and the best and worst places. I used Google Street View for roads where car traffic is allowed. The best route parts were frequently through paths that were not shown in Google Street View. I therefore decided to visit some of the places during the study. Google Street-View from paths

where car traffic is excluded would be convenient for afterwards interpretation of data, but this was not available when the study was conducted.

Complications related to making the drawings of the cycling route may have reduced the number of participants who completed the survey. A technical improvement where it is possible to draw the route in a simple way and also answer a questionnaire in one go would be preferable. It was crucial for this study to collect the route sketches and be able to link them to individual responses to the questionnaire. I therefore consider the method highly relevant when studying cyclists' attitudes towards their route environment, preferences, route choice or experiences. The method could also be relevant for research into other transport modes.

### 5.2.6 The relevance of Russell and colleagues' verbal scaling system on affective quality

In this study, empirical data about bicyclists' aesthetic experience were partly based on their aesthetic judgments and the affective components involved. For the interpretation of the "bike-through" results and part of the survey results, Russell and colleagues' (Russell & Pratt 1980; Russell et al. 1981; Russell 1988) verbal scaling system on affective quality was used (see Sections 2.3.2, 3.4.3, 3.5.4).

The verbal scaling system was useful for presenting and interpreting the categorical position of abstracted affective appraisals and their affective components (linked physical features) both from the qualitative "bike-through" evaluations and the open ended survey questions.

Daniel and Ittelson (1981) have criticised the method because it was based on responses to colour photographs but not 1:1 experiences in real environments. They thought this could mask specific effects of environmental features. In this study, however, participants responded to real environments and described their experiences in open ended questions. I translated the affective appraisals from Icelandic and Norwegian into English. The participants used many of the appraisals with the same meaning as those represented in Russell's diagram (Fig. 4. p. 47); it was therefore easy to find their categorical position on the diagram. The appraisals were related to all senses, visual, hearing, smell and kinaesthetic stimuli.

In order to adapt Russell's (1988) diagram of descriptors to the results of the "bike-through" evaluation, the original four categories were fine-tuned into eight. By doing so it became easier to discuss the categorical position of the aesthetically judged physical features with greater accuracy.

The fine-tuned Russell (1988) diagram was very useful both for systematising the results visually and to identify the affective categorical quality (Pleasant, Unpleasant, Relaxing, Gloomy, Exciting, Distressing, Arousing and Sleepy) for each physical feature that had been aesthetically judged. The positions of the preferred and the most disliked space types and physical features, according to the bicyclists' evaluations on the "bike-through" forms, were also found.

Most of the urban space types investigated included features that influenced aesthetic judgment in more than one affective category. The results show a consistency in the circular tendency of the aesthetic judgments of the various urban spaces, which can go in two directions. The physical features linked to the affective appraisals identified proved to have rather constant categorical location in the diagram. Each feature was judged in more or less the same way. Because of this, and as a new and important contribution to the usefulness of the verbal scaling diagram, it is possible to anticipate what happens if new features are added or taken away in any urban space. For example if it is planned that an urban space which is judged as "Pleasant" (i.e. includes the "Pleasant" features shown on the diagram) should have an increased street life with a dominance of pedestrians, this urban space may move from the "Pleasant" category towards "Exciting" and "Arousing". Much street life will likely move an urban space away from having the preferred qualities for commuting by bike (cf. the grey circle in Figure 6. p. 84), unless pedestrians are kept at a certain distance.

I found the diagram very useful to present the summary of the very broad qualitative data in a valid and at the same time readable way. It shows the spectrum of the various emotional judgments of the different features in an urban space for cyclists' experiences.

The verbal scaling system applied, defined by Russell and colleagues, proved to be appropriate for interpretation of the very qualitative data that focused on the cyclists' affective appraisals. The use of Russels (1988) (Fig. 4, p. 47) diagram is always dependent on aesthetic judgments by participants, notably their use of words that can be identified as affective appraisals. As the results from the "bike-through" evaluation were more detailed than the results from the open-ended survey questions, and included many different affective appraisals, the former diagram (Fig. 6, p. 84) presented richer results than the latter (Fig. 7, p. 85). I consider the verbal scaling system on affective quality defined by Russell and colleagues to be appropriate for the interpretation of any kind of aesthetic experiences people make of urban environments. Its relevance is not at all limited to research into commuter cyclists' aesthetic experiences.

## 5.3 Discussion of dynamic influences and implications for planning policy

### 5.3.1 The influence of dynamic factors for commuting cyclists' aesthetic experience

The manner in which a cyclist is able to interpret received sensory information is a dynamic phenomenon affected by the impact of various motivational factors (see Fig. 5, p. 75).

Possible dynamic influences on commuting cyclists' aesthetic experiences may involve such factors as attitude towards the mode of travel and expectations of the urban environment, which may change with the increase or decrease in the number of cyclists, transformation of the urban environment, time of day or season, and the increased cycling experience of an individual.

Attitude towards the mode of travel and expectations to the urban environment can change with time, as both are in continuous transformation. Stimulation can be shaped by past experience of the urban environment and the attitude towards the importance of a pleasant aesthetic experience is related to the instrumental quality of the route. Mere quantity, as in terms of instrumental quality, may lose its meaning once a satisfying level is attained. Value then turns to the degree of choice offered among accessible resources. An increase in bicycle-friendliness of the environment may at the same time increase expectations of, for example, the instrumental quality of bicycle routes. The qualitative group interview after the "bike-through" tours in Trondheim indicates that this may be the tendency.

Increased cycling culture may attract new groups of people to use the bicycle as a mode of transport. New groups may have new reasons for choosing to cycle and generate new expectations of the environment and towards valuable aesthetic features. Existing cyclists may also change their attitudes, for example with age and increased cycling experience. For the same reasons, desired cycling speed may vary, as may the ability for high speed cycling.

As has been noted, travel speed has an important influence on the perception of environmental features. When cycling slowly, the changes in the character of an urban space occur at a slower pace than when cycling fast, thus more is needed to stimulate curiosity and a positive experience of the time used. It is likely that the participatory landscape might be more important for people who cycle slowly than for those cycling fast. Presumably, experienced cyclists have the ability to travel faster than those with moderate or little cycling experience.

When relatively intense attention is needed to control sensory influences from the environment, grouping of features in the urban space is likely to increase. Increased travelling

speed has the same affect. At the same time, the speed of a bicycle allows detailed experience, certainly when the urban space requires less attention. An infrequent cyclist, a basic skill cyclist with moderate experience, or someone cycling a new route may need to pay more attention to determine forward movement than experienced cyclists who are familiar with their route. Either the person will then have limited ability to experience potential aesthetic features or he/she will need to slow their travel speed. The cyclists in Odense valued vegetation/trees highest among the three cities studied. This may be for several reasons. The instrumental quality of the cycle routes was highest in Odense. Consequently, the cyclists in Odense had attention available for noticing features that they appreciate. They may also have learned over time that vegetation stimulates pleasing emotions. It may therefore be concluded that increased cycling experience may increase the value of pleasant aesthetic experience and that the frequency of changing characteristics in the sequences of urban spaces needs to be higher for less experienced cyclists. The latter group will probably also be more sensible of the instrumental quality of the route environment.

The respondents in Odense valued quietness less than those from the two other cities. I suggest people shape their expectations towards the environment in line with both their positive and negative lived experiences and are likely to value the importance of different features in the context of what they have and what they miss. Perhaps the respondents in Odense had built up less negative attitudes towards noise from traffic than respondents from the two other cities and did not therefore emphasise quietness as a missing feature. In this respect there are three possibilities behind a less negative attitude. The people in Odense are used to the noise from traffic, they don't think they can move away from the noise which is everywhere in the city, or there is generally not much traffic noise in the city and therefore people are not tired of too much noise. I suggest that there are generally more traffic-dominated urban spaces in both Trondheim and Reykjavík, than in Odense - at least the contrasts in the urban spaces are greater in Trondheim and Reykjavík than in Odense. It could also be that the much more extensive network of bike paths in Odense makes it easier for cyclists to choose routes away from the most trafficked roads. Also topography could play a role. In Trondheim, the hilly terrain, combined with the barrier effect of the river, forces cyclists to ride where there is a lot of traffic. Only few alternatives are available if people have destination in the city centre.

The character of any urban space is in constant flux. It is different in the morning than the afternoon, in summer or winter, when empty or congested with people or cars. The results of the study indicate that interaction with other people particularly required attention on

behalf of the cyclists and reduced perception of aesthetic features. Three of the "bike-through" tours were organised in spring and autumn, in the afternoon peak hours. Generally, commuting takes place in the morning and in the afternoon when congestion levels are at the highest. In the cities tested, bicycle paths or lanes are generally not congested and interaction with other cyclists is rare. With increased cycling popularity this could change and so possibly could aesthetic experience and the attitude towards valuable aesthetic features. Urban transformation with increased density may also create higher congestion levels.

Aesthetic experience of winter landscapes may be different from those of summer. It is, for example, likely that functional requirements will change. Route choice possibilities may be reduced due to accessibility or surface quality because of snow and ice. However, the importance of vegetation for aesthetic experience is not limited to the appearance of green leaves. Quietness, changing colours and the filtering of light and the organic structure of branches as a contrast to the hard and grey concrete environment, were not the least important part of the aesthetic qualities related to vegetation. These qualities are not lost in wintertime. In addition, coniferous trees (such as pine and spruce) keep their green colour all through the winter. Trees may also protect people from bad weather and reduce the effect of wind.

### 5.3.2 Implications for planning policy

Many cities have emphasised the need to stimulate cycling by improving the functional quality of bicycle infrastructure. When this infrastructure has been located in aesthetically favourable urban spaces, the aesthetic experience of cyclists passing through may have been stimulated, regardless of the planners' intention in this regard. The results of this study show that when the functional quality of a cycle route is endowed with its aesthetic quality, then the cycling experience is pleasurable. One of the main purposes of planning and designing urban space with respect to influencing commuter cyclists' pleasant aesthetic experiences should be to stimulate consciousness of aesthetic features by minimising the attention required to determine forward movement with respect to, for instance, other travellers.

According to the results of this study, the construction of segregated bicycle infrastructure that fulfils cyclists' functional needs is not likely to make the experience of cycling to work pleasurable on its own. An aesthetically appreciated context is also of importance. Car-dominated environments with oversized infrastructure, buildings and urban

spaces were found to symbolise the priority of the car. Changes in the dominant use of urban spaces from car-oriented to urban spaces that welcome cyclists among other transport modes is likely to be a big step in attracting cyclists.

It is suggested that the challenge for urban planning and design will be to link routes and places with potential aesthetic qualities together into a continuous infrastructure network. The results show that a satisfying instrumental quality of bicycle routes is a precondition for the choice of an aesthetically pleasing route. Satisfying instrumental quality also seems to be a precondition for noticing the aesthetic qualities of the physical environment along a route. When instrumental needs are solved in an acceptable way, commuters can be further stimulated by including aesthetic features, such as vegetation, in the urban space. Although a participatory landscape is more likely to stimulate a pleasant aesthetic experience it is important to bear in mind that the route ahead needs to be as predictable as possible for forward movement. Where commuters can expect other travelling people to cross their path, such as pedestrians walking in an unpredictable way, or where cars can be expected to reverse at any time, their attention will be occupied by determining possibilities for continuous movement, and will thus reduce their perception of aesthetics.

## 5.4 Limitations

The motivational factors of a bicyclist influence the value and the definition of aesthetically favourable features. These motivational factors are expected to have a strong relationship with the person's background, such as age, former cycling experience and frequency. Since the group of people that took part in this study does not cover the potentially different motivational factors among other population groups, the conclusions that can be derived from the results has limits which will be discussed in this section.

The requirements for participation in the "bike-through" tours (both 2.5 hours available time at the given hours and fitness to cycle the given route length (10km)) may have affected not only the number of respondents that showed interest, but also, and most importantly, the kinds of population groups willing to participate.

The "bike-through" tours seemed neither to have attracted younger people nor less experienced cyclists. The experienced cyclists had, however, due to their former experiences much to reflect on and were generally thankful for being given the opportunity to participate

and communicate about their experiences. This may have resulted in even more detailed and qualitative data.

The survey was also suitable for infrequent cyclists or non-cyclists, however, very few of them showed interest in answering the survey although, for this group, only two minutes were needed to complete the questionnaire. The long time and the computer skills required may have reduced the number of respondents in other groups. In addition, opening two different links, one for the questionnaire and another for making the route sketch, and finally sending it separately by e-mail, may have been considered too complicated by many people.

My experience was that the companies that showed interest in giving their employees the opportunity to participate in the survey may in some cases have seen this as permission for the employees to use the working hours for their reply. Some companies were neither willing to interrupt their employees nor to give permission for using the time needed.

For the knowledge that can be produced from the data it should be noted (as discussed in Section 2.3.3), that each response is valid for the particular person that participated in this research and the particular environments under study. Since the participants/respondents in both studies are mainly middle-class, middle-aged people, experienced cyclists who choose to ride to and from work for fitness, environmental considerations and because they like this lifestyle, the results are mainly valid for this group of cyclists in the three cities and the seasons studied. Further research is needed to see how other population groups value the aesthetic qualities of urban spaces through which they are cycling.

# 6. Conclusions

The aim of the study was to investigate how the physical features of urban space influence commuting cyclists' experience in terms of aesthetic meaning, identify these features and find out how such experience is of importance for their evaluation of the quality of their commuting routes.

The results show that several features were judged as aesthetically favourable by the participating/responding commuting cyclists. For visual stimulation the features included vegetation, views of nature, historical buildings and places, clearly defined streetscapes and seeing other people at some distance. For stimuli by sound and smell, either calm traffic only, or no traffic nearby was preferred. Quietness, sounds from leaves and birds, and the smells of vegetation were appreciated. Lack of the aesthetically favourable features mentioned and closeness to overwhelmingly car dominated environments created boring urban spaces.

Aesthetically favourable urban spaces include one or more of the aesthetically favourable features and fulfil at the same time an acceptable functional quality, do not require attention that reduces the possible pleasant aesthetic experience and are good for predictable further movement. Such urban spaces are of great importance for the quality of a bicycle route and the longer part of the total route length they involve, the better. The results show that a satisfying instrumental quality is a precondition for the choice of an aesthetically pleasing route and for noticing the aesthetic qualities along a route. It should be noticed that changing characteristics in urban spaces also has value. Monotonous routes where cyclists can cycle continuously with little stimulation or any need for attention may become boring.

Aesthetically favourable features can alter the character of commuting by bicycle in a very positive way when several other requirements are fulfilled. Aesthetically favourable features are valued when they are at close proximity. The visual landscape at a distance had only limited value when the nearby participatory landscape lacked an expected quality of some kind.

The motivational factors of a cyclist influence his/her valuation and definition of aesthetically favourable features. Participants/respondents in both studies were mainly middle-class, middle-aged, experienced cyclists who chose to ride to and from work for fitness aims, environmental considerations or because they liked this lifestyle. The results are therefore mainly valid for this group of cyclists in the cities studied. The vegetation-rich and continuous route, with fresh air, nice smells and sounds and away from traffic, seemed to

meet the participants/respondents aims for their commutes. Conversely, an overwhelmingly car-dominated environment with noise and pollution may have worked against their aims.

The experience of urban spaces from the viewpoint of cyclists has received limited attention in academic research, and aesthetic experience has not been studied particularly for the purpose of commuting before. For this reason there was not much previous research to build on when starting the present study, and it was unclear what should be involved in an empirical investigation. A conceptual framework of components of importance for the complex study of the aesthetic experience of commuting cyclists was therefore laid out in Paper 1. The definition of components of the framework was based on three theoretical fields: 1) phenomenology of sensory perception and experience, 2) urban design theory, and 3) the theory of environmental aesthetics, in addition to earlier studies on cycling. All these theories complement each other and explain various aspects involved in commuting bicyclists' aesthetic experiences. The theoretical framework is useful for enhancing awareness of the different components that are of importance for the study of commuting bicyclists' aesthetic experiences and for interpretation of empirical data.

One of the main challenges of the empirical part of this study was related to the question of methods that were capable of capturing qualitative information about aesthetic experiences in relation to commuting cycling. This was solved by a new qualitative mobile method called "bike-through" evaluation, which was conducted for this study. The method is similar to walk-through methods, but here the researcher uses the bicycle and rides with a group of invited cyclists. The method consisted of two parts, a cycling tour through a pre-defined route and a qualitative group interview. Together the two parts gave a very qualitative understanding of the way commuting cyclists experience features of the different urban space types defined for the study. Since the routes studied were pre-defined, the method is not suitable for the study of people's daily commuting routes. Commuting as a purpose of cycling was, however, part of the method in the sense that participants were asked to give their evaluations with commuting in mind. This was further discussed in depth in the qualitative group interview where participants, who all were experienced cyclists, seem to have based their comments on former cycling experiences when commuting, either from the same urban spaces or similar situations. Commuting involves a cyclist becoming familiar with the route(s) chosen between home and work. For less experienced participants, the method has limitations in relation to reflecting on the experience of urban spaces that are cycled for the first time.

The varied and complex urban spaces in the case areas were divided into types on the basis of their general physical characteristics, both static and in motion. Theories within the

field of urban design and architecture were of fundamental importance for an understanding of what constitutes the physical environment, particularly from a static viewpoint. However, taking into account the dynamic features of urban space and also to uncover the potential the environment may offer to meet user expectations is an important step forward for the theoretical field.

A survey was conducted in Reykjavik, Trondheim and Odense to find out how aesthetic experiences were involved in the perceived quality of the routes bicyclists have chosen for their commutes. One of the main challenges of this study was to capture the two sides of reality: the reality composed of physical elements and the experienced reality. This was solved by collecting information through both a questionnaire and Google route sketches. What is new in the method, as far as I know, is that each respondent's answer to the questionnaire was linked to his/her sketch. This proved to be very useful for an understanding of the way aesthetic experience was involved in the judged quality of a bicyclist's chosen route. I consider the method highly relevant when studying cyclists' attitudes towards their route environment, their preferences, route choice or experiences.

Bicyclists' environmental experiences are expected to be of various kinds, where only some are related to aesthetic experience. Their aesthetic experiences therefore had to be distinguished from other experiences. The interpretation of the "bike-through" data, and a part of the survey data, was based on identification of the participants' aesthetic judgments. Affective appraisals and affective qualities were selected from both oral and written evaluations. A verbal scaling system visualised in a diagram defined by Russell and colleagues was used to present and interpret the aesthetic quality of aesthetically judged features from the qualitative "bike-through" evaluations and the open-ended survey questions. Highly qualitative data, where many affective appraisals are involved, is a precondition for its use. I suggest that, if this requirement is fulfilled, the diagram is appropriate for the interpretation of the aesthetic experiences of the urban environment of any group of people.

The answers to the open-ended survey questions included a limited number of affective appraisals. To distinguish aesthetic experiences from other experiences here, the answers were first divided into two groups by theme. The answers that fell in the aesthetic group included descriptions of best or worst route parts, where the respondents' evaluation of environmental quality or disadvantages was based on visual perception, hearing or smell sensations.

The group of people who took part in this study was rather homogenous and had fairly similar backgrounds and motivational factors. Therefore, the conclusion that can be derived from the results has limits. The results from the three cities were also similar. People with other aims related to their commutes, for example younger people carrying children, new cyclists, students on the way to university, or immigrants, could have had a different attitude towards the environment and so towards both the value of aesthetics and the content of aesthetically appreciated features. For future research on the influence of pleasant aesthetic experiences on commuting by bike, I think it is important to investigate the experiences of people with different backgrounds and different secondary aims for their commutes. The main challenge here is to find a suitable method and a way to attract different people to participate in such a study.

In summary: this thesis contributes to an understanding of how aesthetics in urban spaces are of importance for the quality of commuting by bike. The results from multi-embedded case studies conducted in Reykjavik, Trondheim and Odense confirm many former studies in the field, and that very many factors contribute, in combination, to make commuting cycling a pleasurable experience. The results of this study show that pleasant aesthetic experience plays an important role in this relationship.

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# Terms in the thesis

**Aesthetic experience:** Refers to a complex relationship between a person's sensuous perception, cognitive understanding and interpretation of the physical environment, which ends with responses to subjective thoughts and feelings during the course of an experience. Aesthetic experience is a process that starts with stimulus input through the senses (sensation) and is continued by a complex process of cognitive understanding and interpretation of the stimulus input (perception). The process ends with an evaluative judgment of the perceived feature(s) from the environment and/or aesthetic emotion (e.g. feeling of pleasure). Learning and cognitive processes can change perception (see perception below). Aesthetic experience can be induced by both pleasurable and dis-pleasurable features. Aesthetic emotion is, however, basically positive.

**Aesthetic features**: Refers to those aspects of the physical environment that prompt aesthetic emotion(s). Aesthetic features are aesthetically appreciated features. In this thesis the word "aesthetics" is sometimes used as a shortening of "aesthetic features".

**Aesthetic judgment:** Is a judgment regarding the aesthetic quality of an object. Aesthetic judgment (sometimes called aesthetic response) encompasses a wide range of emotional and critical responses which can go from extreme pleasantness to unpleasantness. Aesthetic judgment involves a claim about the aesthetic quality of an object (this claim is called affective appraisal in this thesis).

**Aesthetic meaning**: Experience that has aesthetic meaning refers to the meanings or values associated with certain features or characteristics that influence aesthetic experience. The meanings and values that a person might associate with certain environments or objects can be strongly powerful and so influence aesthetic judgment.

**Affective appraisal (affective descriptor):** An affective appraisal takes place when a person judges something as having an affective quality, such as being pleasant, unpleasant, likeable or exciting. Affective appraisal is always directed towards an object or an environment.

**Affective quality (affective component):** An affective appraisal describes an affective quality of an object or of an environment. An affective quality is therefore linked to the affective appraisal in a sentence.

**Basic skill cyclists:** Cyclists that have little or medium experience. Are usually not able to defend their lane when interacting with motorised traffic.

**Car-oriented urban space:** Urban space that favours the needs of cars when both moving and when parked. It therefore favours the speed of a car, the space a car needs for parking, driving and reversing. The car uses a great deal of space compared to cyclists and pedestrians and therefore the infrastructure for cars tends to be very large and dominates the urban landscape.

**Characteristics**: Special qualities or traits that makes an element or thing different from others, a distinguishing trait, quality, or property.

**Cycling (commuting) route:** The course that the commuting cyclist rides, through a sequence of urban spaces, e.g. the total route between home and work.

**Cycling infrastructure:** Refers to all infrastructure that cyclists may use. Pavements for pedestrians are excluded, although they are allowed for cycling in Iceland and Norway. Physical and organisational structure or network of planned routes for cycling, e.g. bicycle lanes, paths or marked routes with signs.

**Cycling-oriented urban space:** Urban space that favours what bicyclists prefer when cycling, it is cycling-friendly. It stimulates a pleasurable cycling experience from both an instrumental and aesthetic viewpoint.

**Experienced cyclists:** Regular cyclists who cycle often and have used the bicycle for a long time. They may also make longer trips. Experienced cyclists are able to defend their lane when interacting with motorised traffic.

**Features**: The structure, form or appearance of elements or things, their quality, prominent parts or characteristics, properties and ability.

**Functional:** Designed for, or adapted to, a particular function or use, capable of functioning; working, practical.

**Human scale:** Environmental scale based on human physical dimensions, capabilities and limits to experience when walking.

**Infrequent cyclists:** A person who rides once in a while.

**Instrumental:** Important in helping or causing something to happen or be done, serving as a crucial means, agent, or tool (e.g. bicycle lanes, bicycle infrastructure, traffic regulations).

**Non-cyclist:** A person who never rides a bicycle.

**Perception:** Involves gathering, organising and making sense of information about the environment. Perception is socially and culturally learnt.

**Regular cyclist:** Related to the frequency of cycling. A person who rides often.

**Urban space**: The surrounding space (room) of a person in which he/she moves in an urban situation. Its boundaries are experienced relative to the position of the person perceiving the space.

# 8. Full length papers

## 8.1 Paper 1

# A theoretical perspective on how bicycle commuters might experience aesthetic features of urban space

**Keywords:**

Bicycle commuting, environmental aesthetics, urban space, aesthetic experience, urban design.

