TØI report 1667/2018

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Institute of Transport Economics
Norwegian Centre for Transport Research

Cycling in Oslo, Bergen, Stavanger and Trondheim

TØI Report
1667/2018

Cycling in Oslo, Bergen, Stavanger and Trondheim

A study of cycling and travel behaviour

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Sammendrag:

Mange syklister i norske byer føler seg utrygge når de sykler, spesielt i sentrum av byene. I tillegg mangler det ofte gode og trygge alternative ruter å velge for syklister. For å øke sykkelbruken i Norge må det innføres tiltak for å bedre forholdene for syklister. I denne rapporten studerer vi sykling og sykkelbruk i de fire største byene i Norge, ved hjelp av ulike datakilder. Vi kombinerer funn fra Den nasjonale reisevaneundersøkelsen med en spørreundersøkelse om sykling og data fra en lokasjonsbasert app. Disse dataene gir relevant informasjon om sykkelbruk i byene, i tillegg til demografi, rutevalg og reisetilfredshet blant syklister.

Summary:

Many cyclists in Norwegian cities feel unsafe while cycling, especially in the city centres. In addition, safe alternative routes are often not available. In order to increase cycle use in Norway, measures must be put in place to both improve the conditions for cyclists and make cycling paths safer. In this report, we study cyclists and cycling behaviour in the four largest cities in Norway, using multiple data sources. We combine results from the National Travel Survey with a survey on cycling and geographical data collected through a specially designed smartphone application. This data gives relevant insight in cycle usage patterns in the cities, as well as the demographics, route choice and travel satisfaction of cyclists.

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Preface

This report is part of the research project *Reducing fossil energy use and CO_2 emissions from transport by paving the way for more bicycles and e-bikes (Cycle-2-zero)* financed under the aegis of the research programme ENERGIX (Project Number: 255628) of The Norwegian Research Council (NRC).

In the research project, we have employed new methods to collect new types of data to study cycling in Norway.

The report uses multiple data sources to study travel behaviour and cycle use in the four largest cities in Norway. The data that are reported have been collected as a joint venture between three different research projects: *Cycle-2-zero*; *Telledugnaden* and *Push and Show*.

The report is written by Tineke de Jong, Jørgen Aarhaug and Erik Bjørnson Lunke. Aslak Fyhri has been project leader for the data collection and for the projects Telledugnaden and Push and Show. Tineke de Jong has worked with data collection (app and survey data). The maps are made by Espen Johnsson.

Tanu Priya Uteng is the project leader of Cycle-2-zero. Aud Tennøy has been quality manager for this report. Secretary Trude Kvalsvik has been responsible for organizing the report for publishing.

Oslo, October 2018
Institute of Transport Economics

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Institute of Transport Economics
Norwegian Centre for Transport Research

Summary

Cycling in Oslo, Bergen, Stavanger and Trondheim

TØI Report 1667/2018
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Many cyclists in Norwegian cities feel unsafe while cycling, especially in the city centres. In addition, safe alternative routes are often not available. In order to increase cycle use in Norway, measures must be put in place to both improve the conditions for cyclists and make cycling paths safer. In this report, we study cyclists and cycling behaviour in the four largest cities in Norway, using multiple data sources. We combine results from the National Travel Survey with a survey on cycling and geographical data collected through a specially designed smartphone application. This data gives relevant insight in cycle usage patterns in the cities, as well as the demographics, route choice and travel satisfaction of cyclists.

Increasing the modal share of cycling is a stated goal in Norwegian transport policy. An increase in cycling will have favourable effects for local communities, with less car traffic, energy use and CO_2-emissions. Almost half of the trips registered in the National Travel Survey (NTS 2013/14) are less than 5 km, and half of these trips were taken with cars. This indicates a potential to reduce car use and increase cycling in Norway.

To achieve this change, there is a need for targeted measures and increased development of cycling infrastructure, which can increase the safety of cyclists. This again requires knowledge about how the existing infrastructure is utilized, what characterizes today's cyclists, and which specific areas in the cities have the largest potential for increased cycling.