## Abstract

*Limited attention has been paid to the value of the aesthetic dimension of the urban environment in altering the character of commuting by bicycle. The positive impact of aesthetics on cycling is primarily related to emotional reactions of an individual. For cyclists, aesthetic experience is a multisensory phenomenon influenced by various motivational factors. The purpose of this paper is to lay out a conceptual framework for studies of the aesthetic experience of commuting bicyclists. Three theoretical approaches were considered for interpretation of information: 1) phenomenology of sensory perception and experience, 2) urban design theory and 3) environmental aesthetics. Together the three theoretical fields complement each other and explain different viewpoints on this complex subject. By relating earlier studies on bicycling to these theories, it may be elucidated the ways in which bicycling affects how the senses work and how perception of the environment can be interpreted in terms of aesthetic meaning. In particular, speed affects this perception. The importance of aesthetic features has a strong relation to expectations and attitude towards the trip.*

## Introduction

The sustainable city of the future is often envisaged with bicycling as an important transport mode serving to reduce automobile traffic, to promote urban densification and build more attractive public spaces where pedestrians and cyclists have priority over cars. Cycling-orientated urban environments have so far received rather narrow focus viewing cycling primarily in functional terms (Forsyth and Krizek 2011). At the same time other important key dimensions of urban design (see definition in, e.g., Carmona et al. 2010) have received limited attention, such as the perceptual and the visual dimensions. Aesthetic appreciation, which is the subject of this article, is however considered to be an important part of urban design and the concept of aesthetics a key to understanding how a person values visual characteristics of urban space as well as features that affect hearing and smelling senses. Aesthetic features may alter the character of cycling, but do likely not stimulate additional cycling. At least, such influence on the bicycle as mode choice is rather far fetched at the moment. However, knowledge about the aesthetic experience of cyclists could provide an important background to the design of cycling-orientated environments. As pointed out by Forsyth and Krizek (2011) this includes features such as level of visual complexity, which elements or forms of the urban space are best perceived and which ones are found to be stimulating given cyclist's height on the bike, its position and speed.

Urban design has been little concerned with the experience of cyclists. For exceptions see Fleming (2012), Timms and Tight (2010) and Forsyth and Krizek (2011), who all have argued for the need to explore cyclist's experiences and to discover the bicycle as transformative force in the design of cities. Additionally, Timms and Tight (2010) have written about the need to explore aesthetic aspects of

walking and cycling. None of these studies take, however, purpose of cycling into account, nor examine how certain features of urban space might influence cyclists' aesthetic experience. By contrast to cyclists, many studies have been carried out on how pedestrians experience the urban space (e.g. Cullen 1971; Gehl 1987, 2010; Gehl et al. 2006). These studies have, however, limited relevance to bicycling as pedestrians have different needs and expectations with respect to the environment (Blanco et al. 2009; Forsyth and Krizek 2011). For that reason, it is important to study the experiences of cyclists separately. In addition, commuter cycling has different needs and expectations than cycling for other purposes (Heinen et al. 2010).

The impact of aesthetics in the urban environment on cycling is primarily related to features that affect emotional well-being. Enhanced well-being has often been associated with recreational cycling, but rarely commuting cycling (Garrard et al. 2012). Indeed, the importance of stimulating well-being is not even mentioned in Pucher and Buehler's (2012) key lessons on cycling promotion and implementation of cycling policies. In addition to positively affecting well-being, aesthetics very likely influence the behaviour of individuals; they are attracted to an appealing environment but distracted from an unpleasant one (Nasar 1988).

The main research focus on bicycling in the urban environment has so far involved the use of quantitative methods on instrumental needs and the functionality of cycling, addressing, for example, the choice of the bike as a mode of travel (Heinen et al. 2010; Naess 2005), the importance of infrastructure (Abraham et al. 2002; Pucher and Buehler 2009; Pucher et al. 2010) and choice of route and route environment (Abraham et al. 2002; Hochmair 2005; Larsen and El-Geneidy 2010; Stinson and Bhat 2003; Su et al. 2010; Tilahun et al. 2007). The findings of these studies indicate that instrumental features like bike lanes, special intersection

modifications and priority traffic signals are the key to pro-bicycling policies in countries with high bicycle share like the Netherlands, Germany and Denmark (Pucher and Buehler 2009). Previous studies on instrumental determinants are certainly also of importance for the purpose of identifying how aesthetic features could be of value for bike commuters. As demonstrated in this paper, instrumental values have strong relevance to the way in which cyclists evaluate the importance of aesthetic features.

The significance of looking at the impact of aesthetics to alter the character of bicycle commuting might vary from one city to another, for instance in relation to its size. Conditions for cycling in large cities are quite different from those in small cities (Pucher & Buehler 2012) and efforts to promote cycling differ (Heinen et al. 2012). Also, the likelihood for the bicycle route of a given length running through urban spaces with variable characteristics is often greater in small or medium sized cities than in large ones. The reason is that densities are usually lower in small or medium sized cities, which often implies a higher presence of green areas and the centre periphery gradient occurs over a much smaller distance.

Earlier studies indicate that aesthetics are important for judging the quality of the bicycle route environment (Hochmair 2005; Naess 2005; Su et al. 2010). Certain route environments are found to have positive impact on cyclists like, for example, a beautiful, green and safe environment in inner urban areas (Wahlgren 2011), off-street and low-traffic residential roads (Abraham et al. 2002; Tilahun et al. 2007), or a negative impact, for instance, high levels of exhaust fumes and traffic congestion (Wahlgren 2011). Earlier studies have also shown that cycling has benefits for emotional well-being. The key self-reported motivations for commencing and continuing cycling include relaxation, stress reduction, fun and enjoyment (Garrard et

al. 2012). However, none of the earlier studies have examined specifically in what way and how certain features affect aesthetic experiences of bicycle commuters.

The study of aesthetic experience is always a subjective topic that is affected by individual viewpoints and experiences (Cold 1993). For cyclists, experience is also a multisensory phenomenon. Examination of the impact of the aesthetic features in the urban environment on commuting cyclists is thus a complex task and requires perspectives from different disciplines, each of which present different parts of the overall topic.

The way an individual experiences aesthetic quality, or lack of such quality, arises from the confrontation between the environment and the perceiver (Cold 1993). This leads to three different perspectives: the perception of the individual, the elements that constitute the physical environment, and the way the perceived environment can be interpreted into aesthetic meaning in the mind of the perceiver. Bearing this in mind, an attempt has been made to lay out a conceptual framework for the study of the aesthetic experience of commuting cyclists. This involves use of three theoretical approaches that are discussed sequentially in the three following sections. The contents of each theory are reflected in the respective section headings. The first section (1) examines sensory perception and experience when bicycling. The second (2) deals with urban design theories on how speed of travel affects attention and visual experience in the urban space. And the third (3) explores relevant environmental aesthetics theories to interpret cyclists' aesthetic experience. The main contribution of this paper is the integration of these theories into a framework that depicts the aesthetic experience of commuting cyclists.

# 1. Sensory perception and experience when bicycling

## 1.1 Sensory perception as phenomenon.

Phenomenology involves the study of essences, among others the essence of perception and consciousness (Merleau-Ponty 1962). Although phenomenology of perception does not particularly focus on aesthetic experience, it gives insight into sensory perception as phenomenon. To gather and interpret environmental stimuli are two processes, sensation and perception. Sensation refers to the biological experience by the human sensory system and may therefore be similar to everyone. Perception, on the contrary, may be structured by associative forces, and may be focused by attention (Merleau-Ponty 1962). According to Merleau-Ponty (1962) attention itself does not create any perceptions, but may enable conscious perceptions which include sensing as well as reasoning.

The most valuable senses in interpreting and sensing the environment aesthetically are vision, hearing, smelling and touch (Porteous 1996). The last sense has, however, little importance when sitting on a bike since bicyclists are not in touch with anything else then their own bike when they are bicycling. Of particular importance in relation to bicycling, in addition to visual sense, hearing and smelling are kinaesthetic sensing. Kinaesthesia, sight and touch are the sensory organs that enable the human body to experience urban space and to give strong feelings to spatial qualities (Tuan 1977) in addition to hearing in terms of e.g. echo.

## 1.2 The influence of motivational factors

Perception is not the passive receipt of sensory signals, but can be shaped by learning, memory and expectations (Goldstein 2007) and influenced by every lived experience, a dynamic background which can change (Dahlberg et al. 2001). This is

affected by the particular life conditions of an individual and includes both material and immaterial living circumstances such as employment situation, availability of material resources, as well as the person's physical conditions. What can be learned from phenomenology for the purpose of this study is that motivational factors, both cultural and individual, influence how sensory information can be interpreted into aesthetic meaning. Individual factors are for example objectives, attitude and expectations. Different groups of cyclists have for instance different needs and preferences (Skov-Petersen et al. 2012) and cycling for utilitarian purposes is likely to be influenced by determinants different from those that influence other forms of cycling (Heinen et al. 2010). Being able to count on travelling time on the way to work is likely important to many commuting cyclists. A cyclist who needs to bike to and from work in order to save money likely will experience the route environment in a different manner than one who chooses to bike to work to get physical exercise. The need to gain high speed or to avoid heavy traffic is not the same for a person on a racer bike as for a parent carrying a child in a van (Skov-Petersen et al. 2012).

Bicycle-commuting culture also varies from one city to another and is in constant transformation. Cycling as a way to move around allows other possibilities of discovering a city, with all its hidden routes and various urban spaces, than other modes do (Fleming 2012). Earlier studies show that bicycle-commuting culture can be more than simply transport from A to B. A recent study from Portland, USA shows that people who bike to work enjoy their commutes the most (Schmitt 2013). One of the most commonly cited reasons for cycling in UK is enjoyment and fitness, as well as low cost, flexibility and relative speed (Gatersleben and Appleton 2007). Compared to other commuter modes, cyclists in UK were more likely to report that their journey to work was pleasant, interesting and exciting (Gatersleben & Uzzell

2007). In Copenhagen about 30% of cyclists are of the opinion that bicycling is a pleasant way to travel through the city landscape (Skov-Petersen et al. 2012). In Odense, a medium sized city in Denmark, a connection was found between cycling as a form of transport and a vision for a lifestyle in general (Troelsen 2005). Attitudes towards cycling thus appear to differ from one city to another. At any rate, the examples from Britain, Denmark and the USA indicate that, although the cities involved are at different stages of contemplating cycling, attitudes towards cycling in those cases are strongly connected with vision of lifestyle. It is likely that an aesthetically attractive environment forms part of that vision.

Notably, the literature referred to above seems to be based on perspectives of middle class people in western culture. This paper may therefore be biased and so not provide truly general information on commuting cyclists' aesthetic experience.

### 1.3 Spatial engagement when bicycling

In phenomenology it is assumed that perception starts with the body (Merleau-Ponty 1962). Accordingly, a key factor in understanding the relationship between perception and the urban environment involves the engagement of the human body in a spatial sense as the perceiver senses the various objects in the environment by their relative position. Forward, backward and sideways are experienced differently in the act of motion (Tuan 1977). Kinaesthetic sense informs the individual what her/his body is doing in space through the sensing of movement registered by its joints, muscles and tendons (Urry 2007). Spatial experience is also affected by travelling speed and the interaction with other bodies. A crowded urban space has thus different characteristics from one with no people or cars. Cycling speeds are variable, but in urban areas they are most often in the range of 10-25 km/hour, which is faster than walking but slower than driving speed. It is concluded that a theory of

visual aesthetic experience needs to take into account how an individual engages in spatial experience, which differs in the case of static versus motional perspectives (see Berleant 1988).

Cycling means that the cyclist must keep balance whilst sitting on a two-wheeled vehicle with the feet on the pedals, using physical effort to move on and eyes to figure out what is happening ahead, sometimes looking quickly to the sides and being sensitive to the environment – all at the same time. It has been argued, for instance in the pamphlet "Visuel cykelkultur" (Borggreen & Kastrup 2010), that the kinaesthetic pleasure of cycling will be highest if the cyclist attains a certain rhythm at a level where a technical device is no longer a limitation and a feeling of "flow" occurs. Forced stops and speed reductions due to traffic and traffic management occur quite often in a city, in which case the cyclist has to start again with the necessary physical effort to gain a new "flow".

### 1.5 Bicyclist's interpretation of sensory information

Riding a bicycle affects how the senses work and how perception of the environment is interpreted. Which sensory information from the environment bicyclists might interpret into a meaning is limited to the features which they pay attention. Spinney (2006, 2007, 2009) and Jones (2005) have studied sensory and kinaesthetic factors in relation to cycling. Spinney (2007) suggests that when riding a bike, the street is a place where visual sense is important, but here it no longer works in isolation from the other senses. He points out that there is a limit to the amount of sensory input the cyclist can handle. Heavy traffic and many intersections over a short distance may much reduce his/her perception of other features. Cycling in the urban environment requires that part of the cyclist's concentration is on controlling his/her balance; the cycling rhythm and his/her own safety due to other travellers.

The studies carried out by Spinney do not consider aesthetic experience but focus on how sensual experience from the environment influences a cyclist's behaviour and how this is related to kinaesthetic sensing. However, kinaesthetic sensing and the limit of sensory information the cyclist can handle in a complex urban situation likely also influences consciousness of aesthetic features.

## 2. How travelling speed affects attention and visual experience in urban space

### 2.1 The effect of travelling speed on readability

The literature on urban design contains studies and theories that have improved understanding of how movement affects visual perception in urban space. Notably, theories within the field of urban design address how people integrate elements into a total structure in their minds, and how visual perception of the urban space relates to travelling speed.

Several urban design theorists have studied how travelling speed and the legibility of the environment affect visual experience from the perspective of car drivers (Appleyard et al. 1966) and from the viewpoint of pedestrians (Cullen 1971; Gehl 1987, 2010; Gehl et al. 2006). It seems likely that interpretation by cyclists of visual perception is in many ways similar to that of car drivers. Nevertheless, due to less travelling speed and the fact that cyclists travel in the open air, their attention to elements as well as their sensual perception – both visually and by other senses – should be more detailed than for a person in a moving car but less detailed than for a pedestrian. The earlier studies are therefore expected to give an insight into cyclists' visual experience of the environment.

The visual experience of a person moving through ever changing urban spaces involves, according to Cullen (1971), the existing view at each time and the emerging view. A moving person in the street is either in a particular place, entering it or leaving it. The effect of being very close, nearby or far away is thus experienced relative to how soon the emerging view becomes the close by view.

Gehl (1987, 2010) and Gehl et al. (2006) have studied the effect of the scale of the urban space on pedestrians. The human sensory apparatus and systems for interpreting sensory impressions are adapted to walking speed. Large-scale and sprawled built-up areas do not offer much experience for the senses that are closely tied to strong, intense feeling (Gehl 2010). A street with a high degree of complexity, like many details and frequent turns, will, however, be experienced as more complex by cyclists than by pedestrians. The rhythm of change occurs faster as travelling speed becomes higher. The environment is also experienced differently at different cycling speeds (Forsyth and Krizek 2011).

According to the studies of Appleyard et al. (1966), it is convenient to organise the elements of visual sequence into identifiable objects that are interpreted as moving in urban space. The perceiver locates moving objects and spaces and organises them into an overall structure in her/his mind in order to orientate her/himself and interpret it in a meaningful way in relation to her/his objectives. Over a longer time, identifiable objects, motions, spaces, orientated structures and meanings are organised into complex sequences (Appleyard et al. 1966). This is the case for commuters in particular. Since they have cycled the same route many times, it is likely that they have grouped the elements of the environment into a general, yet coherent sequence. In a complex environment grouping of features increases with increased travelling speed because more attention is required by the cyclist to control

the sensory influences from the environment. With decreasing complexity of the environment and for a given travelling speed, it becomes possible to experience it in more detail.

### 2.2 Orientation and elements of interest

Lynch (1960) maintains that the orientation of a person presupposes an environmental image, a generalised picture of the physical environment. This image is the product of both instantaneous sensation and of the memory of past experience from the environment and it is used to interpret information and to guide action. Lynch (1960) suggested that a good environmental image gives an important sense of emotional security. In a similar way, it may be assumed that cyclists produce in their mind an image of their route and focus in particular on elements that strengthen their feeling of orientation within the environment. One could see each place entered as a certain stage of the whole trip. Further, Lynch (1960) suggests that the environment may be organised around a set of such focal points or places, or be broken up into named regions, or linked by "remembered" routes.

The physical elements that shape the urban space and might catch cyclists' attention depend on which elements meet his or her expectations on the route ahead. Tietjen (2011, p. 69) discussed the importance of uncovering urban potentials: "… urban is not so much to be understood in terms of formal characteristics but rather as a set of performative capacities." Essential criteria of urbanity are, for example, accessibility and interconnectedness (Tietjen 2011). It is important to uncover which physical characteristics could have a role for commuting cyclists' expectations, which could have meaning in relation to the mode of travel and which could be interpreted symbolically. It is likely that many commuters have

expectations related to functional qualities of the infrastructure, as earlier studies on bicycling demonstrate.

The urban design theories discussed in this section focus on the different physical elements of urban space and how their composition and interrelationships at any time constitute its characteristics, as well as how vehicle speed affects the manner in which these characteristics could be perceived visually. Speed depends on travel mode and, therefore, affects the readability of the environment and how elements perceived visually are organised in the mind of the travelling person.

## 3. Application of environmental aesthetics theories to interpret bicyclists' aesthetic experience

### 3.1 Environmental aesthetics theories

Theories that deal with aesthetic appreciation are important in explaining how, why and for what reason commuting cyclists might interpret perceived elements or features of urban space in terms of aesthetic meaning. For this purpose several theories with in the field of environmental aesthetics are useful. The subject of environmental aesthetics considers the appreciation of both the natural and the human-made environments, including the human-influenced and human-constructed environments (Carlsson 2012). Environmental aesthetics, unlike philosophical aesthetics that emphasise appreciation of art, incorporates various kinds of empirical work concerning the human aesthetic experience of environments. There are a number of different approaches in this kind of research (Nasar 1988). For example, one is linked to environmental design and planning disciplines, such as landscape architecture and attempts to analyse and assess aesthetic experience in terms of the

design features recognised and valued by these disciplines. Attempts have also been made to apply to aesthetic theory a wide range of aesthetic experiences based on, for example, environmental psychology (Bourassa 1991).

It is pointed out in Sections 1 and 2 above that the physical elements that shape the urban space and might catch cyclists' attention depend on which elements meet his/her expectations on the route ahead. These elements could have a symbolic or instrumental meaning or any combination of them, and be affected by a notion of distance. These elements and their aesthetic meaning are addressed by the following theories dealing with environmental aesthetics: (1) the importance of instrumental values in relation to aesthetic experience (Heath 1988), (2) the symbolic meaning of the urban environment (Lang 1988) and (3) the examination of two modes of experience derived from the notion of distance (Berleant 1988).

### 3.2 The influence of instrumental determinants

Heath (1988) has discussed the influence of instrumental objectives on aesthetic experience when the main objective by travelling is instrumental, such as going to and from work. Then he suggests that the interest in the city is likely to be experienced casually or momentarily and that instrumental values of comfort and absence of interruption will dominate. In this context, the route cycled could then be valued mainly by the features that contribute to the success of getting to or from work safely and on time. Cycling for recreational purposes is an activity that is likely to seek aesthetic experience for its own sake. Heath's (1988) hypothesis is that instrumental behaviour will inhibit aesthetic response while behaviour that seeks experience will permit or even enhance it. Many earlier studies on bicycling have observed that a comprehensive network of well maintained, separated and continuous infrastructure that guides cyclists quickly will attain high value, but a

bicycle route that is little more than signs and a line on a map will have low value (Abraham et al. 2002; Pucher & Buehler 2009). Heath (1988) based his hypothesis on Maslow's (1943) hierarchy of needs where cognitive and aesthetic needs are placed as least urgent. Perhaps the aesthetic need is not separate from but integrated with other needs, as Maslow also found in a later study (Maslow 1954). However, earlier studies have suggested that aesthetics influence cyclists (Hochmair 2005; Naess 2005; Su et al. 2010) and certain route environments are found to have more positive impact than others (Abraham et al. 2002; Tilahun et al. 2007; Wahlgren 2011). The mentioned impact may be affected by motivational factors as was pointed out in Section 1.

### 3.3 Symbolic meaning

Aesthetic experience can be divided into sensory, formal and symbolic interactions between people and their environment. Sensory aesthetics are concerned with the pleasing effect of the sensations received from the environment, while formal aesthetics are independent of experience and cover the tasks of urban design disciplines (Lang 1988). The formal characteristics of the built environment are expressed by, for example, rhythms, complexities and sequences of the visual world (Norberg-Schulz 1971). Since symbolic aesthetics have an associational meaning, where the environment gives people pleasure, an understanding of such aesthetics involves an understanding of the positive and negative attitudes that people have about the symbolic meanings available in the environment (Lang 1988). As pointed out in Section 2 above, it is important to look at features in the urban space that have the potential to produce symbolic meaning that meets commuting cyclists' expectations. For instance, if a person commuting home from work thinks it is important to gain stress reduction after a hard working day, then an environment

that symbolises this aim in its characteristics will be evaluated in a positive manner. When this is the case, stress reduction theories (e.g. Ulrich 1981, 1983; Ulrich et al. 1991) within environmental psychology could also be made use of.

### 3.4 The notion of distance

The distance between the elements that shape the urban space and affect the cyclist is very important for his/her aesthetic experience. Elements that shape urban space have certain locations in the setting and indicate distances between elements and the perceiver who is moving in that space. The concepts of the panoramic landscape and the participatory landscape lead to two distinct modes of aesthetic experience (Berleant 1988), see Fig.1

***Fig. 1.*** *The concepts of the panoramic landscape and the participatory landscape lead to two distinct modes of aesthetic experience. The former has only visual value while the latter draws on various senses.*

*To the left: A panoramic landscape along a new bicycle path in Malmø in Sweden. The nearby participatory landscape includes mainly asphalt, closeness to a road and a slope.*

*To the right: Green route in Copenhagen. Cycling among the trees that shape the urban space may stimulate multi sensual experience in many ways; the sight to vegetation, the smell from the leaves and the sound from birds.There is no noise from traffic. The path has also a visual continuity in this picture and it is unlikely that anybody will disturb the continuous feeling of flow since this path is only for cyclists.*

The panoramic landscape is an inaccessible region, open to visual perception only. By contrast, the nearby landscape, which is experienced at a short range, is not exclusively visual, but draws on kinaesthetic responses, apprehended by the body of mass, of texture and of the various sense qualities that all influence experience gained from the urban space (Berleant 1988). Here, the landscape is frequently changing, meaning that it can stimulate cyclists' curiosity more often, make them occupied with what is to be experienced. The nearby landscape causes sense of time to be experienced differently from landscape at distance. The latter symbolises continuous movement, which also is of value for commuting cyclists. The same urban space can include both panoramic landscape and participatory landscape within it.

## 4. Summary

### 4.1 The usefulness of the theories for the aim of this study

The objective of this article has been to define a conceptual framework for studying aesthetic experience of commuting cyclists. The following three theoretical fields have been made use of for interpretation of information: 1) phenomenology of sensory perception and experience, 2) urban design theory and 3) theory of environmental aesthetics. None of these theories can by themselves elucidates aesthetic experience of commuting cyclists in a satisfactory manner but, when put together, the theories complement each other and explain various aspects of the complex subject of this article.

Theories on perception as phenomenon (phenomenology – see Section 1), give insight into sensory perception and aid interpretation of sensory information, explaining how perception is shaped by cultural and individual motives. The

phenomenology describes the relationship between a person's perception and the environment by looking at the spatial engagement of the body. On the other hand, it deals in a very limited way with the physical elements and characteristics of the urban space and does not focus specifically on aesthetic experience.

Aesthetic features in urban space experienced by commuting cyclists bear strong relation to expectations and attitudes towards the trip. Studies on the kinaesthetic sense provide deeper understanding on how the various senses work together when cycling. In a complex urban situation, the cyclist can only handle a fraction of the sensory information, thus reducing his aesthetic experience.

Theories within the field of urban design, discussed in Section 2, are instructive with respect to the manner that travelling speed affects the readability of the physical environment by the traveller and how elements can be organised into a total structure in the mind of the person travelling. For commuters, it might be most convenient to organise environmental elements into components of general characteristics, since the route is familiar to the person. Elements that strengthen orientation may gain particular attention. When relatively intense attention is needed to control sensory influences from the environment, grouping of features in the urban space is likely to increase. Also, increased travelling speed has the same affect. At the same time, the speed of a bicycle allows detailed experience, certainly when the urban space requires less attention.

The three theories within the field of environmental aesthetics, discussed in Section 3, are useful in evaluating how sensory information from the environment could be interpreted into aesthetic meaning in the mind of a cyclist. The theory that deals with the relationship between instrumental values and aesthetic experience is

relevant in evaluating the importance of aesthetic features. The theory on symbolic aesthetics is valuable in interpreting the relationship between a cyclist's attitude towards her/his cycling tour and how features in the environment can be linked with emotional well-being. Theory on the notion of distance reveals how spatial engagement and scale of urban space is linked with the cyclist's sensual perception, and reveals which senses are being stimulated. The landscape at close distance stimulates all senses, while the landscape at distance stimulates mainly the visual sense.

### 4.2. A conceptual framework

The features in the urban space that influence the commuting cyclists' aesthetic experience constitute a complex combination of different variables. Cyclists' experience of aesthetic features of urban space cannot be studied as an isolated phenomenon. It overlaps with other experience. One of the main challenges for future research is to separate the aesthetic values from the instrumental ones. An attempt is made here to solve this by combining the different variables discussed in Sections 1-3 into a single conceptual framework depicted in Fig. 2.

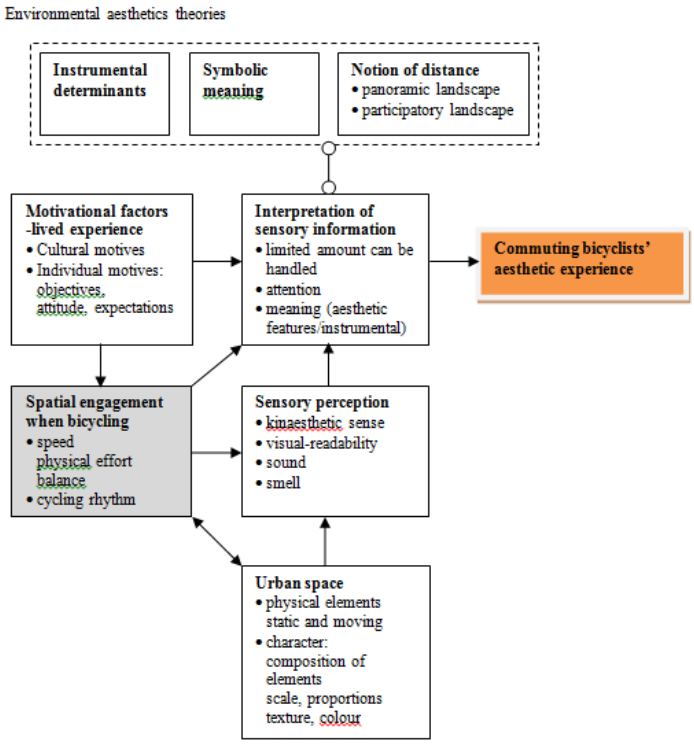


***Fig. 2.*** *The aesthetic experience of commuting cyclists.*

*The figure provides an overall scheme for evaluation of the commuting cyclist's aesthetic experience and how this evaluation is linked to theories on symbolic meaning, instrumental values and notion of distance. Boxes represent themes. Black arrows that point from one theme box to another indicate that the themes at arrow heads are influenced by themes at arrow tails. The theories represent the tool used to evaluate the interpretation of sensory information by the commuting cyclist into aesthetic meaning.*

### 4.3. An example of theoretical interpretation.

Figure 2 shows a bicycle path in the inner city of Malmø in Sweden. The urban space is shaped with buildings in row that define clearly this enclosed streetscape. Another participatory landscape is defined by trees within this streetscape and makes a roof over the bicycle path that passes through the middle of the urban space. The tree trunks separate the bicycle path clearly from the pedestrian area. There is no vehicular traffic nearby. For a cyclist on the way to work in this urban space, the view ahead, as shown on the figure, may be assumed to be good from an instrumental

viewpoint. First of all the distance view shows that the route is predictable for a continuous movement for a while. It is for instance unlikely that pedestrians will walk in the way. Nothing is demanding the cyclist's attention and a cyclist has here full possibility to perceive features in the participatory landscape that might be valued of aesthetic meaning. The trees in the participatory landscape may stimulate the cyclist's aesthetic experience by vision and a sense of smell in addition to a sound from blowing leaves, even from birds singing. The aesthetic meaning of trees and the instrumental quality of this bicycle route is, however, up to the individual cyclist motivational factors.

***Fig. 3.*** *A bicycle path in the inner city of Malmø.*

*Nothing is demanding the cyclist's attention and a cyclist has here full possibility to perceive features in the participatory landscape that might be valued of aesthetic meaning.*

Figure 4 shows a street corner in the inner city of Copenhagen where there usually is much traffic, both motorised and bicycle traffic. In such situation bicyclists likely pay most of their attention to other street users, both other bicyclists and cars. In such situation, awareness of other characteristics in the urban space, such as buildings or vegetation is limited. However, good instrumental facilities, as is the case here, improve the situation.

***Fig. 4.*** *This traffic corner in the inner city of Copenhagen requires much attention from cyclists. Awareness of other features of in the urban space is therefore limited.*

## 5. Discussion

The manner in which the cyclist is able to interpret received sensory information is a dynamic phenomenon affected by the impact of various motivational factors (see Fig. 1). Attitude towards the mode of travel and expectations to the urban environment can change with time as both are in continuous transformation. Stimulation can be shaped by past experience in the urban environment and the attitude towards the importance of aesthetic experience is related to the instrumental quality of the route. It is important to bear this in mind when looking at cities at different stages of implementing bicycle culture. For example, access is not simply an instrumental quality to be maximised. “Access cannot be measured by the sheer quantity of things that can be reached at given levels of cost and expenditure of time. Mere quantity loses its meaning once a satisfying level is attained. Value then turns to the degree of choice offered among accessible resources” (Lynch 1984, p. 191).

The extent to which cyclists are conscious of potentially interesting aesthetic features of urban space is affected by other features in the environment that demand attention from the person cycling. One of the main purposes of planning and

designing urban space with respect to influencing cyclists' aesthetic experience should be to stimulate them into being conscious about aesthetic features by minimising the attention required to move on with the desired speed. A congested space with many intersections, frequent turns and many details will require much attention on behalf of the cyclist. By contrast, a continuous urban space with calm traffic and moderate complexity will have the opposite effect.

The extent to which instrumental features reinforce or counteract consciousness of aesthetic features in urban space depends on the cyclist's motivation and attitude towards the trip, as well as conditions in that space. When the urban space requires less attention, modest cycling speed allows the more detailed experiencing of the environment. A satisfying instrumental quality of bicycle routes is a precondition for aesthetic experience by the cyclist. An urban space that lacks acceptable instrumental quality is unlikely to be chosen as a route for cycling. When instrumental needs are solved in an acceptable way, commuters can be further stimulated by including aesthetic features in the urban space.

An important subject for future research is the identification of which features stimulate commuting cyclists' aesthetic experience and which have the opposite effect. Thorough examination of the physical features in urban space that have the potential to meet cyclists' expectations and attitudes is regarded as valuable. The relationship between instrumental determinants and possible aesthetic experience should be studied. Finally, it should be borne in mind that the aesthetic character of bicycle routes likely differs between small, medium sized and large cities.

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## 8.2 Paper 2

# Features of urban spaces and commuting bicyclists' aesthetic experience

**Harpa Stefansdottir**

## Keywords

Bicycle commuting, aesthetic experience, urban space, environmental aesthetics.

## Abstract

The present study provides new insight into how features of urban space stimulate cyclists aesthetic experience when commuting, which features are experienced as aesthetically pleasant and which have the opposite effect. In addition, the study explores what kind of space types contain the most pleasant features and the most unpleasant. The study introduces a special method called *bike-through evaluation*. It involves engaging groups of cyclists to explore how different types of urban spaces are experienced from an aesthetic point of view with commuting in mind. The experiments were conducted with invited participants who cycled pre-planned routes in Reykjavík and Trondheim, which included up to eight different urban space types. The participants commented on their experience both in writing and through discussions. The information so obtained was then interpreted on the basis of theories within the field of environmental aesthetics. The results clearly demonstrate that the most important features in the urban space regarded as pleasing and found to stimulate aesthetic experience include vegetation, view to nature, historical buildings and places, clearly defined streetscapes, and seeing other people at some distance. In comparison, features that have the opposite effect are auto-dominated places and congested streets with car traffic. In essence, an acceptable instrumental quality of a bicycle route favours experiencing aesthetic qualities.

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## Introduction

Bicycling in a city provides an experience of urban spaces with various sceneries, architecture, vegetation, people, smells and sounds. Although cyclists' experiences might yield to new and important knowledge for the design of cycling-orientated urban spaces, this theme has received little attention in academic research.

The concept of aesthetics is of key importance when we try to understand how a person values the qualitative characteristics of urban space, such as its visual qualities as well as features that affect hearing and smelling senses. The impact of aesthetic features on cycling in the urban environment is primarily related to features that affect emotional reactions related to well-being. Improved well-being has often been associated with recreational cycling but has rarely been considered in studies on commuting by bicycle (Garrard, et al., 2012). Earlier studies, however, have observed a correlation between cycling as a means of transport and perception of lifestyle quality such as enjoyment (Troelsen, 2005; Gatersleben and Uzzell 2007; Garrard, et al., 2012; Smith, 2013).

The design of a cycling-orientated urban space has so far almost exclusively focused on instrumental features such as cycling facilities and networks (Forsyth and Krizek 2011). The reason may be traced to policies worldwide to help realise the potential of increasing the share of commuting cycling substantially in order to improve the overall sustainability of our transport systems. Consequently, environmental influences on the bicycle as a mode choice have been addressed in many studies (Heinen, et al., 2010). Compact urban form, which brings origins and destinations closer together, is found to be important in this respect (Næss, 2005; Forsyth, et al., 2009). Also, results have consistently shown that the presence of segregated cycle infrastructure stimulates the share of cycling as a travel mode (Abraham, et al., 2002; Tilahun, et al., 2007; Pucher and Buehler 2009; Pucher, et al., 2010; Larsen and El-Geneidy 2011). Other key features of urban design (see Carmona, et al., 2010), such as the aesthetic dimension, have received limited attention and the field of urban design has so far been little concerned with cyclists' experiences (for exceptions see Timms and Tight, 2010; Forsyth and Krizek, 2011; Fleming, 2012).

The many studies that have been carried out on how various characteristics of urban spaces are experienced when walking (e.g. Cullen, 1961; Gehl, 1987; 2010; Gehl, et al., 2006) are not transferable to cyclists since the two modes have different needs and expectations with respect to the environment (Forsyth, et al., 2009; Forsyth and Krizek 2011). This is especially the case when cycling has a utilitarian purpose (Heinen, et al., 2010). Aesthetic features may alter the character of cycling, but do not likely stimulate additional commuting cycling. However, knowledge about the aesthetic experience of commuting cyclists could provide an important background to the design of cycling-orientated urban spaces.

According to several quantitative studies, certain route environments are found to have a positive impact on cyclists' experiences – for example, a beautiful, green and safe environment in inner urban areas (Wahlgren, 2011), off-street and low-traffic residential roads (Abraham, et al., 2002; Tilahun, et al., 2007) – or a negative impact, for instance, high levels of exhaust fumes and traffic congestion (Wahlgren, 2011).

As none of the earlier studies have specifically examined how features of urban space influence commuting cyclists' aesthetic experience in a qualitative way, the purpose of the present study is to identify physical features of urban space that affect commuting cyclists′ aesthetic judgment and to examine how other features influence their aesthetic experience. In addition, it will be examined what "urban space types" include the identified features.

The study has used a new experimental "bike-through evaluation" research method. It involves using the bicycle and engaging groups of cyclists to explore how different urban spaces are experienced from an aesthetic point of view. Pre-planned routes were cycled together with invited participants. The layout of each route included up to eight pre-planned stops within different space types. The definition of each space type was based on its main physical characteristics – both static (such as scale, variety, dominance of use and complexity) and dynamic, such as people and vehicles in motion. At each stop, each participant was asked to give a short evaluation on a special form designed for the study. They were asked to give an overall description of which features they found stimulating and which they found discouraging in the urban space, with a particular focus in bicycle commuting. After the tour, the experiences were discussed in each group. Four tours were organised, one in Trondheim and three in Reykjavík.

The interpretation of the "bike-through" results is based on theories within the field of environmental aesthetics using mainly Russell and colleagues' (Russell and Pratt, 1980; Russell, et al., 1981; Russell, 1988) methodological approach on affective quality.

# Theoretical framework for evaluation of cyclists' aesthetic experience

## Perception of urban space when cycling

Aesthetic experience refers to a complex relationship between a person's sensuous perception, cognitive understanding and interpretation of the physical environment, which ends with responses to subjective thoughts and feelings during the course of an experience (Cold, 2010; Gobster and Chenoweth 1990; Markovic, 2012). Judgment of the aesthetic quality of environmental features encompasses a wide range of emotional and critical responses, both positive and negative value judgments of an environment (Russell 1988).

Riding a bicycle affects how the senses work and how the cyclist pays attention to features in the environment. Jones (2005) and Spinney (2006; 2007; 2009) suggested that kinaesthetic sensing is of special importance when cycling. It enables the sensory organs of the cyclist's body to sense movement in space and spatial qualities (Tuan, 1977; Urry, 2007). When riding a bicycle, the street is a place where visual sense is important, but here it no longer works in isolation from the other senses (Spinney, 2007). The cyclist's focus of attention to the features in urban space is also limited, because he/she is partly occupied by controlling his/her own safety and balance on the bicycle for further movement, and his/her position in respect of other travelling people (Spinney, 2007). The many things that take place in the urban space ahead in a complex situation (heavy traffic, for example) may occupy the cyclist's attention and at the same time reduce his/her awareness of features that have less importance. It is thus possible that a cyclist will not pay attention to aesthetics in complex urban situations.

The possibility to move on continuously is dependent on the territory of the cyclist, his/her possibility to move on without being disturbed by other travellers entering or threatening his/her territory. A segregated cycle infrastructure with priority at intersections, which is an instrumental feature, enables continuous movement by allowing the cyclist to maintain a constant pace. Such instrumental feature along a bicycling route influences the kinaesthetic sensing of a bicyclist.

A theory of a visual aesthetic experience needs to take into account how an individual engages in spatial experience which differs in the case of static versus motional perspectives (Berleant, 1988). Aesthetic theory, as derived from the manner cyclists engage in spatial experience, explores how they perceive features of the urban space when moving at cycling speed. This includes all features that both shape the urban space and are within it, static and moving. A crowded urban space, for example, during the peak hours of the day, will thus most likely be experienced differently from a deserted one.

## Environmental aesthetics

Theories within the field of environmental aesthetics are considered useful for this study in explaining how, why and for what reason commuting cyclists might interpret perceived elements or features of urban space into aesthetic meaning. The field focuses on the appreciation of both natural and human environments (Carlsson, 1998, 2011) and uses scientific methodologies to assist in explaining the relationship between physical stimuli and human response (Nasar, 1988).

In order to identify cyclists' aesthetic experiences, it was found to be convenient for this study to rely on cyclists' aesthetic judgments. A person's judgment of places is described with adjectives which Russell (1988) calls "affective appraisal". Such appraisal occurs when a person judges something as having an affective quality, such as being pleasant, likeable, exciting and so on and thus resembles both emotions and cognitions (Russell, 1988). He calls the objects involved in aesthetic experience "affective components" (ibid).

Russell and Pratt (1980) have proposed a verbal scaling system with a circular order, the validation of which was further confirmed in a factor analytic study (Russell, et al., 1981). With this approach, the terms to describe affective qualities of places can be systematically interrelated. The network of these interrelationships has been illustrated with a diagram or, according to Russell (1988), a ″spatial metaphor″ (Fig. 1). It consists of two bipolar dimensions. The horizontal axis ranges from extreme unpleasantness through a neutral point to extreme pleasantness. According to this system, the judgment of an element or feature of urban space that is found to be neither pleasant nor unpleasant can go in two opposite directions. The vertical axis concerns the arousing quality of a place, and ranges from sleepy towards extremely arousing. The categorical affective descriptors that include Exciting, Gloomy, Distressing and Relaxing separate the diagram into four main areas (Fig.1). Russell (1988) presented a more detailed layout including more refined environmental descriptors within each of the four categorical ones (Fig. 2). Russell's methodological approach has been applied in this paper in order to systematise the cyclist's judgment of the aesthetic quality of the different environments.

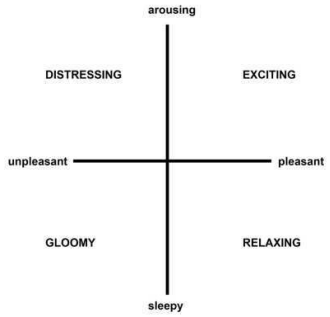


***Fig. 1.*** *A spatial representation of descriptors of the affective quality of environments*

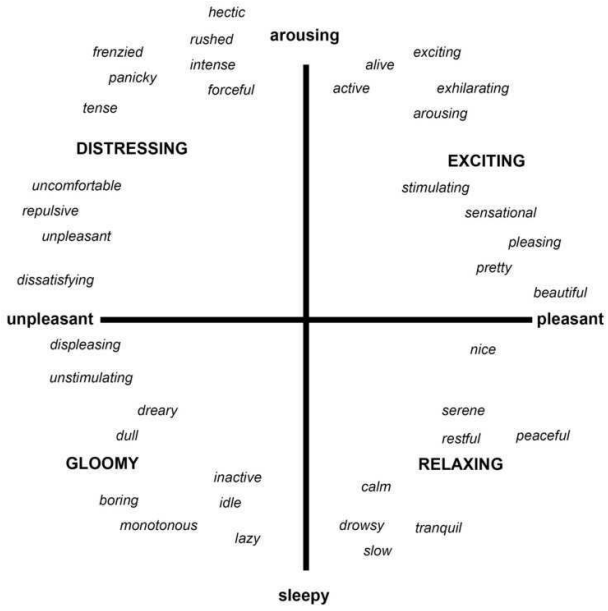


***Fig. 2.*** *Russell's (1988) 40 descriptors of the affective quality of the environment located in the diagram of Fig. 1.*

Three theories were used to interpret the aesthetic meaning of cyclists' experiences in this study. The first theory, the notion of visual distance, is seen as an important feature in visual perceptual experience. Applying this concept to the urban landscape and environmental design results in two different modes: the "visual landscape" at distance and the "participatory landscape" in close proximity (Berleant, 1988). The second theory reveals the symbolic meaning of the environment. From this viewpoint, the environment can express an associational meaning with respect to, for instance, the shape and proportions of volumes, the degree of enclosure (Lang, 1988) and the dominating use of the space. The third theory involves instrumental determinants. The values of instrumental features for aesthetic experience are reflected by Heath (1988) who has applied Maslow's

(1943) "hierarchy of needs". Heath suggested that aesthetic experience of a path or transportation network can be reinforced, if instrumental quality is as expected and reduced if a path lacks such quality. This argument has led the present study to expect that the way in which a cyclist values aesthetic quality is influenced by instrumental values.

# The bike-through evaluation method

## Mobile methodology

To identify the features in urban space that affect cyclists' aesthetic judgments and to examine how other features influence their aesthetic experiences requires a method that captures the complexity of the phenomenon. Such a method should be rich in qualitative measurements, include kinaesthetic sensing as well as different sensory influences from the urban space that, according to Goodman (1991), include sound, smell, and motion. For these purposes, this study has developed a mobile method termed "bike-through evaluation".

Mobile methodologies focus on the sensing of places when moving in real urban spaces (Sheller and Urry 2006). The researcher is mobile and while moving through the spaces under focus, he/she either implements or governs the study. Several investigations have made use of mobile methods by walking (see e.g. Hein, 2008; Jones, et al., 2008; Evans and Jones, 2011) but fewer by cycling. Spinney (2006) and Jones (2005) have, however, explored the importance of kinaesthetic sensing when cycling. The usefulness of mobile methodologies lies in the gathering of important qualitative data from informants. As pointed out by Hein et al. (2008), the walk-through interview offers great potential for exploring environmental perception. It is a fast and easy way to get an indication about what is positive and what is problematic in a specific environment and is a simple method to obtain viewpoints, experience and dialogue (de Laval, 2006). In addition, it focuses effectively on features in the places under study (Evans and Jones, 2011).

## Implementation of the bike-through tours

The bike-through evaluation research method involved pre-planned bicycle routes. Cyclists were invited to cycle these routes with the researcher. Each route included up to eight space types with different characteristics, and the same number of stops. During the tour, the participants were asked to make individual evaluations on a form specifically designed for the study. The form requested an overall evaluation of both stimulating and discouraging features on each space type with bicycle commuting in mind. In addition, the participants could suggest improvements. At the end of the tour, each participant was asked to write on the evaluation form which street or route part (space type) they liked the most and which one they disliked the most and for what reasons. At the end of every cycling

tour, the evaluations, the participants' experiences and any topical issues related to commuting were discussed.

The tours were about 10 km long. Three tours were organised in Reykjavík (May, 2011) and one in Trondheim (September, 2011); each tour had 5–7 participants, the maximum number of participants that could join an in-depth group discussion. An invitation for participation was sent to bicycle-clubs and organisations with interests in bicycle commuting. Altogether 15 cyclists participated in Reykjavík and 7 in Trondheim. The season and the relatively high number of existing groups involved in cycling issues in Reykjavík might explain the difference between the numbers of participants in the two cities. In Reykjavík, local cycling enthusiasts have campaigned for years for a more bicycle-friendly policy. This seems to have created atmosphere that stimulates participation in cycling-related activities. The cyclists enrolled in the study were all experienced commuting cyclists and most of them were middle-aged. The present research method requires that each participant is physically able to cycle 10 km and has 2.5 hours available for the study. These prerequisites may have affected the decision to participate.

The total duration of the trip was about 70 minutes. Each stop lasted about 5 minutes and as the distance of the trip was limited to 10 km it could be cycled within 30 minutes. Three of the tours started just after work during the peak hour. The time was selected to test how congestion affected the cyclists' experience. One tour in Reykjavík was conducted on a Saturday morning to give those who were busy just after the workday an opportunity to participate.

The objective of the layout of each route was to include as many different urban space types as possible. The characteristics of each space type are described in Section 4. The tour in Trondheim, which generally has a hilly landscape, was made through a rather flat area. Slopes require more effort from cyclists and do certainly affect their experiences. Avoiding the hilly landscape in Trondheim made it easier to concentrate on the effect of aesthetic experience and to cover the planned distance within the time limit.

# Space types

## Classifying space types of post-war cities

The methodological approach to define space types to investigate in the bike-through evaluation was based on the main physical characteristics of urban space. Buildings, natural landscape and vegetation shape the urban space and affect its aesthetic character, for example, by their scale and proportions and by their relation to each other. Their composition can have an effect on a person's aesthetic experience as well as their visual richness, variety, complexity or dominance perceived in an urban space (Porteous, 1996). Dynamic characteristics such as rhythm and speed in which people enter and leave the space, can also influence this experience.

The 10 km route was positioned in the central parts of Reykjavík and Trondheim, because these districts are composed of urban space types of great variety. A route here can, for example, pass along heavy traffic roads, through spaces close to rural areas, along residential streets, through narrow and congested streets in the city centre or through open spaces with a sprawling character.

Reykjavík and Trondheim have a similar urban planning history as do other Nordic and European post-war cities. The dominance of the private car has affected the characteristics of many urban spaces and has had negative consequences. Studies on land use in the city of Reykjavík show that nearly 50% of it is covered by traffic facilities (Sigurdsson, 2004). Across the Western world, the tendency in the last decades has been to optimise road size for automobile capacity without considering the consequences with respect to the scale of the neighbourhood (Calthorpe and Fulton, 2001). Efficiency has been correlated with large, centralised organisations and activities, exemplified by the view that "bigger is better". Suburban sprawl has been described (by Duany, et al., 2000) as an abstract system of carefully separated elements of single use where daily needs are located within driving distance.

Urban spaces that possess low-density characteristics can be found around many workplaces within a short distance from the central areas in both Reykjavík and Trondheim. The automobile landscape has become what Urry (2007) calls "dead public spaces" where transport by car takes place between private worlds. Urban spaces where mobility occurs have been largely theorised as relatively meaningless non-places (Augé, 2008). During my conversations with cyclists in Trondheim and Reykjavík, it was pointed out, however, that the routes along the main infrastructure for traffic often provide the most direct passage through cities.

The process of the modern zone planning has often resulted in separated neighbourhood units that can be reached by car or public transport. This has often resulted in in-between spaces, including vacant fields and former paths or routes that are no longer in use. Research on vacant, little used and mostly unkempt fields and strips is important because to classify them only as barriers, buffer zones or vacant land is to simplistic (Wikstrøm, 2005).

Since Jane Jacobs's (1961) critiques of the 1950s' zoning policies and encouragement for vibrant urban communities with dense, mixed-use neighbourhoods, the discussion about how design can contribute to pleasant and joyful street life and outdoor activity has been growing (followed by, e.g., Whyte, 1980; Appleyard et al. 1981; Gehl, 1987). The physical implications of the pedestrian scale (often termed the human scale) may be realised in the form and detail of buildings as they relate to the street (LeGates and Stout, 2007). As an example of a contribution of a building to street life is when activities in first floor reflect openness and appeal to pedestrians (Gehl, 1987). Pedestrians are thought to experience narrow streets and small places more intensively than large-scale urban spaces (Gehl, 2010) but this is not necessarily the case with cyclists. Research is required to verify this.

The tendency has been to promote cycling by facilitating routes with special infrastructure. However, cyclists might choose routes other than those actually planned. This might especially be the reality in Trondheim and Reykjavík because it is permitted to cycle everywhere both on traffic roads and on pavements among pedestrians. In Trondheim, for example, many cyclists choose the paths along the river Nidelva although these paths are not marked on the bicycle route map.