Study area and data sources

This report focuses on the four largest cities in Norway: Oslo, Bergen, Stavanger and Trondheim.

We have collected travel data from more than 2 000 people in these cities using a GPS-based smartphone application, Sense.Dat, in 2017. The application tracks movements the user makes, and suggests the transport mode and travel purpose of the trips. In addition, respondents have answered a web-survey on their travel behaviour and cycle use.

These two data sources are combined with data from the NTS which gives more general information about travel behaviour in Norway.

Data from the surveys and application is used to estimate cycling share in the different cities, to look at route choice and cyclists' experience during cycling trips.

Cycling in Norway

Cycling has a modal share of only four percent of all trips, according to the NTS (see Figure S-1). In the four largest cities the share varies between three percent in Bergen and nine percent in Trondheim.

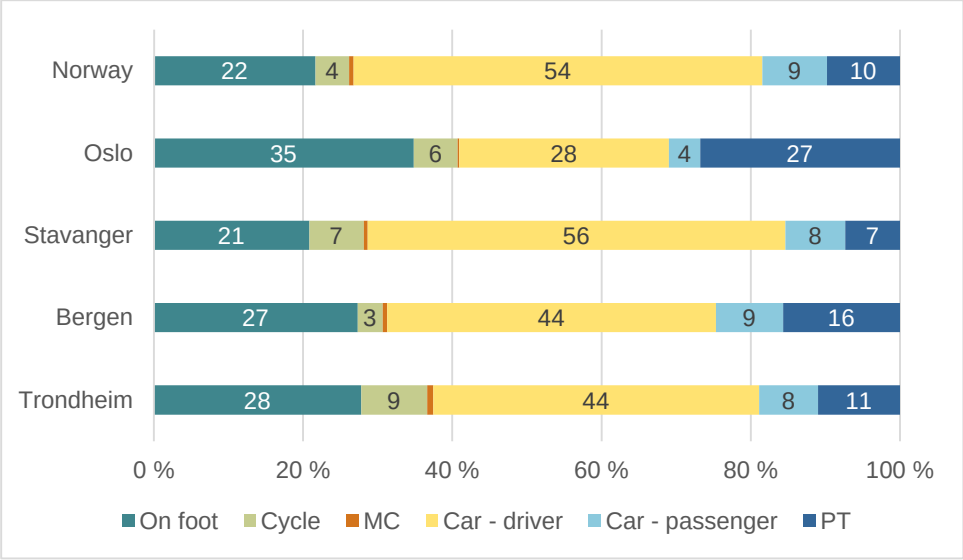


Figure S-1: Modal share in Norway and the study cities[1] in 2013/14. NTS 2013/14.

NTS 2013/14 data was collected through one whole year, and data analyses highlighted that cycle use varied through the year. Therefore, and as other data used in our project is collected in spring/summer, it is interesting to see how the cycling share (according to NTS) varied through different seasons. This is shown in the table below.

Table S-1: Cycling share by season in 2013/14. Percentage. NTS 2013/14.

	Winter	Spring	Summer	Autumn
Oslo	2	7	10	11
Bergen	2	5	4	3
Stavanger	6	9	8	10
Trondheim	7	11	12	11

In all the cities, cycling share is higher in spring and summer, than in winter. The differences between the cities however, are maintained through the year.

Looking at trip purpose we find that a large share of cycling trips are conducted as transport to and from work or school. More cycling takes place on week days, and especially in the morning and afternoon.

Route choice

We have used the app data, containing all registered bicycle trips, to study route choice in the cities. Most cycling trips take place in or around the city centres, or on specific routes leading into the city centres.

In Oslo (Figure S-2), the most used roads into the city centre are the E18 from the west and Mosseveien from the south. In the city, the Ring 2 and Ring 3 are frequently used, as well as the roads along the coastline, including Dronning Eufemias gate.