## Definition of space types

Table 1 lists eight space types typical to Reykjavík and Trondheim. Their characteristics are described below.

| Name of space type | Characteristics |
|---|---|
| | Upper bullet: main physical characteristics of the urban space (static)<br>Lower bullet: dynamic characteristics (moving) |
| **Cars only** | o separate very large buildings, road size for auto-capacity/ direct main route, few details, continuous open space |
| | o no street life, maximum flow of cars with high speed |
| **Traffic street** | o often large separated buildings, few details, |
| | o motorised traffic has priority over other users in e.g. crossings |
| **Low-density auto-oriented zone** | o single-use elements, big car parking areas, unclear definition of streetscape, zoning |
| | o motorised traffic has priority, unclear pattern of movement |
| **Hidden route** | o a street, trail etc. that is not generally used |
| | o no users at all |
| **Urban greenery** | o public green space, human-made |
| | o no motorised traffic, recreational activity |
| **Residential streets** | o often vegetated, quiet |
| | o calm traffic |
| **Natural space** | o within or by the edge of the city, view to nature |
| | o no motorised traffic, recreational activity |
| **Enclosed streetscape**<br>pedestrian priority<br>motorised traffic priority | o relatively narrow, dense, inner city streets, buildings in row define clear streetscape, frequently changing rhythm in streetscape |
| | o diverse use, activities contribute to street-life |

***Table 1. Urban space types as defined in this article***

**The space type “cars only”**

Figures 3-A and 3-B illustrate two urban spaces close to the centres of Reykjavík and Trondheim that are designed with the greatest emphasise on high speed and maximum flow of private cars. These ″cars only″ space types also have relatively long distances between other activities, resulting in few crossings and continuous high-speed driving.

**The space type “traffic street”**

Figures 4-A and 4-B show urban spaces that are first of all intended for motorised traffic, which has priority over other transport modes along the street. These ″traffic street″ space types are located in relation to activities along the street or nearby, such as service buildings, to which accessibility is regulated often with priority for motorised traffic in crossings, which are rather frequent. The scale of the space and the architecture of new urban buildings are influenced by the conditions of motorised transport (Gehl, et al., 2006).

**The space type “low-density auto-orientated zone”**

The low-density characteristics around workplaces often reflect the high degree of prioritisation for cars. The environment typically consists of large, isolated buildings surrounded by substantial asphalted areas for car parking. The definition of the streetscape is often unclear and the same applies with the definition of pattern for movement. Figures 5-A and 5-B depict an example of such a space type, here termed “low-density auto-orientated zone”.

**The “hidden route” space type**

Figure 6 shows the space type called “hidden route” and is exemplified by an old street in Reykjavík that is no longer in use, but could serve cyclists well. Studying the experience of a hidden route aimed to explore whether the participants were familiar with routes alternative to those actually planned for cycling and how the unknown would influence their experience. The routes tested were quieter and calmer than the planned routes along traffic roads.


**Fig. 3. The space type "Cars only"**

A From Reykjavík: New Hringbraut
B From Trondheim: Havnegata


**Fig. 4. The space type "Traffic street"**

A From Reykjavík: Sudurlandsbraut
B From Trondheim: Prinsens gate


**Fig. 5. The space type "Low-density auto-oriented zone"**

A From Reykjavík: Skeifan, a shopping and commercial area
B From Trondheim: Havnegata Brattøra, a recently renovated area by the harbour

**Fig. 6. The space type "Hidden route"**

This old street in Reykjavík is not in use any more but could serve cyclists well. It has the potential both to be more direct and to have a better microclimate than another nearby route that runs along a main traffic road.

**Fig. 7. The space type "Urban greenery"**

Laugardalur, Reykjavík


**Fig. 8. The space type "Residential street"**

A From Reykjavík: Laufásvegur
B From Trondheim: Nedre Møllenberg gate.


**Fig. 9. The space type "Natural landscape"**

A From Reykjavík: Ægissída.
B From Tronhdeim: Nidelva river.


**Fig. 10. The space type "Enclosed streetscape"**

From Reykjavík:
A Hverfisgata, trafficked "Enclosed streetscape",
B Laugavegur, pedestrianised "Enclosed streetscape".

**The space type "urban greenery"**

Figure 7 shows the space type called "urban greenery"; the example is from Reykjavík. This space type refers to human-made green areas within the structure of a city such as urban parks. Paths through parks are generally designed for pedestrians and cyclists and provide a route away from car traffic. The urban space is characterised by vegetation, which is the main element in shaping the urban space. The "urban greenery" space types are generally planned for recreational activities.

**The space type "residential street"**

The space type "residential street" (Figs. 8-A and 8-B) refers to the characteristics of the residential streets in the central areas in Reykjavík and Trondheim. Generally the streets do not have separated bicycle lanes, but some are, however, marked on the bicycle route map in Trondheim. The traffic is most often calm, although the streets are dominated by parked cars. The streets are lined by private housing and gardens and limited public activities. Quietness, often also vegetation, is typical for this space type. The manner in which the residential streets connect to the surrounding infrastructure network may be various and the distance between crossings is most often short.

**The space type "natural space"**

In both Reykjavík and Trondheim, areas with natural landscape have paths that were originally planned as recreational routes. In Trondheim, some of these paths sometimes follow the banks of the river Nidelva (Fig. 9-A) which runs through the centre of the city down to the adjacent fjord. The view to the natural landscape, the river and the vegetation along it are important characteristics of this urban space.

A continuous path goes along the coast around almost the whole city of Reykjavík (Fig. 9-B). There are not many workplaces nearby. However, the path connects different areas from the suburban areas to the central areas. This route is characterised by views of the natural landscape, vegetation and the sea. There is no motorised traffic close by.

**The space type "enclosed streetscape"**

Many inner city streets within the old central parts of Reykjavík and Trondheim are relatively narrow and they are bordered on one or both sides by continuous walls of houses close to the street with a changing rhythm of details in the facades. Often activities in the houses bear relation to the street and contribute to street life. In some cases such streets are the most direct

routes through the city centres. In the bike-through evaluation, this space type is called "enclosed streetscape". In some enclosed streetscapes, the car has taken over as the main transport mode (Figs. 10-A). In other streets, pedestrians are given priority (Figs. 10-B).

# Results

## Preliminary studies for interpretation of the results

The participating cyclists were not instructed to comment on aesthetic experience in particular, but only their overall experience in the different urban spaces. Therefore it was not expected that they would make a distinction between features that could be classified as aesthetic, instrumental or kinaesthetic in their evaluations.

In order to ease the interpretation of the results and define a terminology to describe them, the following preliminary study was made. The words used by the participants, both on the written notes and used in the oral discussions, were first grouped by theme into aesthetic, instrumental and kinaesthetic phenomena. Then their use of words was studied to identify which physical features were linked to specific affective qualities and senses. Three categories were formed:

1) The possibility to move continuously (related to kinaesthetic sensing)

2) Stimuli by vision (or lack of such stimuli)

3) Stimuli by sound and smell (or lack of such stimuli)

By identifying affective appraisals in the cyclists' evaluations, both written and oral, an assessment was made as to which physical features were of significance for their aesthetic experience and how they judged the different physical features. The affective appraisals indicate where the linked physical features (affective quality) may be located in Russell's (1988) diagram (see Figs. 1 and 2). The appraisals were translated by the author from Icelandic and Norwegian to English. As the participants used many of the appraisals with the same meaning as those represented in the diagram of Russell (Fig. 2), it was easy to do the positioning. In order to adapt Russell's diagram of descriptors to the results of the bike-through evaluation, the original four categories were fine-tuned into eight.

## Aesthetically judged features of the urban space types

The fine-tuned Russell diagram (Fig. 11) represents a simplified summary of the most frequently mentioned physical features by the participants in the bike-through evaluation that were linked to their aesthetic judgment.

For their aesthetic judgment, the cyclists mostly focused on those physical features that had to do with vegetation, a view to nature, the character of the streetscape and the complexity of the visual stimulation. Also the presence or absence of motorised traffic and the presence or absences of other people were of importance to their experience.

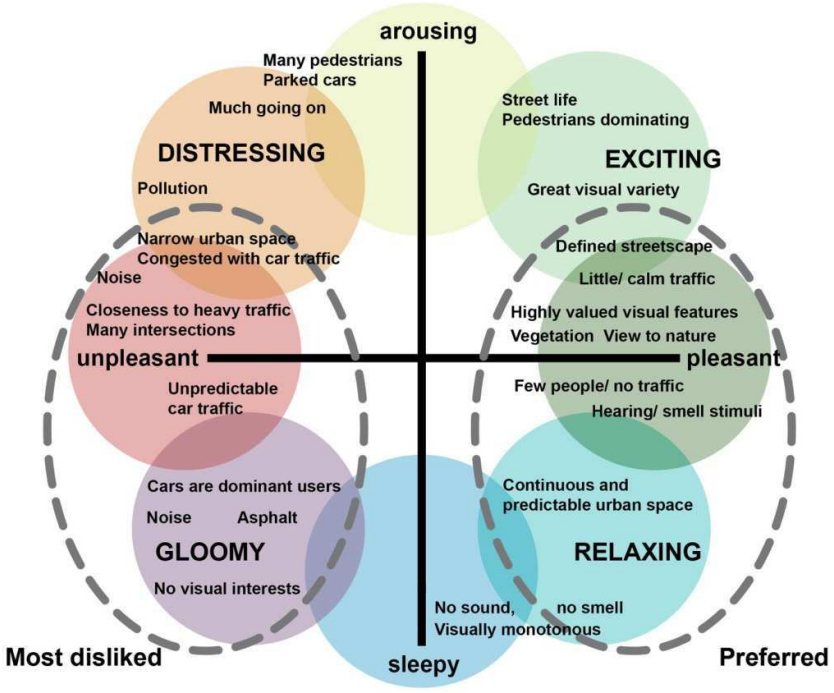


***Fig. 11. Modified Russell type diagram***

*The diagram shows the eight categories (coloured circles) used in this study. The most important physical features of the urban space obtained from the bike-through evaluation are shown with small lowercase letters on the diagram. The two grey circles embrace an important outcome of the bike-through evaluation. The circle to the left matches the results of the most disliked routes, ranging from gloomy to unpleasant, and to the right the preferred urban spaces ranging from relaxing to pleasant.*

Further, by looking at the cyclists' choice of best and worst streets in the evaluation form, it appears that the best streets included physical features associated with the categories Pleasant and Relaxing while the worst ones included features of the categories Unpleasant and Gloomy. Most of the investigated urban space types included features that influenced aesthetic judgment in more than one category (see Fig. 12). The following sections present the characteristics in the most aesthetically stimulating urban space types, the most discouraging space types and the ones that are in-between. In addition, the identified features that were judged to bear an aesthetic quality and those experienced as discouraging within the different space types are described.

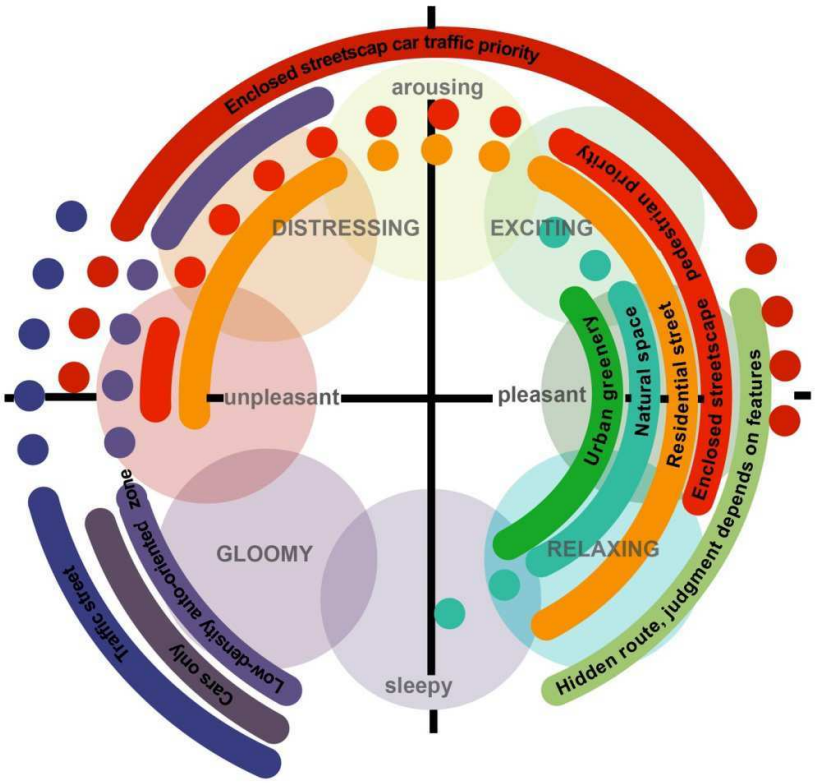


***Fig. 12. Cyclists' evaluation of space types located in the fine-tuned Russell (1988) diagram*** *Most of the urban space types investigated included features that influenced aesthetic judgment in more than one category (see the features in Fig. 7). The text along the curves shows urban space types. The features that characterise each type are generally mentioned by the cyclists participating in the bike-through tours when the curves are continuous but when broken into dots they are sometimes mentioned.*

**The categories Pleasant and Relaxing: aesthetically stimulating urban spaces**

The results from the bike-through evaluation show that all the space types that contain physical features in the category Pleasant (see Fig. 11) are participatory landscapes, this is landscapes in close proximity with frequently changing urban space characteristics (Berleant 1988) and include visually interesting elements that are highly valued. At the same time, the spaces belonging to the Pleasant category were described as being good for the possibility to move continuously. Highly valued features that stimulated vision included historical buildings and places, natural elements (mountains, water, rivers) and vegetation.

Visual variety, clearly defined streetscapes, gardens and seeing other people at some distance were also found to be stimulating features and thus classified as Pleasant. Either calm traffic only or no traffic close by was preferred. Quietness was thus valued as Pleasant, yet the sound from leaves and

birds was appreciated as well as the smell from vegetation and even from coffee shops. Streets with much motorised traffic sometimes had elements in this category, if there were both highly valued visual features and a good possibility to move continuously.

A space type fell into the category Relaxing (see Fig. 11) when the possibility to move continuously was maximised and nothing was disturbing or demanding the cyclist's attention. Urban spaces that contained Relaxing features always also contained Pleasant ones. Features that stimulated vision fell into the Pleasant category while sound and smell stimuli fell into the Relaxing category. The space types that included features of the Pleasant and Relaxing categories were first and foremost "natural space" and "urban greenery".

The "urban greenery" type (see Fig. 7) was the best liked among most participants in Reykjavík. Closeness to vegetation was highly appreciated for all senses, especially together with reduced noise and pollutants from car traffic. A male participant in Reykjavík said the atmosphere changed when a row of trees separated the bicycle path from the traffic street by a small distance. Then you are in *"paradise, noise is reduced, wind is reduced, and the stress goes. You're not in traffic anymore."* Good possibility to move continuously was, however, at the same time very important. Too narrow spaces shaped with trees where the urban space in front had no predictable continuity were found to have disadvantages.

Views to water and mountains were frequently described with the appraisal "beautiful" by the cyclists. These elements, the absence of motorised traffic together with very good possibilities for continuous movement, made the "natural space" type an attractive alternative in good weather in both cities. In addition to very positive comments about aesthetic qualities, the separate bicycle path along the "natural space" of Ægissída in Reykjavík (Fig. 9-B) was described as a "bicycle freeway" where you *"do not experience traffic lights and it is easy to predict travel time."* Some participants in Reykjavík maintained, though, that they would not always choose the routes along the coast because of wind and the length of the route compared to other alternatives. A man pointed out that he often chose longer and more beautiful routes in good weather, particularly on the way home.

The "natural space" of the path along the river Nidelva in Trondheim (Fig. 9-A) was also appreciated for commuting purpose. Some participants said this route was their favourite, being both effective and beautiful at the same time. One participant wrote on the evaluation form: *"nice traffic-free surroundings along the beautiful river, few people and easy to ride."* It was however pointed out by a female participant that she would not use this route on a rainy day like the day when the bicycle tour took place. *"There are holes and puddles in the gravel surface and you can become dirty. I'm not so afraid in general to have dirty clothes. But if I'm on my way to work, I would sacrifice the experience of nature if there was a lot of mud there."*

The “hidden route” by Old Njardargata in Reykjavík (Fig. 6) included features that were judged as aesthetically stimulating by the cyclists. The route was appreciated because it was far away from traffic and had a view over natural areas. The cyclists were not familiar with this route, except one female participant who said that she used it quite often because of the distance from car traffic and because it was calm.

From the perspective of aesthetic experience, the space type “residential street” included very positive qualities from the participants’ viewpoint. However, it was mentioned that it also included negative instrumental features due to parked cars that could be reversed at any time and stop signs and speed bumps that disturb continuous movement. In addition, the residential streets in the test were found sometimes to lack direct network connections.

**From the category Gloomy to Unpleasant: aesthetically discouraging urban spaces**

The results show that an urban space that fell into the categories Gloomy and Unpleasant lacked stimuli for vision, sound and smell. Sometimes such urban spaces were also called asphalt desert by the participants in Trondheim. First of all they were found to be dominated by car traffic. The street types “cars only” and “traffic street” (Fig. 3) fell into the Gloomy and Unpleasant categories. The space type “low-density auto-orientated zone” (see Table 1) ranges from the category Gloomy to Distressing.

Thinking about the need to move on and one’s own safety required the most attention in the urban spaces categorised as Unpleasant. The worst circumstances were found in narrow spaces that were also congested with motorised traffic with no separate bicycle lane.

A Gloomy urban space was described as having little to experience for cyclists other than closeness to car traffic. The cyclists did not feel that their safety was threatened by the traffic in the Gloomy urban space. Their territory was seldom disturbed, because this urban space most often had separate bicycle paths. However, many intersections, detours and stops impeded continuous movement and both slowed down cyclists’ speed and made their trip longer. At the same time car traffic was made easier. The cyclists said this underlined the priority of the car. An example of a Gloomy urban space is the upper part of Laugavegur and the first part of Sudurlandsbraut in Reykjavík (“traffic street” Fig. 4-A), which was described with the appraisal “boring”. The participants described the urban space also as “monotonous” with heavy traffic close by, many intersections and traffic lights.

The “low-density auto-orientated zones” tested – Skeifan in Reykjavík (Fig. 5-A) and Brattøra in Trondheim (Fig. 5-B) – range from Gloomy to Distressing. One participant said of Skeifan: *“Biking in this area requires full attention. It is not fun. Traffic is very aggressive.”* Another participant said: *“It is an inefficient route, boring and uncomfortable. You try to get out of the area as fast as possible. It is confusing what is what, parking or street. Cars can come from every direction.”* Both Skeifan and Brattøra were commonly classified as the worst streets. The participants in Trondheim were very

dissatisfied because they experienced that their needs were not reflected in the recent design of the traffic system in Brattøra. They thought that it was obvious that the motorised traffic had priority and that the cyclists were on the premises of pedestrians, being forced to bicycle along the pavement and taking detours because of the many roundabouts through which the cars drive easily. Sometimes cyclists were also forced to dismount the bicycle and to walk over the walkways whilst pulling the bicycle along.

**From the category Distressing through Arousing to Exciting**

When an urban space fell into the category of Distressing, stimulation by vision or sound was of limited importance. The reason was due to cars and pedestrians, as well as many intersections and stops that interfered with continuous movement of cyclists and required their attention. It was also pointed out that cars that were parked might start reversing.

The space types “enclosed streetscapes” as well as the “residential streets” range from the category Pleasant to Unpleasant. The aesthetic appraisals used by the participants that belong to the categories Exciting-Arousing (see Figs. 11 and 12) refers to visual qualities only. Those included variety in both streetscape and street life. Their negative experience included pedestrians who often moved in an unpredictable manner.

The “enclosed streetscapes” that were full of pedestrians were experienced differently from those congested with car traffic. This can best be explained by comparing Laugavegur shopping street (Fig. 10-B) and Hverfisgata (Fig. 10-A), which are two parallel streets in the city centre of Reykjavík. Both streets have similarly scaled rows of small houses on the sides and are direct routes through the city centre close to many facilities. The former street is rather crowded with pedestrians on the pavements and a unidirectional lane with slow car traffic. The latter street, with one lane in each direction and pavements on both sides, was very congested with private cars, pedestrians and buses when the bike tours took place. None of the streets had any separate bicycle lane. Both routes were cycled in the peak hour. Hverfisgata was experienced by most of the participants as the worst part of the tour. The highly appreciated visual features mentioned were of no value to some of the cyclists. At the same time, most of the cyclists said they felt insecure on the street which they described as “too narrow”, with pollution and heavy traffic.

Laugavegur shopping street (Fig. 10-B) was also found to be aesthetically attractive in many ways. The disadvantage mentioned was that it was not possible to achieve a continuous speed because of the many pedestrians, heavy traffic and cars reversing all the time. Yet, the participants who had cycled the street before emphasised that it was a good alternative early in the morning before other traffic became too heavy, because the route was direct, wind-shielded and aesthetically attractive.

# Conclusions

This study has demonstrated how features in urban space stimulate cyclists' aesthetic experience when commuting. The features of the urban space that are experienced as aesthetically pleasant from the viewpoint of the participating cyclists have been identified as well as those which have the adverse effect. The present study substantiates the results of earlier research on this topic.

An attempt was made to divide the varied and complex urban spaces into types on the basis of their main physical characteristics, both static and moving, in order to facilitate analysis of their features judged of importance for aesthetic experience. Eight types were defined (Table 1).

The methodology adapted to achieve the goal of this study has been called "bike-through evaluation". It leads to qualitative understanding of the stimulating and discouraging features of the different urban space types that influence aesthetic experience.

The results of the bike-through tours clearly demonstrate that visual features which stimulate pleasant aesthetic experience include vegetation, views to nature, historical buildings and places, clearly defined streetscapes and seeing other people at some distance. For stimuli by sound and smell, either calm traffic only or no traffic close by are preferred. Quietness is thus valued as pleasant, yet the sound from leaves and birds is appreciated, as well as the smell from vegetation. Lack of the aesthetically stimulating features just mentioned creates a boring and displeasing urban space. Overwhelming dominance of motorised traffic and an obvious priority of cars clearly had negative visual, sound and smell influences as well as aesthetically negative symbolic meaning.

Of the eight urban space types listed in Table 1, those that were considered most attractive in every respect were "urban greenery" and "natural space". Good possibility to move continuously was, however, at the same time very important. Too narrow spaces shaped with trees where the urban space in front had no predictable continuity were found to have disadvantages. In addition, open spaces of the "natural space" type were often windy and gravel paths instrumentally unfavourable in rain. The "residential street" also had many aesthetically stimulating features, but many instrumental disadvantages. "Hidden routes" had variable characteristics. Therefore they need to be judged in each case. The street types "cars only" and "traffic street" were regarded as discouraging from an aesthetic viewpoint, but often they were found to have positive instrumental features such as separate and continuous bicycle-lanes. The type "low-density auto-orientated zone" was characterised by obvious priority of motorised traffic. Cyclists felt that they were not welcome in this zone. The "enclosed streetscape" was experienced in different ways depending on how it was occupied by different user groups and how crowded it was.

The space types regarded as worst overall were the "low-density auto-orientated zone" and the "enclosed streetscape" with congested traffic. The former zone lacked aesthetically stimulating features and was instrumentally unfavourable. The latter suffered, in some of the spaces tested, from

the fact that the cyclist's attention was so much focused on working out the space ahead for continuous movement that he/she lacked capacity to observe features that were in other cases judged as aesthetically Pleasant. Distance view, for example, had no value when there were instrumental obstructions in the participatory landscape.

Based on the above it is suggested that instrumental improvements along bicycle routes would favour experiencing the quality of the urban space, not only from an instrumental viewpoint but also from an aesthetic one. By being less affected by the disturbing surroundings, cyclists would have better opportunity to experience features with aesthetic quality. Thinking about the need to move and one's own safety required most of the attention in the urban spaces categorised as Unpleasant. The worst circumstances were found in narrow spaces that were also congested with motorised traffic with no separate bicycle lane.

When cyclists have all their important instrumental needs fulfilled, as was the case in an urban space with aesthetically Pleasant and Relaxing features, the enjoyment of cycling may be maximised. The preferred urban space for commuting by bicycle is plotted below the horizontal line on the diagram in Fig. 11 as being both Pleasant and Relaxing whereas the "enclosed streetscape", which is the densest of the eight space types, is plotted above the horizontal line. This type is considered to be the most favourable to pedestrians and it is positive for urban densification and sustainability, but it possesses some disadvantages for cyclists. Commuting cyclists most often cycle during the peak hour. For this reason, the traffic congestion of any kind may contribute to their negative experience of this urban space type. Although visual stimulation in the ″enclosed streetscape″ is appreciated by cyclists, it is important that planners bear in mind that commuting cyclists prefer a Relaxed urban space, rather than Exciting, which involves a predictable space ahead. It is, however, important to be aware that if cycling becomes very monotonous, no senses are stimulated and no attention is required. In that case, the urban space will move towards the category Sleepy. This could be dangerous if cyclists are no longer aware of unexpected events that could occur on the way.

Most of the participating cyclists had both used the bicycle for commuting regularly for a long time and were familiar with many different route possibilities in the cities. This gave very qualitative viewpoints for the group discussions. However, their experience might have influenced their viewpoints. For other groups of cyclists further research is needed, for example, those with limited experience.

Neither is the value of the serial experience of changing urban spaces for aesthetic experience reflected in this study. Further research is also needed for that purpose.

In summary: the present study shows that aesthetic experience of commuting cyclists is a complex phenomenon. The urban space that stimulates best aesthetic experience has at the same time features judged as being aesthetically stimulating and features that do not reduce aesthetic experience.

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## 8.3 Paper 3

# *Urban routes and commuting bicyclist's aesthetic experience*


## *Abstract*

The present study examines whether and in what way aesthetic experience is involved in the judged quality of bicyclist's route which they have chosen to ride between home and work. In this respect it is considered important to distinguish aesthetic experience from experience that is related to the influence of instrumental or functional features. The aesthetic impact is primarily related to features that stimulate emotional well-being when cycling. An online survey was conducted in three Nordic cities, Odense, Trondheim and Reykjavík, concentrating on cycling in different urban surroundings. The interpretation of the meanings and values associated with certain features or characteristics that influenced the commuting cyclists' aesthetic experience is in this paper based on three theoretical viewpoints: (1) the phenomenology of perception and experience, (2) urban design theory and (3) environmental aesthetic theories and methods. The last theory involves the interpretation of experience from the environment into aesthetic meaning. The results of the survey indicate that aesthetic experience is of value to most of the respondents and is, therefore, of importance in developing the quality of bicycle routes for commuting. Greenery and contact with the natural environment and distance from motorised traffic are the most important influences on pleasurable aesthetic experience.



## *Keywords:*

Bicycle commuting; aesthetic experience; urban design; bicycle routes; emotional well-being

# *1. Introduction*

A cycle tour in a city between home and work provides serial experience of changing urban spaces with different characteristics, such as along congested roads, calm streets, narrow paths and backyards, even vegetated parks or fields. As the cyclist moves through the different spaces, he or she senses the environment by vision, sound and smell. Mainly due to travel speed, this experience of the city from the bicyclist viewpoint is very different from the city experienced when driving or walking (Forsyth & Krizek, 2011). Although knowledge about bicyclists' experiences might be important criteria for the design of cycling oriented urban spaces, little attention has been paid to this theme in academic research. For exceptions, see (Fleming, 2012; Forsyth & Krizek, 2011; Marling & Jespersen, 2013; Timms & Tight, 2010). These studies have, however, not focused on commuting cycling, which is found to have different needs and expectations than cycling for other purposes (Heinen, Wee, & Maat, 2010). Commuter cyclists may for example be likely to emphasise functional issues higher than people cycling for recreational purpose. The concept of aesthetics is, in this paper, assumed to be the key to the experience of urban space, which also is important dimension of urban design (see Carmona, Tiesdell, Heath, & Oc, 2010).

It is well known that cycling is environmentally friendly and healthy mode of transport. Therefore many cities are looking for possibilities to stimulate people to choose the bicycle as mode of transport instead of car. The goal is to improve the overall liveability of urban environment and the sustainability of transportation systems (Pucher & Buehler, 2012). Earlier studies have demonstrated that instrumental features are very important to promote bicycling (Abraham, Mc Millan, Brownlee, & Hunt, 2002; Heinen et al., 2010; Larsen & El-Geneidy, 2010; Pucher & Buehler, 2009; Pucher, Dill, & Handy, 2010; Tilahun, Levinson, & Krizek, 2007). Consequently, the design of cycling-oriented urban environment has focused extensively on functional issues, such as cycling facilities and networks, whilst the aesthetic dimension has got little attention. Although improved aesthetic experience among cyclists is unlikely to stimulate additional commuting cycling, earlier research on the functionality of cycling is important for understanding this topic, as will be demonstrated in this paper.

Aesthetic experience refers to a person's sensuous perception, emotional response to subjective thoughts and feelings and cognitive understanding and interpretation of the physical environment (Cold, Kolstad, & Larssæther, 1998; Gobster & Chenoweth, 1990). The meanings and values that a person might associate with certain features or characteristics within the urban space can influence aesthetic judgment. It encompasses a wide range of emotional and critical responses which can go from extreme pleasantness to unpleasantness (see J.A. Russell, 1988).

Cyclists' emotional well-being has most often been associated with cycling for the purpose of recreation but rarely commuting (Garrard, Rissel, & Bauman, 2012). Several studies indicate that enhanced emotional wellbeing is important motivation force to commence and continue cycling (for all purposes) such as stress reduction, pleasantness, excitement, fun and enjoyment (Garrard et al., 2012; Gatersleben & Appleton, 2007; Gatersleben & Uzzell, 2007). Scenery and experience of urban spaces have also shown to be important part of the quality of travelling by bike (Gatersleben & Uzzell, 2007; Skov-Petersen, Jacobsen, Vedel, Snizek, & Nielsen, 2012).

For cyclists, experience is a multisensory phenomenon. Spinney (2007) suggests that when riding a bike, the street is a place where visual sense is important, but here it doesn't work in isolation from the other senses. It is therefore considered important for this study to look at the sensuous perception of aesthetic experience through hearing and smelling in

addition to vision. In addition, Spinney (2009) suggests that kinaesthetic sensing is very important to cyclists (Jones, 2005; Spinney, 2006, 2007, 2009). It enables the sensory organs of his/her body to sense movement in space and spatial qualities (Tuan, 1977; Urry, 2007).

This study examines whether and in what way aesthetic experience might be involved in the judged quality of bicyclist's route which they have chosen to ride between home and work. In this respect it is considered important to distinguish aesthetic experience from experience that is related to the influence of instrumental or functional features. An online survey was conducted in three Nordic cities, Odense in Denmark, Trondheim in Norway and Reykjavík in Iceland. The innovative method used to interpret the survey results involves connecting the participants' answers, to both multiple choice and open ended questions, their sketches of their route, which characteristics can be viewed in Google Street view.

The structure of the paper is as follows: In the next section (2), relevant theoretical background for interpretation of the meanings and values associated with certain features that influence commuting cyclists' aesthetic experience is presented. Thereupon, in section (3), the methods used in the study are explained. In section (4) the results from the online survey are presented and discussed in section (5). A brief section (6) of concluding remarks finalizes the paper.

## *2. Theoretical background*

The interpretation of the meanings and values associated with certain features or characteristics that influence commuting cyclists' aesthetic experience is in this paper based on three theoretical viewpoints. The first involves phenomenology of perception and experience. This phenomenology gives an insight into what could affect the individual opinions about meanings or values of certain features, such as those with aesthetic meaning. Perception is not a passive background, but could be influenced by learning, memory and expectations (Goldstein, 2007) and every lived experience, a dynamic background which can change (Dahlberg, Drew, & Nyström, 2001). The second theoretical viewpoint involves urban design theory, and its focus is on the different physical elements of urban space and how their composition and interrelationships at any time constitute its characteristics. Notably, travel speed affects the manner in which these characteristics could be perceived visually. The third viewpoint concerns theories within the field of environmental aesthetics (Nasar, 1988) that are relevant for interpretation of features in terms of aesthetic meaning. Specifically, it considers the instrumental values that influence the aesthetic experience(Heath, 1988); symbolic aesthetics (Lang, 1988) and the notion of distance (Berleant, 1988). Symbolic aesthetics have an associational meaning in which the environment gives people pleasure (Lang, 1988). The *participatory* landscape in the proximity of the observer and the *visual* landscape at a distance that primarily has a visual meaning are quite different modes of experience (Berleant, 1988).

Heath´s (1988) hypothesis is that instrumentally influenced behaviour will inhibit an aesthetic response, while behaviour that seeks experience will permit, or even enhance it. Heath (1988) based his hypothesis on Maslow´s (1943) hierarchy of needs, in which cognitive and aesthetic needs are considered to be the least urgent. Earlier studies have demonstrated how instrumental facilities promote bicycling, but it is apparently not as obvious how aesthetics impact it. There seem to be some overlap between the two, implying that Maslow´s (1943) hierarchy of needs is not fully applicable here.

Also, a verbal scaling system defined by Russell (1988) and Russell and Pratt (1980) has been applied in this paper in order to systematize the cyclist's judgment of the aesthetic quality of the different environments. This approach is based on persons' judgments of places as described with adjectives which Russell (1988) calls "affective appraisals". To find a place

pleasant, disgusting, stressful, and so on, is to attribute to that place an affective evaluation of quality, using words that describe its components as pleasant, disgusting or stressful. The verbal scaling system is proposed with a circular order, the relevance of which was further supported by a factor analytic study (J.A Russell, Ward, & Pratt, 1981). According to Russell (1988), the terms for the affective qualities of places are systematically interrelated. The network of these interrelationships can be described using a diagram that Russell calls a *spatial metaphor* (Fig. 1). Its base consists of two bipolar dimensions. The horizontal axis ranges from extreme unpleasantness through a neutral point to extreme pleasantness. The vertical axis concerns the arousing quality of a place and ranges from sleepy to extremely arousing. Figure 2 shows how Russell (1988) has located forty descriptors of environments within the diagram shown in Fig. 1.

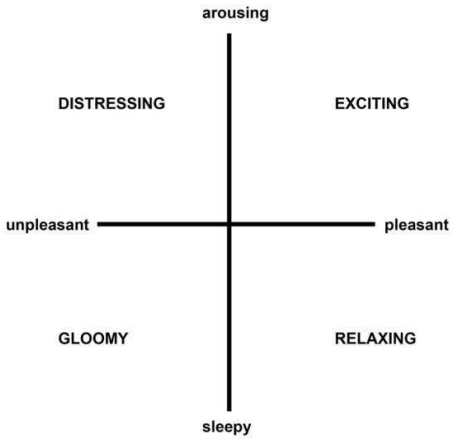


Figure 1: A spatial representation of descriptors of the affective quality of environments


Figure 2: Russell's (1988) descriptors of the affective quality of the environment located in the diagram of Figure 1

## *3. Methods*

Three medium sized Nordic cities were chosen as cases to study, Reykjavík, Trondheim and Odense. Within the three cities, companies were selected to which invitation was sent to participate in an online survey in summer 2011. The companies chosen had locations within a radius of about 3 km from the inner city centre, where the main employment areas are located. The cities have many similarities that are important for the purposes of this study. They all have compact areas in the city centre and urban spaces with variegated characteristics. The areas where the companies were located had different relationships to characteristics of the environment, such as closeness to the city centre, closeness to natural landscapes and greenery, and closeness to traffic-dominated roads and streets.

The share of bicycling in Reykjavík (4%, Capacent_Gallup, 2011) and Trondheim (7%, Trondheim_kommune, 2010) is rather low, compared to Odense (25%, DTU, 2011). For the purpose of ensuring minimum participation in the survey, the companies chosen in Reykjavík and Trondheim had participants registered in the "cycle to work competition" project ("Hjólad í vinnuna [Cycle to work]," ; "Sykle til jobben [Cycle to work],"). It proved to be more difficult in Odense to find companies willing to participate than in the other two cities. Therefore, companies in Odense were not limited to participants in the "cycle to work competition" project. An email was sent to a contact person in each company with a request to send information regarding the survey to all employees. In some bigger companies or institutions, the survey was announced only on a webpage.

In section 2, it was pointed out that lived experience can influence cyclist's opinions of which features may have aesthetic meaning, how and in what way. The participating employees were therefore asked important background questions related to their cycling experience, how frequently they cycled and about their attitudes towards the bike as mode of transport. Other multiple choice questions were related to the importance and influence of various physical features in their route environment between home and work on their experience. Participants also gave their route a rating from 1-6 (6 is the highest grade), in which they evaluated how good they thought their route was. In addition, they were asked to give descriptive evaluation in three open ended questions. In the first two they were requested to describe the street, the part of their route or the area on the way between home and work they liked the most when cycling, and the part they disliked the most. They also were asked to describe briefly the reason for their reply. In the third question they could comment on additional aspects that were of major importance regarding their choice of route.

Along with the questionnaire, participants were asked to make a sketch of their most frequently used bike route between home and work. This was done using an online program, "WalkJogRun.net" (WalkJugRun.net), that is linked to Google Earth. The sketches were linked with the answers of the individual participants. The benefit of this method is that the bicyclist's attitude towards the environment, as well as his/her experiences, can be viewed in context with the sketch. The linkage to Google Earth made it possible to discover the characteristics of the routes using its "Street View" function. This is available for most streets in the case cities.

The answers to the qualitative open ended descriptions were divided into two groups. One group included answers that clearly were related to aesthetic features and the other those answers that were related to instrumental features, cf. the discussion in the introductory section about the importance of distinguishing between different kinds of experiences. The answers that fell in the aesthetic group included descriptions of best or worst route parts, where the respondents' evaluation of environmental quality or disadvantages was based on

visual perception, hearing or smell sensation. The answers that fell in the instrumental group included descriptions where the quality of different parts of the route was evaluated on the bases of instrumental or functional qualities or the lack thereof.

# *4. Results*

In section 4.1-4.3 the results from the most important multi choice questions from the survey are described. A summary of the results from open ended questions are presented in section 4.4. All text related to the survey and quotations were translated from the various Nordic languages by the author.

## *4.1. Participation*

In Odense, 12 companies participated in the survey, while eight participated in Reykjavík and nine in Trondheim. Most of the companies were large and comprised of middle-class employees, including persons with higher education. Altogether, 276 participants completed the survey in the three cities. In Reykjavík 141 people participated, 82 in Trondheim and 51 in Odense. Together 123 women and 151 men participated and 109 completed the drawing of their route. Most of the participants were middle-aged. In Odense, only 10% of the participants were under 30 years of age; in Trondheim, 9% were under 30; and in Reykjavík, 5% were under 30.

## *4.2. Background questions on lived experience*

In Odense, nearly 79% of the participants cycled to work at least three times a week (which was the highest answering alternative in the survey) in the summertime (April-October); 62% in Reykjavík; and 71% in Trondheim. In Odense, nearly 9% bicycle to work at least once a week (but less then 3 times) in the summertime; 19% in Reykjavík; and 15% in Trondheim. In Odense, 55% of the participants bicycle to work at least three times a week in the wintertime; 28% in Reykjavík; and 26% in Trondheim. From this, it can be concluded that the participants in all cities represent frequent cyclists. Bicyclists in Odense use their bikes more often, especially in the wintertime. Other employees (none-cyclists or few-times cyclists) of the invited companies showed limited interest. Division between men and women was similar.

The most common reason given in all three cities for cycling to work was related to fitness and lifestyle. Many participants also indicated that they cycled because it was environmentally friendly. Involuntary reasons for choosing the bike were seldom chosen. The financial crisis in Iceland might have caused at least some participants in Reykjavík to say that they biked in order to save money. In general, a slightly larger number of men cycled to work than women, with the reasons being that they a) did not have access to a car or parking at work, b) to save money or c) because it takes less time.

## *4.3. The importance of attractive scenery and preferred elements*

The participants were asked whether attractive scenery while cycling to work mattered to them. They could choose among three alternatives. The attractive scenery proved to be very important to almost half of the participants in the survey and to have some importance to an additional one third. Attractive scenery had more importance to women than to men. In

Odense, fewer men thought that the attractive scenery was of importance than in the other two cities. Thus, it can be concluded that the importance of attractive scenery ranges from some to high importance to most of the bicyclists participating in the survey and that it is slightly more important to women than men.

The participants were asked which of the following elements in the environment they would prefer to experience while they bicycle to or from work: driving cars, quietness, view, buildings, vegetation/trees, pedestrians or other cyclists. Vegetation/trees were found to be by far the most important to experience in all three cities, or for 46% of the participants. Quietness was, however, the most important to many participants or 22% of the participants and least important to women in Odense. View was also important to some people, and particularly, to women in Odense. Together 16% of the participants thought view was the most important experience.

## *4.4. Best and worst parts of routes*

Together 194 participants (of a total 276 participants) answered the open ended question about the best part of their route and 192 answered the question about the worst part. Among about half of the respondents in all the three cities, the perceived best part of the route turned out to be related to aesthetic features (with about one fourth including both aesthetic and instrumental features). A smaller portion, about one fifth of the answers about the worst part, was related to features that produced negative hearing and smelling feelings. Comments about the worst parts of streets, were, however, most often related to the lack of instrumental qualities such as safety or the presence of too many forced stops because of traffic lights.

### *4.4.1. Stimulating and negative features for aesthetic experience*

The features that can be interpreted as having aesthetic meaning and have relation to best parts of routes include quietness, vegetation and closeness to natural elements. Distance from heavy traffic is also important. This is the case for all the three cities.

The affective appraisals "beautiful" and "quiet" were frequently associated with green areas. Quietness is linked with hearing, while beautiful relates to the visual sense, although it also could have a connection to other senses. The absence of motorised traffic was described several times as being an important reason for participants' selections of the best parts of their routes. Sometimes, it was not clear whether the participants' usage of words was related to safety or whether the vicinity to motorised traffic was related to negative sensual experiences.

Participants in Odense seldom mentioned particular streets or parts of streets as the best or worst parts of their routes. They most often described their general characteristics such as "*the most quiet and greenest,*" "*forest path*" and "*the most beautiful route, a good start of the day*." A female participant in Odense considered that the best part of her route was the first part, which was in her neighbourhood. *" It goes through a small forest area*." The worst part was "*the long part where the bike path follows a very busy road, which is very open to wind and weather*." A male participant in Odense described the best part of his route with the words "*forest, beautiful and sheltered*" and the worst with the words "*big road, noise and exhaust fumes.*" These comments precisely describe stimulating aesthetic qualities as well as negative experiences for the senses. The affective appraisal "beautiful" described the forest, which also had the instrumental quality of being sheltering.

In Reykjavík and Trondheim participants mentioned most often specific places, areas or streets as the best or worst parts of their route. The best parts in Reykjavík were in most of

the cases along the coast, through green valleys that stretch from the suburban areas as well as small parks in the inner city. In Trondheim closeness to the river *Nidelva* was found to be particularly attractive in addition to paths along vegetated areas. All these route parts are away from motorized traffic roads and streets. In all the cities, residential streets and other calm vegetated streets were mentioned a few times as the best parts of routes because of the benefits of being vegetated and quiet, with little or calm traffic. Trails separated with trees from traffic roads were also appreciated in all the cities. Comments on worst places involving negative sensual experiences concerned car dominated environment. These common features in best and worst route parts are exemplified in the following subsections. Additionally, results about the correlation between instrumental and aesthetic qualities are presented.

### *4.4.2. Lack of pleasurable features in a car dominated environment*

Comments about the worst places concerned closeness to motorised traffic, pollution and noise. Sometimes, the environment that could be interpreted as lacking aesthetic quality was described by the appraisals 'boring' or 'ugly'. A female participant in Reykjavík wrote: "*Passing the mall is ugly; the boring concrete environment is totally designed for cars, but not people. The same is the case for bicyclists, pedestrians and the people stepping out of cars and walking to the mall*." She wrote that the best part of her route was "*along bicycle paths in green areas. It is quiet and beautiful*". In other comments, she said it would be "*much more fun to bike where ... routes with good scenic views were available*." The affective appraisal "boring" refers to the human-made environment constructed of concrete, which she obviously connected to the absence of a pleasurable visual experience. She seemed to consider greenery as being stimulating to the visual sense and the separated path away from the main road as a possibility for avoiding unwanted noise.

Figure 3 shows the worst route part to another female respondent in Reykjavík along the road *Hringbraut*. She wrote "*there is much traffic and it is not specifically enjoyable.*" Other worst route parts are presented in the following sections, as parts of the sequence of changing urban spaces.


Figure 3: Worst route parts are dominated with car traffic

*a* *The new Hringbraut in Reykjavík - overview*
*b-c* *The junction of new Hringbraut and Njardargata*
*d* *Along the new Hringbraut*

### *4.4.3. Routes through inner city parks and calm streets –short break from motorised traffic*

In the inner city of Reykjavík, people frequently mentioned urban parks as the best parts of their routes. Their qualities are described with greenery inhabited by singing birds, quietness, beautiful places and closeness to water. They have either distance from motorised traffic or calm traffic. A young male participant bicycling in the inner city, said the best part of his route was along "*Reykjavík city lake. It is a beautiful place.*" (see Fig. 4). An eldrely

woman said that the best part of her cycling route was through the city park *Hljómskálagardurinn. „ This route has, at the same time, a beautiful environment and limited car traffic*."


Figure 4: A route in Reykjavík through an inner city park

*Above, a map of the route to a young male participant in Reykjavik. The lower case letters show location and rhythm of photos perspectives.*

*a* *Along Njardargata, getting close to the bridge that crosses the new Hringbraut*
*b* *The bridge over new Hringbraut with its heavy traffic and noise*
*c* *Passing the bridge*
*d* *Entering Hljómskálagardurinn from the bridge with view to Reykjavik city lake. Quiet and calm urban space with view to water and vegetation, replaces the noisy and rapid atmosphere of the road.*
*e* *Path along the lake, calm atmosphere with stimulating features for aesthetic experience.*
*f* *Still cycling along the lake, but now also along the street Lækjargata.*
*g* *In city centre cyclists use most of their attention in figuring out how they should move forward safely among other street users.*
*h* *Comments about the worst parts of streets were most often related to the lack of instrumental qualities such as safety or the presence of too many forced stops because of traffic lights.*

Calm and vegetated streets are few times mentioned as the best route part. A female participant in Odense wrote that the best part of her route was the street "*Heden, because it is the most quiet and the greenest.*" (see Fig. 5-d). From the map it can be seen that Heden is a street through a cemetery. In contrast, the worst route part to a female participant in Odense was "*along the Sønder Boulevard, because it is much trafficked and there are many traffic lights.*" (Figure 5-b). Sønder Boulevard has a bicycle track separated from car traffic, which seems to have a good quality from an instrumental viewpoint. Therefore, it is likely that the

amount of traffic affected emotional well-being in the mind of this participant. She rated this route as bad (1-2). *Sønder Boulevard*, regarded as the worst route part, constituted about half of the total route length, which, altogether, is 2.6 km long, and of which *Heden* comprises only a small part.

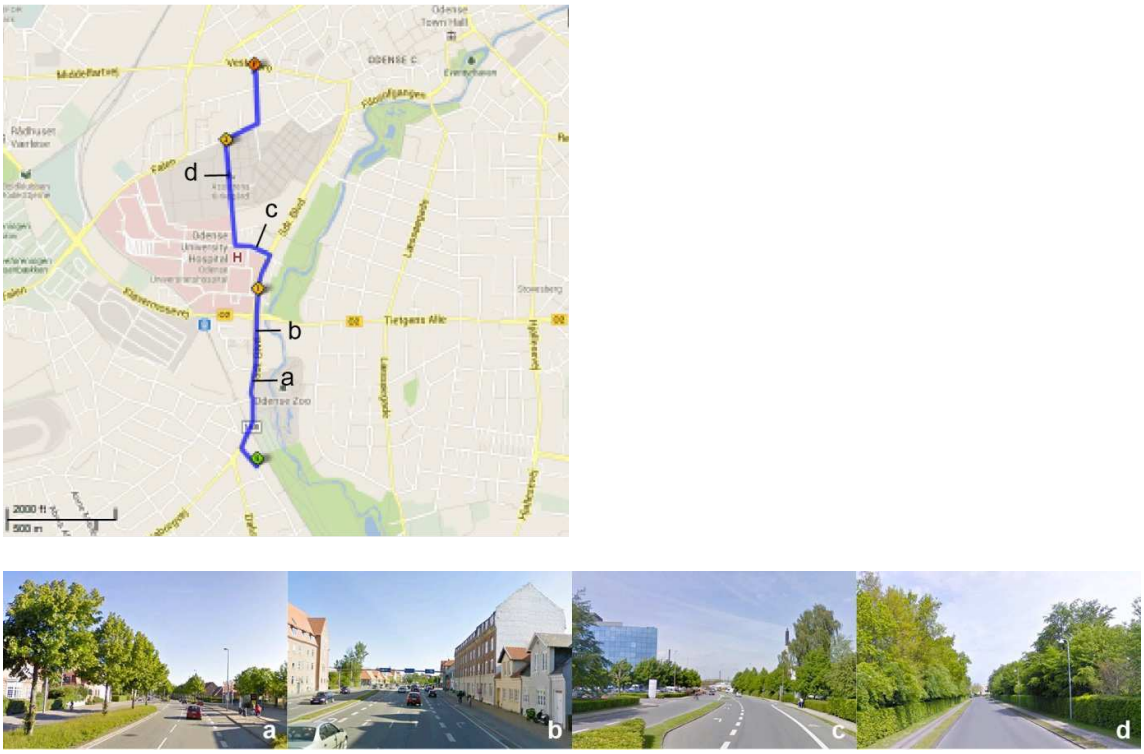


Figure 5: A route in Odense through a cemetery.

*Above, a map of the route in Odense. The lower case letters show location and rhythm of photos perspectives.*

*a-b* *Sønder Boulevard , the worst route part because of much motorized traffic and traffic lights.*
*c* *J.B. Winslows Vej*
*d* *Heden, the best part of the route, the most quiet and greenest.*

As in the other two cities, the best parts of routes in Trondheim frequently were associated with escaping from motorised traffic into a more vegetated and quiet environment. Figure 6 shows the 7.4 km long route cycled by a female participant who said the best part was when "*passing Skansen, along the path through the green area.*" Here this female crosses the street (see Fig. 6-e) to cycle through the park instead of along the street. She rated the route as medium (3). The best part, at *Skanseparken*, constitutes only a small part of the route. In connection to the relatively low rating, it should be pointed out that the rest of the route, as considered by the author, is neither similar to the worst part, nor the best part.