[1] N: Norway=196035, Oslo=20680, Stavanger=8913, Bergen=9330, Trondheim=7037

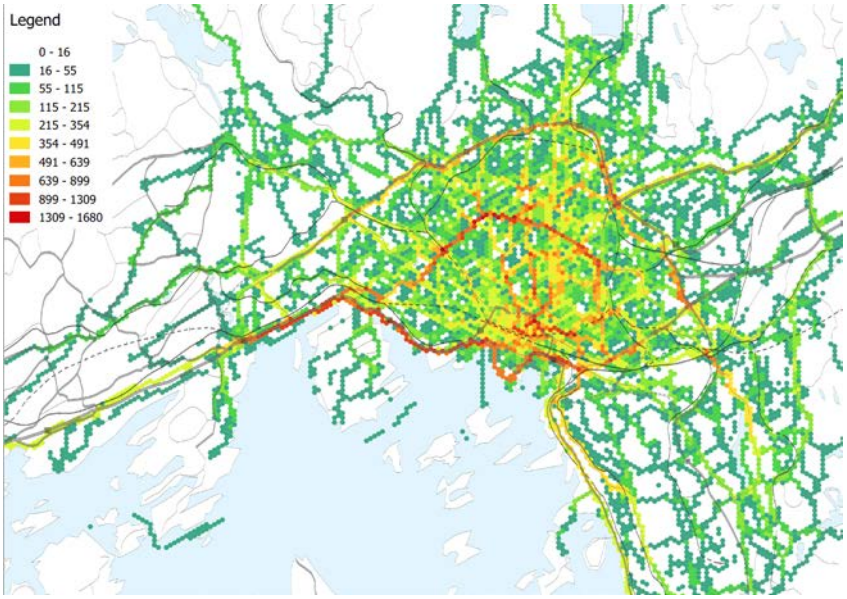


Figure S-2: Route choice in Oslo. Number of trips registered in the data collection period. Sense.Dat 2017

In Bergen we see many cycling trips between the city centre and the southern parts of the city, while in Trondheim, Elgseter gate is the most used road leading into the city centre. In Stavanger, the cycling pattern is more spread out over a larger area.

Experience of traffic safety

Survey respondents have been asked to map places where they feel it was problematic or difficult being a cyclist, and why they felt this was problematic. We also asked how safe they felt at the indicated spots, as we expect that a high degree of unsafety could be a significant barrier to cycle use.

We find that many of the roads where cyclists feel unsafe, are roads where cycling infrastructure is available. In Oslo, Dronning Eufemias gate and Ring 2 are among the roads where most people feel unsafe. In Bergen, the most frequently reported unsafe areas are in the city centre around Bryggen and Fisketorget.

In Trondheim and Stavanger, however, there are more reports of unsafe areas outside of the city centre.

At the same time, a majority of the respondents do not report that they avoid the unsafe areas in a large degree. This indicates that there are few safe, alternative routes available.

The respondents have also been asked the reasons why they feel unsafe. The most frequent reasons are bad infrastructure solutions, many cars and little space.

Comparison and conclusion

We have compared the four cities, looking for possible explanations for differences in cycling share between the cities. We find that cyclists in Trondheim generally cycle shorter distances than in Bergen. In addition, cyclists in Bergen are somewhat less satisfied with cycling conditions.

These factors, distances and satisfaction, could be parts of the reason why the cycling share is comparatively smaller in Bergen. But they could also be expressions of the same underlying phenomenon - an immature cycling culture, where only a few brave use the bicycle, mostly for longer trips.

Another difference is how cycling has been given priority in city planning in these cities, with Trondheim having had a long-time focus on promoting cycling, while Bergen focused more on public transport.

Transportøkonomisk institutt
Stiftelsen Norsk senter for samferdselsforskning

Sammendrag

Sykkelbruk i Oslo, Bergen, Stavanger og Trondheim

TØI rapport 1667/2018
Forfattere: Erik Bjørnson Lunke, Jørgen Aarhaug, Tineke de Jong and Aslak Fyhri
Oslo 2018 105 sider

Mange syklister i norske byer føler seg utrygge når de sykler, spesielt i sentrum av byene. I tillegg mangler det ofte gode og trygge alternative ruter å velge for syklister. For å øke sykkelbruken i Norge må det innføres tiltak for å bedre forholdene for syklister. I denne rapporten studerer vi sykling og sykkelbruk i de fire største byene i Norge, ved hjelp av ulike datakilder. Vi kombinerer funn fra Den nasjonale reisevaneundersøkelsen med en spørreundersøkelse om sykling og data fra en lokasjonsbasert app. Disse dataene gir relevant informasjon om sykkelbruk i byene, i tillegg til demografi, rutevalg og reisetilfredshet blant syklister.