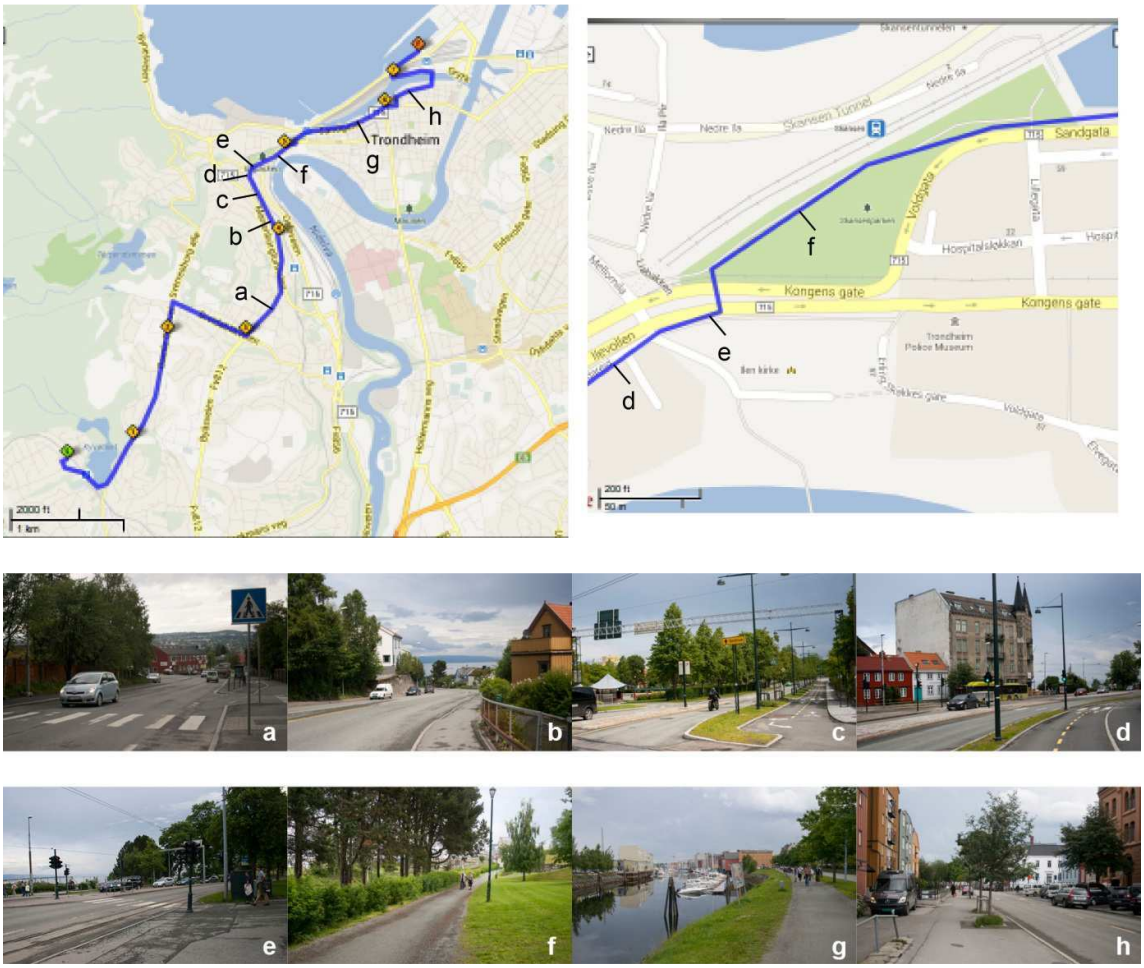


Figure 6: A route in Trondheim through a small park.

*Above, a map of the route in Odense. The lower case letters show location and rhythm of photos perspectives.*

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|---|---|
| *a-b* | *Along Byaasveien. The characteristics shown on the figure are typical for a large part of the route.* |
| *c-d* | *Along Ilevollen* |
| *e* | *Crossing Kongens gate to reach Skanseparken* |
| *f* | *Through Skanseparken, the best part of the route* |
| *g* | *On a path along Sandgata with view to the harbour* |
| *h* | *An enclosed streetscape of the city centre with many obstacles that require more attention from cyclist.* |

### *4.4.4. Trails, separated with trees from traffic roads*

Short distances away from heavy traffic and the presence of vegetation can be enough to change the experience from overwhelming traffic environment to an aesthetically pleasing environment. Such places are mentioned several times in the survey. A female participant from Reykjavík described the best part of her route that was when she cycled "*on a path along Sudurlandsbraut. I like it because the path is separated from car traffic by trees and a small green area along the path.*" (see Fig. 7)


Figure 7: Route part along Sudurlandsbraut in Reykjavík

*a* *Cycling along the mortised traffic*
*b-c* *Getting closer to the part where trees separated it from the motorised traffic*
*d* *Cycling in another urban space away from motorised traffic, the best part of the route.*

A similar example is the route of a male participant along a traffic road in Odense. The best part of his route was "*Niels Bohrs Allé – a natural trail runs along it so you can avoid traffic and traffic lights.*" It is not clear whether "natural trail" means closeness to nature or whether the latter part of the sentence is the reason it was the best part. Many other answers in the survey indicated that route quality had a relationship to both aesthetic and instrumental features. The trail by *Niels Bohrs Allé* (see Fig. 8-a, b and c) clearly meets the preferred aesthetic qualities frequently mentioned: greenery, quietness and distance from noise and pollution. The participant rated his overall route as very good (5-6). Other parts of the route also have qualities assessed by the author to be similar to the natural trail by *Niels Bohrs Allé*, but they are not mentioned by the participant. These parts, together with *Niels Bohrs Allé*, constitute a large part of the route. The worst route part was at a particular place at the junction of *Munkerudsvej/Rødegaarsvej* (Figure 8-d), and was given this evaluation because of slow traffic lights and heavy traffic. Slow traffic lights clearly had effect on the instrumental quality of the route while heavy traffic could have both instrumental and aesthetic meaning.

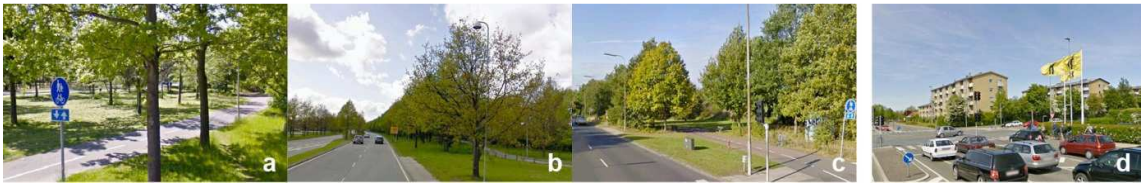


Figure 8: A route in Odense separated from motorised traffic with trees

*a-c* *The trail by Niels Bohrs Allé is separated from the motorised traffic with trees between, the best route part. These characteristics constitute a large part of the route. The total route receives high rating.*
*d* *The corner Rodegardsvej/ Munkerudjsvej, the worst route part.*

### *4.4.5. Closeness to nature and green paths in the suburban areas*

In suburban areas of Reykjavík, the green valleys of *Fossvogsdalur* and *Ellidaárdalur were* frequently mentioned as the best part of routes. Routes along the coast were mentioned several times as the best route parts because of the view. One respondent also mentions the sound from the sea, which is found to be pleasant. What these routes have in common is that they include qualities that were regarded by participants from both instrumental and aesthetic viewpoint. They are long and continuous, there are few or no crossings and they are at the same time green, far away from motorised traffic, noise and pollution. A female participant said about her route, which passes through *Fossvogsdalur* and along the coast, that it was a "*good place to think and watch a beautiful environment on the way*." *Ellidaárdalur* was also found to be a beautiful place where people could experience nature and seasons better than

when driving. The main reason for selecting *Fossvogsdalur* (Fig. 9) as the best route part was perhaps best described by a female participant by the words "*beautiful area and away from car traffic.*" She rated the route as very good (grade 4). The best part of the route constituted a very large part of the total route length.


Figure 9: Example of a best route part in the suburban areas in Reykjavík

*Bike path through the about 3 km. long valley Fossvogsdalur in Reykjavík. This route part has qualities from both instrumental and aesthetic viewpoint. It is long and continuous, there are no crossings and at the same time it is green and far away from motorised traffic, noise and pollution.*

In Trondheim best route parts in the suburban areas were as in Reykjavík also often along paths in natural and vegetated environment away from motorised traffic. Also, the best part of the route in Trondheim frequently was identified as being the stretch when the cyclist crosses or comes close to the *Nidelva* river. The river runs through the middle of the city, down to the fjord adjacent to which the city centre is located. Many of the participants in the survey need to cross the river on their way to and from work. There are several bridges where the river can be crossed. Some of them are used mainly for motorised traffic, but others allow only pedestrians and bicycle traffic. The bridges that were mentioned as the best parts of a route are those that do not have motorised traffic, see Stavne bridge in Fig.10. The landscape around the river is easy to cycle through, as it is the flat part of the city which collects the water from the surrounding hills. The area was found to have a beautiful view of nature and a distance from motorised traffic accompanied by comfortable surroundings, trees and flowers.


Figure 10: Passing the bridge at "Stavne" in Trondheim

*Passing the river Nidelva at Stavne was frequently mentioned as the best part of route in Trondheim. The bridge, which is for cyclists and pedestrians, in addition to a railway, is a great contrast from the hilly and vegetated landscape in Trondheim. It is a long freeway where the cyclist can keep a constant pace with minimum effort and at the same time breath the air at the river, smell the water and watch the distance view to the hills in front and the landscape along the river.*

### *4.4.6. Route choice and instrumental/ aesthetic qualities*

Several comments in the open ended questions on issues related to route choice offered clear descriptions of the relationship between the importance of instrumental and aesthetic qualities in the available routes. A male participant in Reykjavík thinks that the most important factor involved in route choice is "*safety and health. Ideally, I would like to be able to cycle farther away from the main roads because of dust and soot emissions. I have tried to find such routes, but they have disadvantages. There are wonderful small parts..., but it's not easy to connect them to the cycling route network*." Although he said he would prefer to do so, he thought he can not choose the aesthetically pleasing routes because of instrumental

reasons, i.e., they do not fit into the infrastructure network. Another participant said he chooses a route in the wintertime that provides shelter, although it is not aesthetically attractive. Wind and shelter are important factors in participants' descriptions in Reykjavík, as well as in Odense.

A female participant from Odense said she preferred "*as little pollution from cars as possible. But because the route I prefer to ride is a field track, I can only ride this path if the weather permits.*" Another female participant said about her route choice: "*I do not avoid things. I take the route that allows me to get quickly to and from work, but it would be great if that route was nicer. There is too much traffic on my route.*"

Some participants in Trondheim precisely described how the hilly terrain in the city affected their choice of route. The best part of the route of a female participant was the "*Tyholt area, because this is the flattest part … and, at the same time, it is very nice there.*" Even if the terrain is the main influence affecting her choice of route, aesthetics also were important for evaluating the quality of the route.

## *4.5. Affective appraisals*

Affective appraisals were abstracted from the bicyclists' use of words about the best and the worst parts of their routes in their qualitative comments. An assessment was made to what extend the different physical features were of importance for their aesthetic experience based on how they were judged by the participants. The affective appraisals indicate where the linked physical features (affective quality) are placed in a modified Russell (1988) type diagram (Figure 11) which represents the summary of the most frequently mentioned physical features related to aesthetic experience.

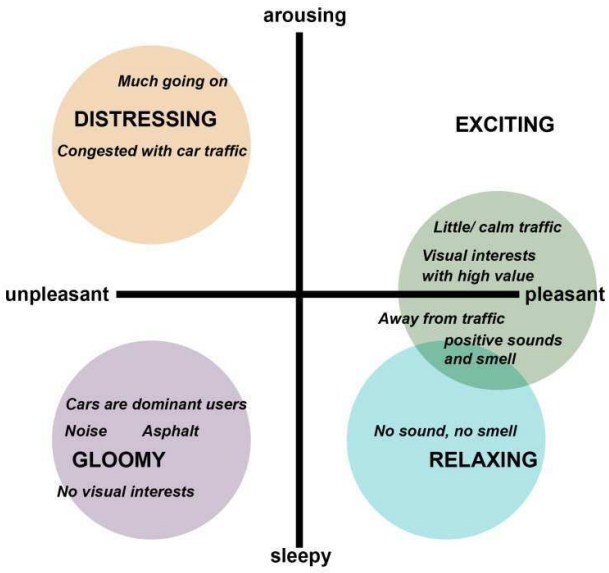


Figure. 11: Modified Russell type diagram

*The most important physical features of the urban space for aesthetic experience obtained*

The cyclists' choices of the best and worst streets shows that the best streets include features associated with the categories "*pleasant*" and "*relaxing*," while the worst ones include characteristics associated with the categories "distressing" and "gloomy." A "gloomy"

environment that lacks aesthetically pleasant features and in which cars are the dominant users were described with the appraisal boring. The environment was described as grey with no visual interest. A "*distressing*" environment was congested with vehicular traffic and was characterized by intensive activity. It is likely that no environment fell into the category "*unpleasant*," because the cyclists may have avoided routes which they found unpleasant. The most preferred environment, that was "*pleasant*" and "*relaxing*," included the most preferred element, that is, vegetation. It also was quiet or may have had stimulating sounds and smells.

# *5. Discussion*

## *5.1. The influence of lived experience*

According to phenomenology of perception and experience, lived experience can influence the opinion of the individual. Earlier research on bicycling has shown that instrumental facilities constitute a very important part to stimulate bicycling. The results show however that the aesthetic experience of the environment was important to most of the participants and attractive scenery appeared to have some or great importance. Presumably, this importance was affected by their expectations and attitudes towards their trip which involved vision for good lifestyle, environmental awareness and fitness objectives. These results are in line with former studies in the UK (B Gatersleben & Appleton, 2007; Birgitta Gatersleben & Uzzell, 2007) and Australia (Garrard, Rissel, & Bauman, 2012). The results do not indicate how aesthetics of the environment influence people who seldom bicycle because this group showed limited interest to participate in the survey. Further research is needed to elucidate this issue. It shall be noted that outdoor activities in natural environment are deeply embedded in the Nordic culture. With another group of participants, for instance immigrants, the results might have been different.

## *5.2. Features with aesthetic meaning*

Vegetation was the element most participants in all three cities preferred to experience when bicycling. In comments about the best parts of routes, positive appraisals also refer most frequently to vegetation and green areas. Earlier studies have come to the conclusion that vegetation and objects in the nature produce aesthetic experience (e.g. Gobster & Chenoweth, 1990; Kaplan & Kaplan, 1989). According to Appleyard (1980), trees can play many roles and have multiple functions for inhabitants in a city. The results of the survey showed that the best parts of a bicycle route were most often through vegetated areas and/or involved contact with nature and distance from vehicular traffic. Closeness to motorised traffic, in particular, was found to be uncomfortable because of noise and pollution. Urban parks in the inner city, green valleys and paths with a short distance from traffic, having trees in between, were all mentioned as the best parts of routes. The contact with vegetation and nature was of importance, in particular, for the visual sense, but also for other senses. Positive urban sounds and smells were mentioned, for instance, the presence of birds nesting in trees.

The appreciation of the natural vegetation structure and other roles that urban vegetation plays with respect to human perception of the urban environment along roads have already been discussed in a review more than 25 years ago by Smardon (1988). He suggested that vegetation has both an instrumental and a psychological function and is perceptual, including visual sensory benefits and symbolic aspects. As the opposite of an environment characterized by vegetation, urban spaces in which motorised traffic and concrete buildings

form an oversized grey asphalt landscape are considered to be boring in the minds of several cyclists.

### *5.2.1. Symbolic meaning*

Few comments appeared revealing viewpoints that can be related to symbolic meaning. The overwhelming priority of the private car was reflected in the character of the environment, in the amount of motorised traffic, in the size of the infrastructure reserved for cars and in the grey colour of the constructed environment. This symbolised the priority of motorised vehicles and clearly reflected a story demonstrating how unwelcome other transport modes than cars were to use this environment.

Appleyard (1980) pointed out that the characteristics of trees with their soft textured leaves filtering and reflecting light, producing an ever-changing pattern, provides a contrast to the grey, hard and static constructed environment. A female participant in Reykjavík said about the worst part of her route, which follows Hringbraut (Fig. 3), "*that there is much traffic and it is not specifically enjoyable.*" Another wrote that the environment along the mall was ugly and boring concrete environment, totally designed for cars, but not for people. These comments clearly reflected the lack of aesthetic stimuli in the minds of these cyclists.

Symbolically, vegetation also can have meaning. Appleyard (1980) groups the functions of trees as sensory, instrumental and symbolic. Symbolically, trees can be, among other things, important representatives of nature in the city, i.e., symbols of nature (Appleyard, 1980). Ulrich (1981, 1983) has suggested that people may benefit the most from visual encounters with nature during times when they are stressed. The aesthetic experience that trees and other vegetation can offer might play an important part in achieving mental restoration on the way to and from work. A woman in Reykjavík said she liked the green route through Fossvogsdalur and along the coast, because it was "*good place to think and watch a beautiful environment on the way*."

### *5.2.2. The notion of distance to potential aesthetic features*

There is another viewpoint of an aesthetic experience that reveals the differences between an aesthetically stimulating and discouraging environment for commuting cyclists and can be explained with the theory of the notion of distance (Berleant, 1988). A comparison of the routes in Reykjavík shown on Figures 3 and 7 provides insight into the differences between the close by *participatory* landscape and the *visual* landscape at distance. Figure 3 shows a route along the large trafficked road Hringbraut and Figure 7 shows Sudurlandsbraut, including a bike path a few meters away from motorised traffic and separated from it by trees and a small green area. Niels Bohrs Allé in Odense, Figure 8, and Skanseparken in Trondheim, Figure 6, are similar examples in which a barrier of vegetation separates the cycling path from the trafficked road and provides a division between the urban space of the bicyclist and the motorised traffic. The route along Hringbraut, Figure 3, follows a very large and open urban space and includes a *visual* landscape at distance, but it has no protective and close by *participatory* landscape within it. This urban space is designed for a speed other than the rather slow cycling speed that allows a detailed experience. The rhythm of changes occurs slowly in this huge scaled urban space, and at a close proximity, there is little to experience other than the closeness of motorised traffic, pollution and noise. By dividing this urban space with a row of trees, the cyclist riding the path becomes part of another urban space on the opposite side that could be described by the concept of a *viewshed*, as shown by the examples on Figures 6, 7 and 8. It is generally accepted that urban vegetation is usually

not very effective to block unwanted noise (see Smardon, 1988), but it does help to mitigate the physiological effects of noise by visually screening off the adjacent source of noise.

## *5.3. Instrumental features/ aesthetic experience*

The results of the survey supports Heath's (1988) hypothesis regarding instrumental determinants, meaning that a satisfying instrumental quality is a precondition for the choice of an aesthetically pleasing route. A preference, however, is not the same as what is actually chosen. A preference is more about what makes the person satisfied. Route choice always involves an evaluation of many factors in which the route chosen is the best overall alternative among those available and is related to the cyclist's personal attitudes at a particular time. As an example, a female participant in Odense says the route she prefers to cycle is a field road, but she can only ride this path if the weather permits it. Her comment reflects an instrumental quality, the quality of the surface of the field road, which is a precondition for her to bike this path, even though she would prefer it on the basis of her aesthetic point of view. During rain, perhaps the dirt and the water splashing on her clothes have to be cleaned when she arrives at work. There are more examples from the survey that are along the same line. A male participant in Reykjavík says he would ideally like to be able to cycle farther away from the main roads because of dust and soot pollution. Aesthetically pleasant features would make him more pleased as a cyclist, but because the instrumental conditions for bicycling have not reached a satisfying level at the "*wonderful*" places, he cannot use them.

## *5.4. Reflection of the method used*

Respondents evaluated and explained qualities and disadvantages of their own route which they most often cycled in real environments between home and work. The linkage of the individual participant answers to questionnaire and his/her route drawing made in the Google program showed to be very useful for an understanding of the way aesthetic experience was involved in the judged quality of the bicyclist's route which they had chosen to ride between home and work. Background questions on lived experience gave information about possible influences on the individual opinion. Open ended questions were particularly useful and choice of best and worst places forced the participants to give descriptions of the features that stand out in their experience of their route environment. Google Street-view made it possible to look closely at the route environments and the best and worst places. However, the street-view is most often only available for streets were it is possible to drive car. The best route parts were frequently through paths that were not shown in Google Street-view. It thus became important to visit some of the places during the study. Google Street-view can be very useful for environmental studies. It would therefore be advantage for further studies in this field to add Street-view to paths for none motorised transport. Complications related to making the drawings of the cycling route may have reduced the number of participants that completed the survey.

Participants in Odense who provided descriptions of the good and the bad parts of their routes and related them to their aesthetic experiences were not always the same as those who presented a drawing of their routes. They seldom mentioned particular streets or parts of streets as the best parts but described the general characteristics of their best and worst route parts. The reason might be due to smaller contrasts in the urban spaces in Odense than in the two other cities. This made it difficult to locate the good and the bad parts of routes on a map, as described by individual participants.

The theories applied to interpret which among the perceived features could have aesthetic meaning were useful and gave logical answers to the questions in focus. Theory of symbolic meaning was useful to interpret how associational meaning in the environment influenced the respondents' experiences. Theory of instrumental values gave insight into how such values affect aesthetic experience. Theory on the notion of distance revealed on how close by elements were perceived differently then those from far away.

The verbal scaling system applied, defined by Russell (1988) and Russell and Pratt (1980), was found to be appropriate for this study. It was used to abstract affective appraisals and their linked component (physical features) from the open ended questions. Then the Russell (1988) diagram was applied to systematize the results. Daniel and Ittelson (1981) have criticised the method because it was derived from responses to colour photographs but not real environments. They thought this could mask specific effects of environmental features. In this study, however, participants responded to real environments and described their experiences in open ended questions.

## *6. Conclusion*

The results from the study showed that aesthetic experience was important to most of the commuting bicyclists in the survey. The aesthetic experience constituted an important contribution to the quality of a bicycling route for commuting in all three cities considered in the present study. Vegetation and vicinity to the natural environment were the most important aesthetically pleasant features. In the inner city, bicycle routes running through urban parks or routes that were separated from motorised traffic by trees or green areas are contributing factors to an urban design that can stimulate aesthetically pleasant experience of commuting bicyclists. To stimulate the aesthetically pleasing experience during long distance bicycling from suburban areas, continuous green structures were important. In general, proximity to traffic seemed to be the most negative factor affecting cyclists' emotional well-being. The cyclists' wish was to escape from the uncomfortable experience caused by closeness to motorised traffic into an environment characterized by vegetation and possibility of experiencing nature, fresh air, quietness and positive sounds. The results of the survey also indicated that participants having the opportunity to experience aesthetically pleasing features during a longer part of their routes accompanied by a continuous infrastructure for cycling with few stops, rated the quality of their routes higher than those having only brief parts with aesthetically positive features along their commuting routes.

It is suggested that the challenge for urban planning and design will be to link routes and places with potential aesthetic qualities together into a continuous infrastructure network. The results show that a satisfying instrumental quality of bicycle routes is a precondition for aesthetic experience by the cyclist. When instrumental needs are solved in an acceptable way, commuters can be further stimulated by including aesthetic features, such as vegetation, in the urban space.

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# 9. Appendix

## 9.1 “Bike-through” tours

### 9.1.1 Invitation for participation in “bike-through” tours (example in Norwegian)

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DATE 09 2011

Til syklister i Trondheim.

**Forskning om attraktive sykkelruter.**

Har du lyst til å delta i et forskningsarbeid om attraktive sykkelruter i Trondheim og samtidig bidra med å forbedre omgivelsene i byen ut i fra syklisters opplevelse?

Jeg leter etter syklister som vil delta i et forskningsarbeide om attraktive ruter for transportsykling. Forskningsarbeidet vil inngå i min PhD avhandling som jeg skriver ved Institutt for Landskapsplanlegging, Universitetet for Miljø- og Biovitenskap.

Deltakelsen innebærer å være med på en **sykkeltur den 14. september**. Sykkelturen starter kl. 16.00 sentralt i Trondheim.

Sykkelturen vil bli omtrent 10 km lang og vil vare i litt over en time. Det blir syklet rolig og med mange stopp på veien, hvor deltakere skal notere enkle kommentarer til opplevelsen av de fysiske omgivelsene underveis. Turen avsluttes i møtelokaler hvor kommentarene som er blitt notert diskuteres nærmere. Det blir servert forfriskninger. Til sammen vil turen med gruppeintervju vare i ca. 2,5 timer.

Det er lagt vekt på at deltakere både er en mangfoldig gruppe av begge kjønn med variert erfaring som syklister, og har interesse for sykling som transportform. Deltakere må ha fylt 18 år.

Interesserte sender e-post til **hstefans@umb.no** før 6. september. Deltakere vil da få sent nærmere opplysninger om sykkelturen.

Vennlig hilsen

Harpa Stefánsdóttir, ph.d. stipendiat

Institutt for landskapsplanlegging
Universitetet for miljø- og biovitenskap, 1432 Ås

### 9.1.2 Invitation and background questionnaire before “bike-through” tour

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DATE 06.09. 2011

**Forskning om attraktive sykkelruter.**

Kjære deltaker i forskning om attraktive sykkelruter.

Takk for å vise interesse for å delta i sykkeltur knyttet til mitt forskningsarbeid om attraktive sykkelruter. Jeg vil herved invitere deg til å delta. Din deltakelse innebærer å være med på en sykkeltur den **14. september**. Den starter fra **Filmteatret Prinsens gate 2a kl. 16.10 presis**. Vennligst gi beskjed hvis tidspunktet ikke passer eller hvis du ikke ønsker å delta. Du tar med egen sykkel på turen. Bruk av hjelm anbefales. Det blir maksimalt 7 andre deltakere på denne turen.

Deltakere for utdelt ark som de skal bruke til å skrive på i løpet av turen. Hver og en tar vare på sine ark på sykkelturen. Det anbefales å ta med ryggsekk, eller lignende, for skrivesaker og papirer.

Sykkelturen vil bli omtrent 10 km lang og vil vare i litt over en time. Det blir syklet rolig og mange stopp blir tatt på veien hvor deltakere skal notere enkle kommentarer til opplevelse av de fysiske omgivelsene på veien. Turen avsluttes i **møtelokaler** hvor kommentarene som er blitt notert diskuteres nærmere. Det blir servert forfriskninger under intervjuet. Til sammen vil turen med gruppeintervju vare i omtrent **2,5 timer**.

Forskningsarbeidet vil inngå i min avhandling om attraktive sykkelruter for transport sykling, som jeg skriver ved Institutt for Landskapsplanlegging, Universitetet for Miljø- og Biovitenskap. Resultatene vil også publiseres i internasjonale tidsskrifter og på konferanser. Planlagt avslutning for avhandling er høsten 2013.

Deltakere bes ta hensyn til at deltakelse på turen, og all diskusjon mens turen og gruppeintervju varer er konfidensiell. Deltakere bør kun kommentere egen opplevelse og erfaring på turen. Resultater fra turen blir publisert anonymt. Etter turen blir navnelister, som knytter undersøkelsen til deltakere, slettet.

Prosjektet er blitt melt til Personvernombudet for forskning, Norsk samfunnsvitenskaplig datatjeneste AS.

Deltakelsen er valgfri. Det er tillatt å ikke svare på enkelte spørsmål og/eller slutte deltakelse når som helst.

Her under er det et spørsmåls skjema ang. alder, kjønn og hvor ofte du sykler. Jeg vil be deg fylle ut den og sende meg til **hstefans@umb.no** før 12. september.

Vennlig hilsen

Harpa Stefánsdóttir, stipendiat

Institutt for landskapsplanlegging
Universitetet for miljø- og biovitenskap, 1432 Ås

Vennligst sett kryss på strek foran relevant(e) ord:

Du har rett til å velge å ikke svare på enkelte spørsmål

1. Jeg er
__ mann
__ kvinne

2. Jeg er ____ år gammel

3. Jeg sykler gjennomsnittlig til jobb i perioden mai-september
__minst 3x/uke
__minst 1x/uke
__minst 1x/måned
__mindre enn en gang i måneden

4. Jeg sykler i perioden mai-september (alle turer til sammen inkl. til jobb)
__minst 3x/uke
__minst 1x/uke
__minst 1x/måned
__mindre enn en gang i måneden

5. Jeg sykler gjennomsnittlig til jobb i perioden oktober-april
__minst 3x/uke
__minst 1x/uke
__minst 1x/måned
__mindre enn en gang i måneden

6. Jeg sykler i perioden oktober-april (alle turer til sammen inkl. til jobb)
__minst 3x/uke
__minst 1x/uke
__minst 1x/måned
__mindre enn en gang i måneden

7. Hvorfor har du valgt å sykle til jobben? (du kan velge å krysse ved flere en et alternativ)
__For å komme i god form
__ Fordi det er miljøvennlig
__Fordi jeg har ikke adgang til bil
__For å spare penger
__Jeg har ikke adgang til parkeringsplass på arbeidssted
__Det gir kortest reisetid
__Jeg liker livsstilen

Andre grunner, hvilke? _____

### 9.1.3 The pre-planned routes

| Group | Stop | Space types | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Cars only | Low-density auto-oriented zone | Hidden route | Traffic street | Enclosed streetscape | | Urban greenery | Natural space | Residential |
| | | | | | | car dominated | pedestrians | | | |
| 1 | 1 | | | | | | Laugavegur shoppingstreet | | | |
| | 2 | | | | Suðurgata | x | | | | |
| | 3 | | | | | | | | Ægissíða | |
| | 4 | | | Reykjavíkurvegur /G. Njardargata | | | | | | x |
| | 5 | Gamla Hringbraut | | | | | | | | |
| | 6 | | | | | | | | | Gunnarsbraut |
| | 7 | | | | Laugavegur upper /Suðurlandsbraut | | | | | |
| | 8 | | | | | | | Laugardalur | | |
| 2 | 1 | | | | | Hverfisgata | | | | |
| | 2 | | | | | | Tjarnargata | Treetunnel HÍ campus | | |
| | 3 | | | | | | | | Ægissíða | |
| | 4 | | | Reykjavíkurvegur /G. Njardargata | | | | | | x |
| | 5 | Nýja Hringbraut | | | | | | | | |
| | 6 | | | | | | | | | Gunnarsbraut |
| | 7 | | | | Laugavegur upper /Suðurlandsbraut | | | | | |
| | 8 | | | | | | | Laugardalur | | |
| 3 | 1 | | | | | | | | Sæbraut | |
| | 2 | | | | | Lækjargata | x | | | |
| | 3 | | | | | | | | | Laufásvegur |
| | 4 | | | | x | Snorrabraut | | | | |
| | 5 | | | | Laugavegur upper /Suðurlandsbraut | | | | | |
| | 6 | | | Háaleitishverfi path | | | | x | | |
| | 7 | | Skeifan | | | | | | | |
| | 8 | | | | | | | Laugardalur | | |
| 4 | 1 | Prinsens gate/ Elgeseter | | | x | | | | | |
| | 2 | | | | | | | x | Nidelva sti | |
| | 3 | | | | | | Øvre Bakklandet | | | |
| | 4 | | | | | | | | | Nedre Møllenberg gt. |
| | 5 | | x | Strandveien Laderuta- | | | | | | |
| | 6 | | | | | | Thaulowkaia | | x | |
| | 7 | | | | | | | | | |
| | 8 | | Havnegata- Brattøra | | x | | | | | |

**Table-A: street names / route part names in "bike through" routes**

The table shows the names of the streets/ route parts included in each "bike through" tour. All the streets/ route parts are marked with the same number on the maps for each group. The vertical columns show the closest "space type" category for each street/route part. The x-es stand for attributes from other space types category, meaning that those space types having x in their row are not including only characteristics belonging to the chosen category.

***Route group 1, Reykjavík***

Time: Wedensday 25th May 2011, started at 5 pm at Hlemmur.

Route 10,6 km

Participants:

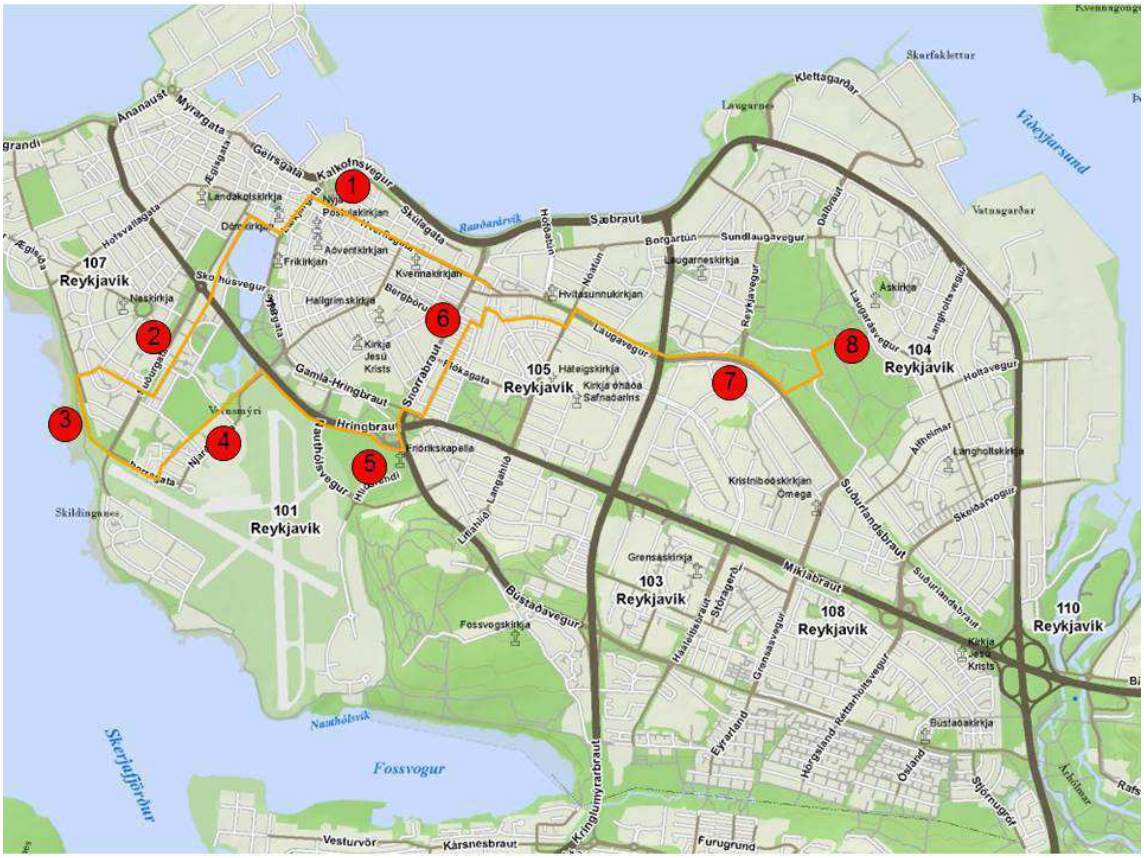
5 registered, 3 completed

Weather:

NW 6 m / s, 7 ° C, partly cloudy
Melon Blast 11 m / s

Time used and interview.

Bike tour with stops lasted for 70 minutes. Interview lasted for 1 hour and 35 minutes.
A light meal was served at Café Flora in Botanical Garden under the group interview.




Map of route group 1, Reykjavík, the numbers refer to stops, see table a.

***Route group 2, Reykjavík***

Time: Thursday 26th of may 2011, started at 5 pm at Hlemmur.

Route: about 10 km

Weather:

Rain, southeast of 7 m/s
Melon Blast 13 m/s
Temperature 5 ° C
(Rainfall 0.8 mm?)

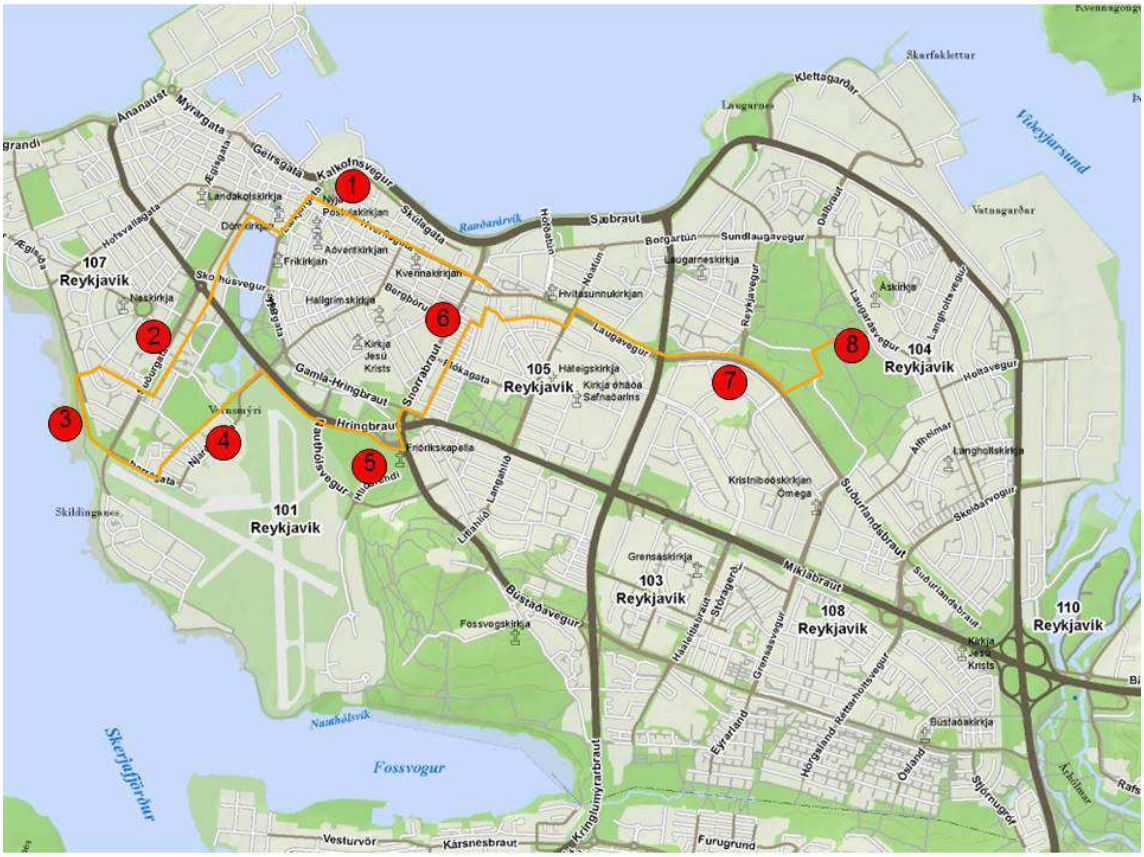
Significantly heavy rain and wind. Weather was difficult for participants. Two and two stops were combined often where some shelter could be found. Participants were asked about the effects of the weather in the discussion afterwards.

Participants.

6 registered, 5 completed.

Time used and interview.

Bike tour with stops lasted for 70 minutes. Interview lasted for 1 hour and 35 minutes. A light meal was served at Café Flora in Botanical Garden under the group interview.




Map of route group 2, Reykjavík, the numbers refer to stops, see table a.

***Route group 3, Reykjavík***

Time: Saturday 28th of may 2011, started at 10 am at Hlemmur.

Route: 10,1 km

Weather:

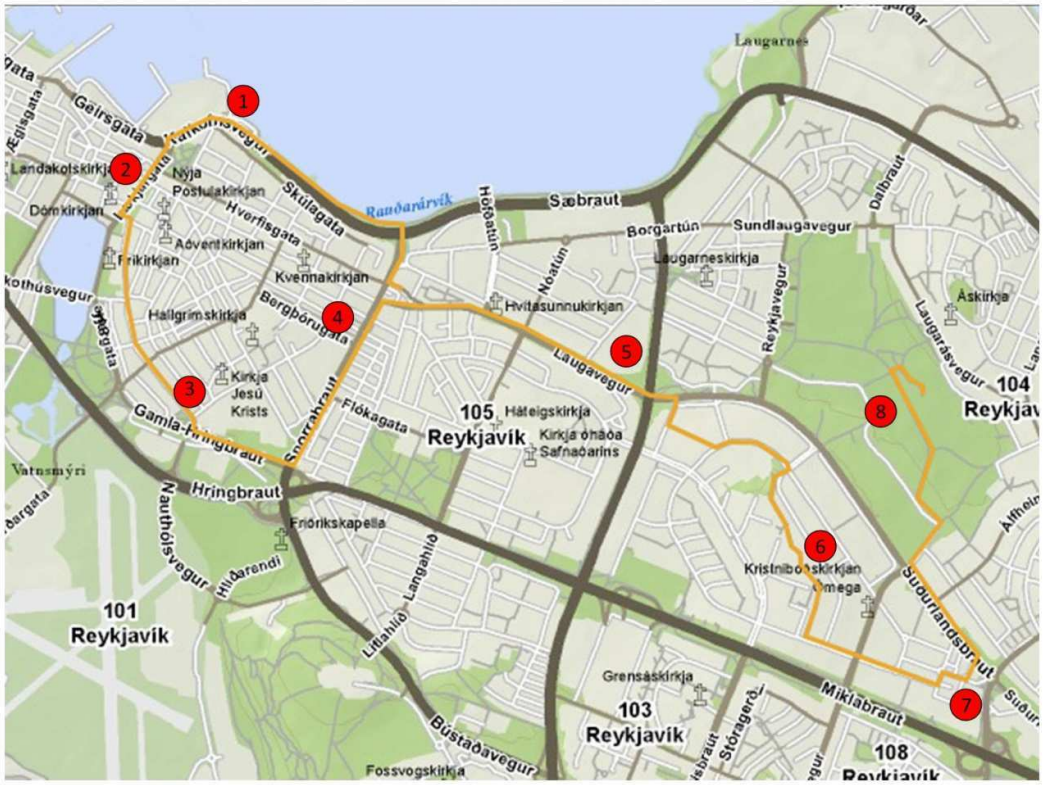
Good

Participants.

6 registered, 5 completed.

Time used and interview.

Bike tour with stops lasted for 70 minutes. Interview lasted for 75 minutes. A light meal was served at Café Flora in Botanical Garden under the group interview.




Map of route group 3, Reykjavík, the numbers refer to stops, see table a.

***Route group 4, Trondheim***

Time: 14th of September 2011, started at 16.00 am at Prinsens gate in front of Filmteatret cinema.

Route: about 10 km

Weather:

Rather good, some rain.

Participants.

7 registered and completed.

Time used and interview.

Bike tour with stops lasted for about 70 minutes. Interview lasted for about 70 minutes. A light meal was served at Byplankontoret i Trondheim [Planning office, Trondheim municipality] under the group interview.


Map of route group 4, Trondheim, the numbers refer to stops, see table a.

### 9.1.4 An example of evaluation form for “bike-through” route group 1, Trondheim

# Forskning om attraktive ruter for transport sykling.

## + Stimulerende omgivelsesfaktorer

Hvordan virker omgivelsene i gaten stimulerende på deg når du sykler?

f.eks. hva synes du er interessant ved gaten som et ledd i sykkelrute, er det noe i omgivelsene som vekker gode følelser eller komfort, ville du velge å sykle her på vei til jobb? Hvorfor? Hvorfor ikke? Hva er positivt ved å sykle her?

## - Hemmende omgivelsesfaktorer

Hvordan virker omgivelsene i gaten hemmende på deg når du sykler?

f.eks. hva syns du er forstyrrende ved gaten som et ledd i sykkelrute, er det noe som du opplever som kjedelig eller som trussel, ville du velge å sykle her på vei til jobb? Hvorfor? Hvorfor ikke? Hva er negativt ved å sykle her?

## Forslag til forbedring

Er det noe som du synes mangler for å gjøre denne gaten til en del av en **god rute** for transport-sykling?

**Deltaker nr. ___**

## 1 Prinsensgate - Elgeseterbrua

**+**

_____

**-**

_____

Forslag til forbedring

## 2 Nidelva sti

**+**

_____

**-**

_____

Forslag til forbedring

## 3 Øvre bakklandet

**+**

_____

**-**

_____

Forslag til forbedring

## 4 Nedre møllenberg gate

**+**

_____

**-**

_____

Forslag til forbedring

## 5 Strandveien - Laderuta

**+**

_____

**-**

_____

Forslag til forbedring

## 6 Thaulowkaia – gang- og sykkelbro

**+**

_____

**-**

_____

Forslag til forbedring

## 7 Havnegata - Brattøra

**+**

_____

**-**

_____

Forslag til forbedring

## 8 Kjøpmannsgata

**+**

_____

**-**

_____

Forslag til forbedring

Hvilken gate likte du **best** i turen som del av rute til transport sykling?

_____

Hvorfor?

_____

Hvilken gate likte du **minst** i turen som del av rute til transport sykling?

_____

Hvorfor?

_____

## 9.2 Survey

### 9.2.1 Invitation for participation in the survey (example in Norwegian)

God dag,

Jeg ønsker at dette brevet blir videresendt til alle ansatte i firmaet.
Ditt firma er blitt valgt ut som en aktuell deltaker i undersøkelse om attraktive omgivelser for transportsykling. Utvalgte firmaer har beliggenhet sentralt i Trondheim og har hatt deltakere i sykle til jobben auksjonen 2011.

Alle ansatte i firmaet er invitert til å delta i undersøkelsen. Arbeidet inngår i min PhD avhandling i byplanlegging ved Universitetet for miljø- og biovitenskap på Ås.
Miljøvennlige transportmåter som sykling er meget viktige i kampen for bærekraftig utvikling i byer. Hvordan vi skal få flere til å sykle er et vanskelig spørsmål. I dette forskningsarbeidet blir perspektiver på hvor attraktive forskjellige omgivelser er for sykling undersøkt. Flere mellomstore byer i Norden blir studert. Det tar mellom 2 og 15 minutter å delta, avhengig av om du sykler eller ikke.

Deltakelsen innebærer:
1) Å svare på spørsmål om alder, kjønn, motivasjon til sykling og om du sykler og hvor ofte.
Å svare på spørsmål om sykkelruter og valg av ruter.

2) Å tegne ruten som ble syklet fra hjem til arbeid (Kun deltakere som har syklet til jobb deltar i del 2)

I del 2 blir det spurt om e-post adresse. Dette er for å gjøre kobling mellom del 1 og del 2 (tegning) mulig. Etter at svarene er mottatt blir e-post adressene slettet og deltaker blir anonym.

1) Trykk på linken for å svare på spørsmål: https://web.questback.com/harpastefansdottir/vmawljauzk/

2) Trykk på linken for å tegne din sykkelrute: http://www.walkjogrun.net/routes/

Du finner veiledning til hvordan du kan tegne din sykkelrute i vedlegg.

Med vennlig hilsen

Harpa Stefansdottir stipendiat
Institutt for landskapsplanlegging,
Universitetet for Miljø- og Biovitenskap
1432 Ås
tlf 64 96 63 82

Det understrekes at all deltakelse er frivillig. Deltaker har rett til å velge å ikke svare på alle spørsmål. Prosjektet avsluttes høsten 2013. Prosjektet er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskaplig datatjeneste AS. Datamaterialet oppbevares i UMBs system for lagring av alle data knyttet til PhD-avhandlinger.

### 9.2.2 Questionnaire survey

Attraktive ruter for transport-sykling

**1) Jeg er**

- ○ Mann
- ○ Kvinne

**2) Hvor gammel er du?**

- ○ 18-30 år
- ○ 31-40 år
- ○ 41-50 år
- ○ 51-60 år
- ○ eldre en 60 år

**3) Hvordan kommer du deg til jobb oftest i perioden mai-september?**

- ○ Kjører bil selv
- ○ Jeg er passasjer i bil
- ○ Tar buss/ tog/ trikk
- ○ Sykler
- ○ Går hele veien

**4) Hvordan kommer du deg til jobb oftest i perioden oktober-april?**

- ○ Kjører bil selv
- ○ Jeg er passasjer i bil
- ○ Tar buss/ tog/ trikk
- ○ Sykler
- ○ Går hele veien

**5) Hva syns du er akseptabel reisetid for deg til arbeid?**

- ○ opp til 15 minutter
- ○ 15-30 minutter
- ○ 30-45 minutter
- ○ min reise kan ta mer en 45 minutter

**6) Hva syns du er akseptabel reiselengde for deg på**

**sykkel til arbeid?**

- ○ mindre en 1 km
- ○ 1-3 km
- ○ 3-5 km
- ○ 5-10 km
- ○ Mer en 10 km

**7) Har du mulighet til å sykle på separert sykkelsti eller sykkelfelt på vei til jobb?**

- ○ Ja, deler av veien
- ○ Ja, hele veien
- ○ Nei
- ○ Vet ikke

**8) * Har du syklet til jobben noen gang?**

- ○ Ja en gang/ få ganger
- ○ Ja jeg sykler regelmessig til jobb
- ○ Nei aldri

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Nei aldri"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

Du kan velge flere svar

**9) Hvis du aldri har syklet til jobben eller har syklet kun få ganger, hva er grunnen til det?**

- ☐ Jeg har ikke tilgang til sykkel
- ☐ Det er for lang avstand
- ☐ Det tar for lang tid
- ☐ Jeg liker ikke å sykle
- ☐ Jeg syns jeg er i for dårlig form
- ☐ Jeg synes ikke ruten jeg kan velge er attraktiv nok
- ☐ Jeg har lyst til å prøve selv om jeg ikke har gjort det ennå
- ☐ Andre grunner, hvilke?

**10) Hva av følgende ville du helst ønsket å oppleve i omgivelsene mens du sykler til eller fra arbeid**

Velg et alternativ

En sykkelrute fra hjem til arbeid kan være via sykkelstier, bilgater, på fortauet eller hvor som helst hvor man har mulighet til å sykle. I spørsmålene herunder betyr rute veien man velger. Ruten kan ligge gjennom for eksempel tett bebyggelse, åpne arealer, grønne parker, bildominerte områder eller langs naturområder.

**11) Hvor attraktive synes du omgivelsene fra ditt hjem til arbeid virker til sykling**

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1= minst attraktivt | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

**12) Jeg sykler gjennomsnittlig til jobb i perioden mai-september**

- ○ minst 3x/uke
- ○ minst 1x/uke
- ○ minst 1x/måned
- ○ mindre enn en gang i måneden

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
- )

**13) Jeg sykler gjennomsnittlig til jobb i perioden oktober-april**

- ○ minst 3x/uke
- ○ minst 1x/uke
- ○ minst 1x/måned
- ○ mindre enn en gang i måneden

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for

respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

**14) Jeg sykler i perioden mai-september (alle turer)**

- ○ minst 3x/uke
- ○ minst 1x/uke
- ○ minst 1x/måned
- ○ mindre enn en gang i måneden

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

**15) Jeg sykler i perioden oktober-april (alle turer)**

- ○ minst 3x/uke
- ○ minst 1x/uke
- ○ minst 1x/måned
- ○ mindre enn en gang i måneden

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

Du kan velge flere svar

**16) Hvorfor har du valgt å sykle til jobben?**

- ☐ For å komme i god form
- ☐ Fordi det er miljøvennlig
- ☐ Fordi jeg har ikke adgang til bil
- ☐ For å spare penger
- ☐ Jeg har ikke adgang til parkeringsplass på arbeidssted
- ☐ Det gir kortest reisetid

- [ ] Jeg liker livsstilen
- [ ] Andre grunner

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

Du kan velge flere svar

**17) Jeg sykler alltid den samme ruten til eller fra arbeid**

- [ ] Ja
- [ ] Nei, jeg varierer av og til på veien hjem
- [ ] Nei, jeg varierer av og til på vei til jobb

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

**18) Jeg kjenner til flere alternative ruter som jeg kan velge i mellom når jeg sykler til jobb**

- ( ) ja
- ( ) nei
- ( ) vet ikke, jeg har ikke undersøkt det

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

**19) Sett kryss foran det som har størst betydning for ditt valg av rute til jobb, (den du sykler mest ofte)**

- Separert sykkelsti er avgjørende for mitt valg av rute
- Jeg prioriterer separert sykkelsti, men velger den overhodet ikke hvis den ligger langs en meget trafikkert gate
- Separert sykkelsti spiller ingen rolle for mitt rutevalg, jeg velger å sykle i mest mulig attraktive omgivelser
- Ikke relevant spørsmål

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

**20) Har visuell opplevelse mens du sykler til jobb betydning for deg?**

- Ja, jeg setter stor pris på å se noe vakkert eller spennende mens jeg sykler til jobb
- Nei, jeg tenker ikke så mye på det jeg opplever på veien
- Liten betydning, men noen

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
- )

1= minst betydning

**21) Hvor stor betydning har følgende for deg når du sykler til jobb?**

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Jeg velger rute hvor jeg føler meg sikker som syklist | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Jeg velger korteste veien uansett hvor den ligger | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Jeg velger rute hvor det er jevnt dekke | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Jeg velger å sykle mest mulig gjennom grønne områder/ naturområder | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Jeg velger å sykle hvor jeg kan se andre | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

mennesker

| | | | | | | |
|---|---|---|---|---|---|---|
| Jeg velger å sykle hvor jeg ikke trenger å stoppe ofte, ved lys eller krysse store trafikkårer | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

kryss ved flere en et alternativ hvis relevant

**22) Ved valg av min rute til jobb prøver jeg å unngå**

- ☐ å sykle i nærheten av biltrafikk/ bildominerte områder
- ☐ gater med for mange fotgjengere
- ☐ trange gater
- ☐ ruter hvor jeg må stoppe eller sykle sakte
- ☐ svingete gater
- ☐ grønne områder
- ☐ åpne områder
- ☐ Andre ting, hvilke?

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

**23) I hvilken gate/gatedel/område på vei fra hjem til arbeid liker du best å sykle i? Beskriv kort hvorfor.**

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller

- Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

**24) I hvilken gate/gatedel/område på vei fra hjem til arbeid liker du minst å sykle i? Beskriv kort hvorfor.**

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
- )

**25) Hvilke andre ting vil du nevne som har stor betydning for ditt rutevalg til jobb**

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
- )

Du skal også tegne din rute på kart og sende den med epost. Gå tilbake til epost sending/ informasjonsbrev, hvor du kan logge deg inn på program for å tegne din sykkelrute etter at du har trykket på "SEND"

**26) HUSK Å TEGNE DIN SYKKELRUTE!**

**Denne informasjonen vises kun i forhåndsvisningen**

Følgende kriterier må være oppfylt for at spørsmålet skal vises for respondenten:

- (
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja jeg sykler regelmessig til jobb"
  - eller
  - Hvis "Har du syklet til jobben noen gang?" *er lik* "Ja en gang/ få ganger"
- )

For at det skal være mulig å koble din tegning av sykkelrute til dine svar i undersøkelsen er det nødvendig at du gir opp epost adresse, samme som du sender tegningen fra. Epost adressen blir slettet etter at

tegningen er koblet til svarene.

**27) Vennligst skriv din epost adresse her**

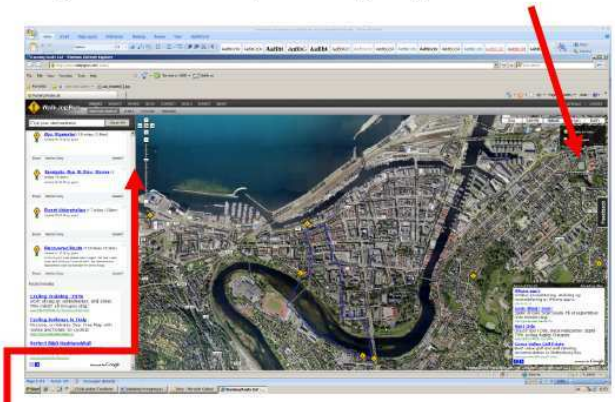
### 9.2.3 Guidance for drawing route in WalkJugRun.net

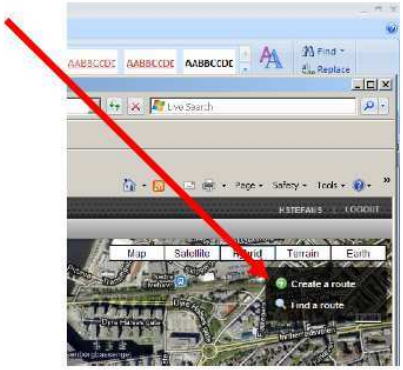
## Veiledning for tegning av sykkelrute:

Gå til websiden http://www.walkjogrun.net/routes/

Zoom inn til ditt område hvor du sykler. Du kan skrive inn adresse i venstre hjørne, men det er ikke nødvendig.

Velg "**create a route**" øverst i høyre hjørne.



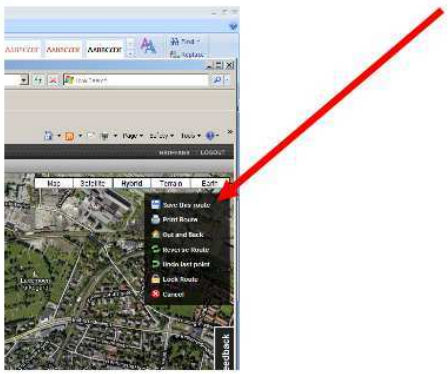



**Nå kan du begynne å tegne**. Det gjør du ved å trykke venstre knapp på din mus på kartet der hvor du har syklet. Du kan trykke ned knappen så ofte du vil, hver gang ruten skifter retning.

Du kan zoome tegningen ut eller inn når du vil. Da bruker du midterste knappen på musen (hvis den har 3 knapper) eller + og – knappene på skjermen.

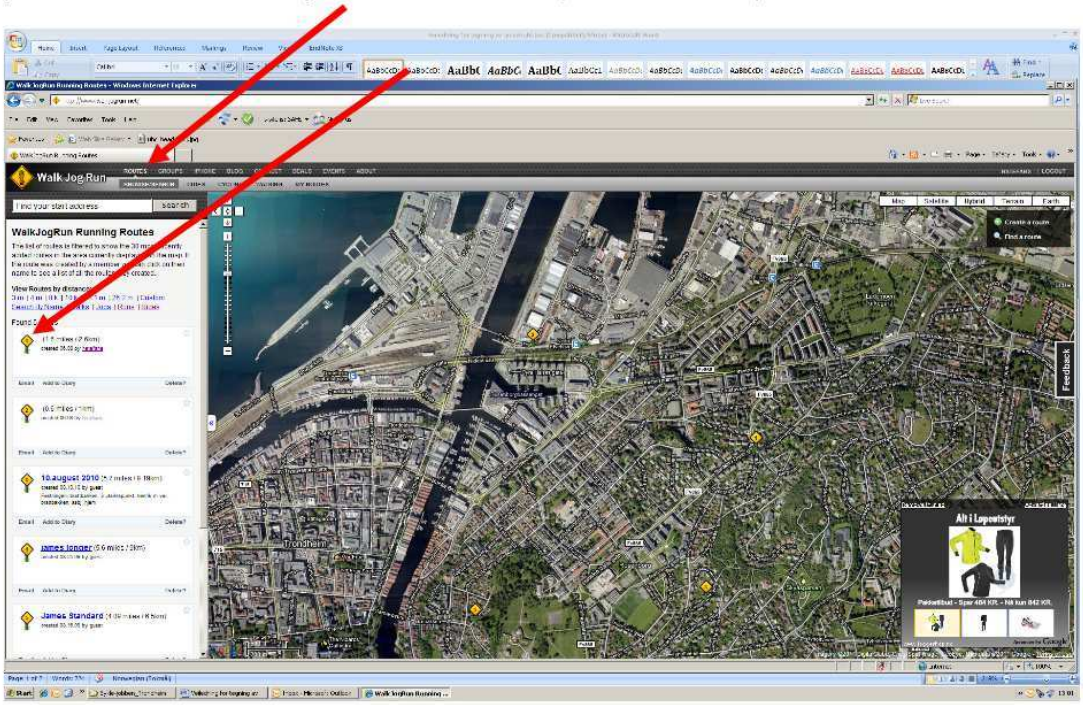
Hvis du vil flytte kartet frem og tilbake på skjermen holder du venstre knappen nede og får opp hånd på skjermen. Hånden betyr at du kan flytte kartet på skjermen. Du kan også bruke pilene på skjermen (samme sted som + og – knapper). Du kan velge "undo last point" også øverst i høyre hjørne (se bilde nedenfor). Da visker programmet ut ditt siste punkt. Du kan siden fortsette å tegne igjen.

Når du er ferdig velger du "**save this route**" øverst i venstre hjørne

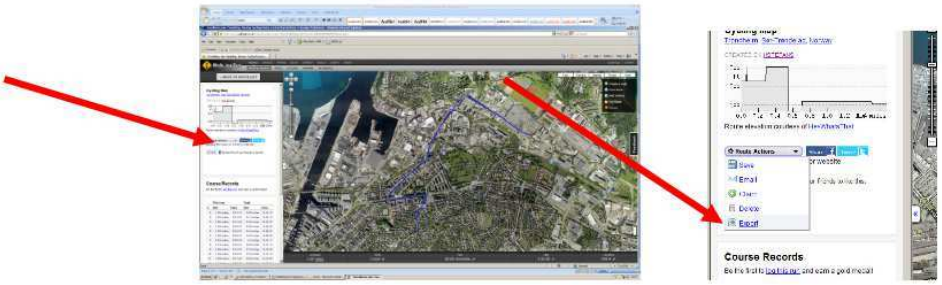


Du  får nå opp nytt vindu. Trykk på "**Save new route**".  Velg et navn for din rute. Du trenger ikke fylle ut noen annen informasjon i dette vinduet.

**Ruten din kommer nå øverst på listen under "walk jog running routes" på venstre side**. Hvis ikke, trykk på "routes" øverst i venstre hjørne.  Da vil då få listen (tar noen sekunder).




Velg nå ruten din øverst i listen. (trykk to ganger med venstre museknapp i den gule boksen)




Velg nå "**route actions**"  og velg "**export**".  Velg **KML** format og velg "**save**".  Du velger selv hvor du lagrer filen på din datamaskin.  **Hent filen og send den med epost til hstefans@umb.no**

Lykke til

og tusen takk for din deltakelse

## 9.3 Interpretation of results from “bike-through” tours

### 9.3.1 List of the affective qualities identified from the "bike-through" data

| | nr | variable | experience | |
|---|---|---|---|---|
| **The ability to move (kinaesthetic experience)** | 1 | many pedestrians | | - |
| | 2 | much going on | | - |
| | 3 | bad surface/ speed bumps | + | |
| | 4 | few people | + | |
| | 5 | no other traffic | + | |
| | 6 | predictable continuous space | + | |
| | 7 | narrow space/ conflict | | - |
| | 8 | many intersections/ stops | | - |
| | 9 | congested with car traffic | | - |
| | 10 | parked cars/ reversing | | - |
| | 11 | general ability to move | + | |
| **Visual stimuli (lack of stimuli)** | A | great visual variety | + | |
| | B | other people | + | |
| | C | streetscape | + | |
| | D | gardens | + | |
| | E | dense urban structure | + | |
| | F | historical place | + | |
| | G | view to historical buildings | + | |
| | H | view to nature | + | |
| | I | vegetation | + | |
| | J | tidy environment | + | |
| | K | grey buildings | | - |
| | L | no visual interests | | - |
| | M | birdlife | + | |
| | N | closeness to heavy traffic | | - |
| | O | asphalt desert (materiality) | | - |
| | P | environment dominated by car traffic | | - |
| | Q | no traffic closeby | + | |
| | R | no people | + | |
| **Hearing and smelling stimuli** | a | little/ calm traffic | + | |
| | b | no traffic | + | |
| | c | quiet | + | |
| | d | vegetation | + | |
| | e | birds singing | + | |
| | f | fresh air | + | |
| | g | noise | | - |
| | h | felling for insecurity | | - |
| | i | pollution | | - |
| | j | sheltered/ wind reduced | + | |
| | k | little pollution | + | |
| | l | windy | | - |
| | m | closeness to heavy traffic, much attention needed | | - |

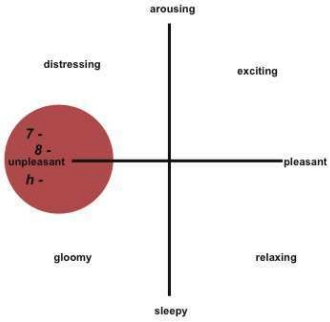
### 9.3.2 Identified affective qualities for each street/route part evaluated

**Cars only**

Nyja Hringbraut

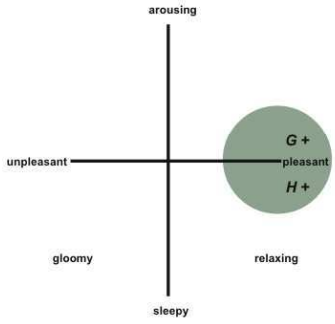

**Traffic street**

Sudurgata 1. part



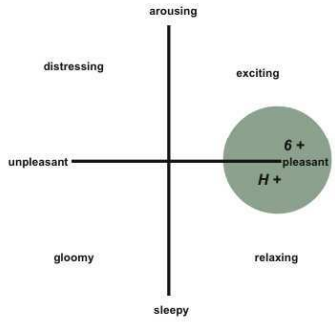

**Cars only**

Prinsens gate/ Elgeseter bridge



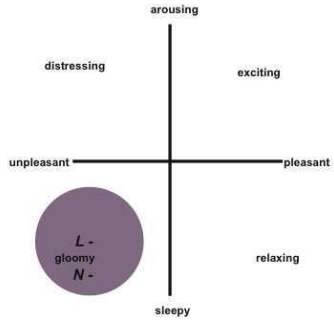

**Traffic street**

Sudurgata 2. part



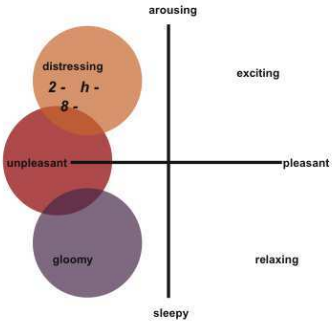

**Traffic street**

Laugavegur upper (Sudurlandsbraut)



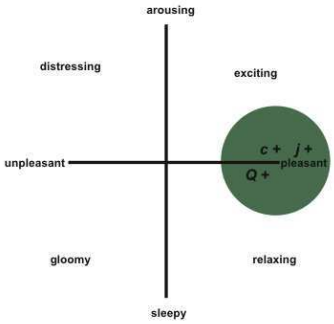
**Low-density auto-oriented zone**

Skeifan



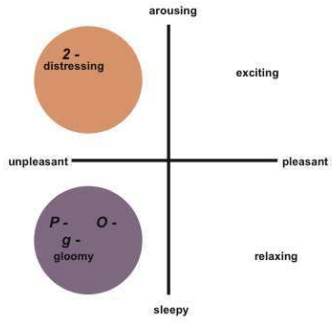

**Hidden route**

Old Njardargata



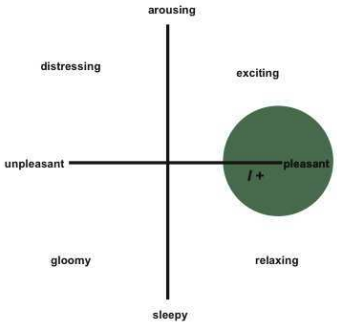

**Low-density auto-oriented zone**

Brattøra



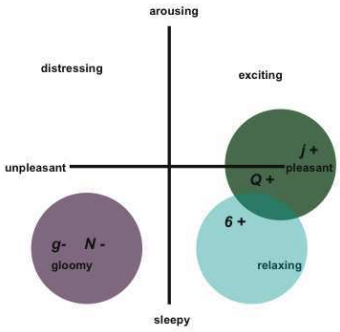

**Hidden route**

Haaleitisbraut path



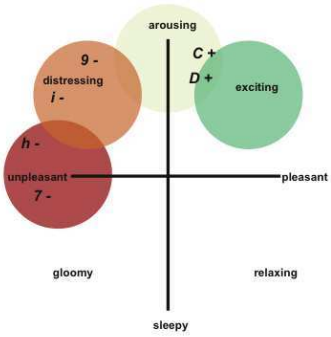

**Hidden route**

Strandveien - Laderuta



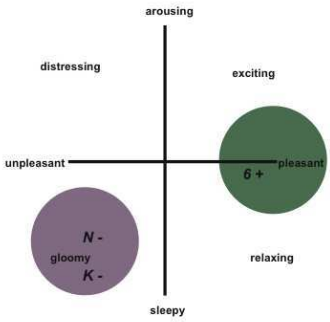
**Enclosed streetscape**
**motorised traffic priority**

Hverfisgata



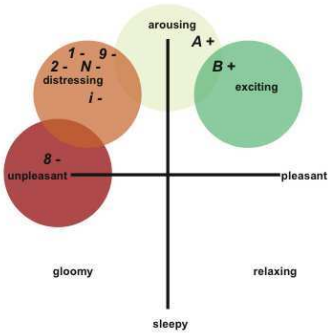

**Enclosed streetscape**
**motorised traffic priority**

Snorrabraut



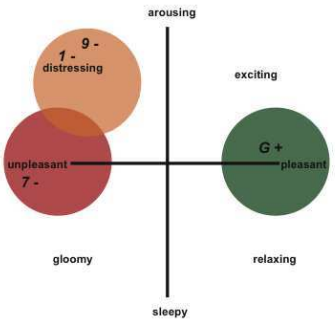

**Enclosed streetscape**
**motorised traffic priority**

Lækjargata



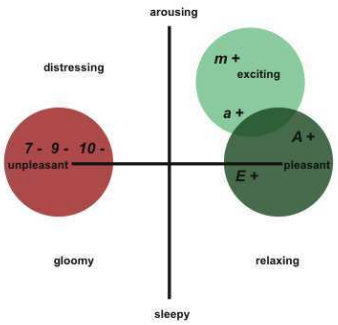

**Enclosed streetscape**
**motorised traffic priority**

Kjøpmannsgata



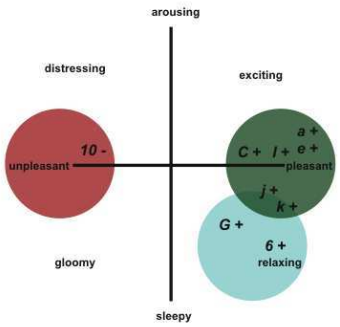
**Enclosed streetscape**
**pedestrian priority**

Laugarvegur (shopping street)



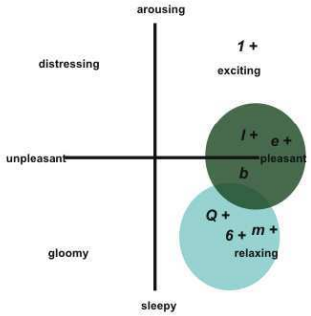

**Enclosed streetscape**
**pedestrian priority**

Tjarnargata



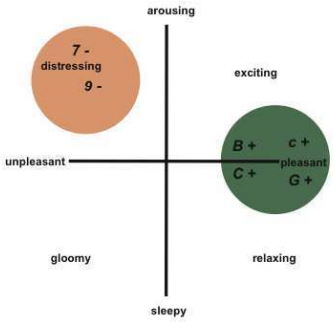

**Urban greenery**

Laugardalur



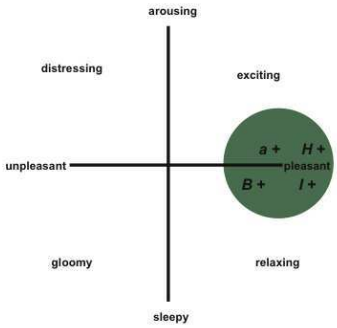

**Enclosed streetscape**
**pedestrian priority**

øvre Bakklandet



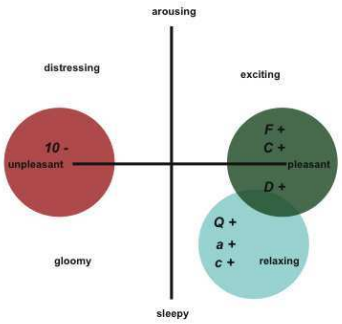

**Enclosed streetscape**
**pedestrian priority**

Thaulowkaia



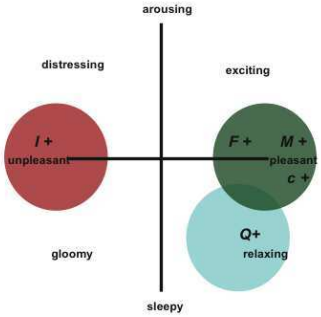
**Residential street,**

Laufasvegur



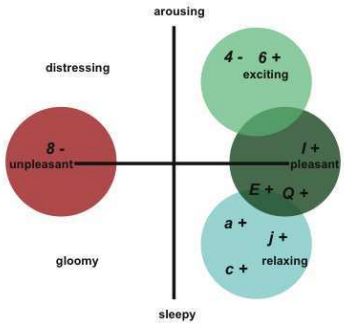

**Natural space**

Ægissida



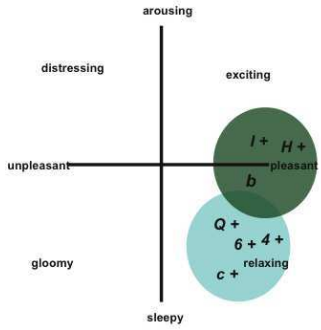

**Residential street,**

Gunnarsbraut



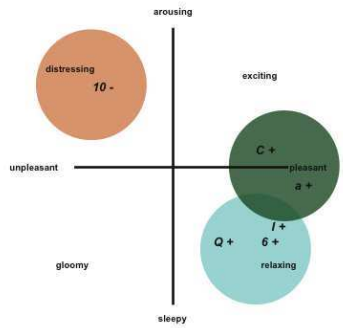

**Natural space**

Nidelva river path



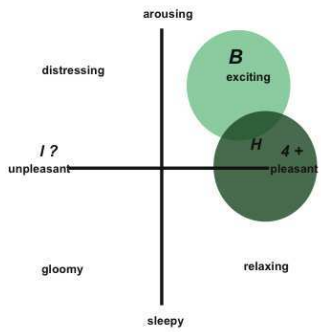

**Residential street,**

Nedre Møllenberg




**Natural space**

Sæbraut



### 9.3.3 The identified affective qualities located in the modified Russell (1988) diagram