Det er et uttalt mål i Norge å øke sykkelandelen, spesielt i de største byene. En økning i sykkelbruk vil ha positive effekter både på lokalsamfunn, energibruk og CO_2-utslipp. Nesten halvparten av registrerte reiser i Den nasjonale reisevaneundersøkelsen (RVU 2013/14) er under 5 km lange, og halvparten av disse reisene foretas med bil. Dette indikerer et potensial for å redusere bilbruken og øke sykkelbruken i Norge.

For å oppnå en reduksjon i sykkelbruk er det behov for målrettede tiltak og økt utbygging av sykkelinfrastruktur. Dette igjen krever kunnskap om hvordan den eksisterende infrastrukturen brukes, hva som karakteriserer dagens syklister, og i hvilke deler av byene det største potensialet før økt sykling finnes.

Studieområde og datakilder

Studieområdet for denne rapporten er de fire største byene i Norge: Oslo, Bergen, Stavanger og Trondheim.

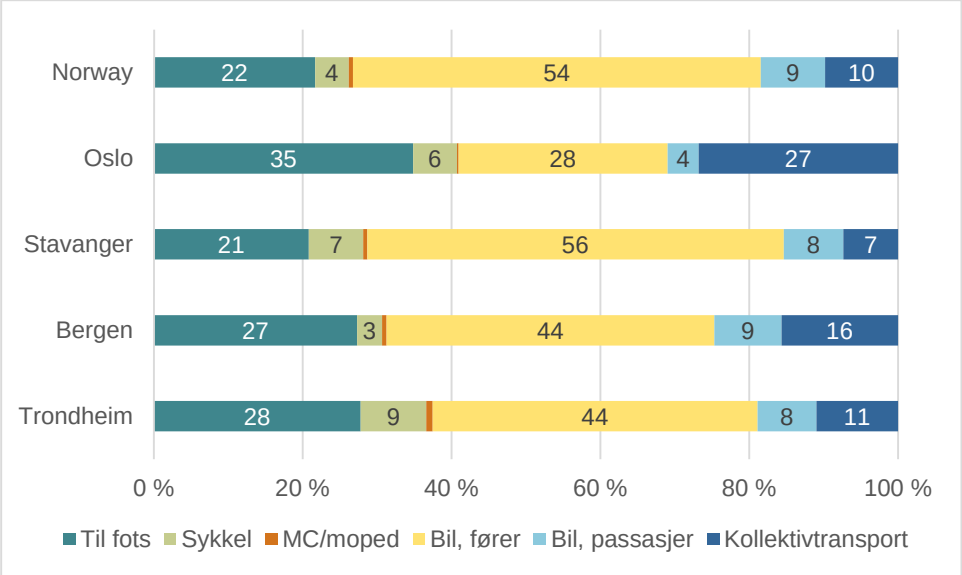
For å studere sykkelbruk har vi samlet inn reisedata i disse byene ved hjelp av en GPS-basert app, Sense.Dat. Appen sporer bevegelsene brukeren foretar, og antyder i tillegg transportmiddel og reiseformål. I tillegg har respondentene gjennomført en internettbasert spørreundersøkelse om sine reisevaner og sykkelbruk.

Disse to datakildene kombineres med data fra Den nasjonale reisevaneundersøkelsen som gir mer generell informasjon om reisevaner i Norge.

Dataene brukes for å analysere sykkelandeler, for å se på rutevalg og for å analysere syklisters opplevelse av sykkelforhold i byene.

Sykling i Norge

Sykkelandelen i Norge som helhet er på fire prosent (andel av alle reiser), ifølge RVU (se Figur S-1). I de fire største byene varierer sykkelandelen fra tre prosent i Bergen til ni prosent i Trondheim.



Figur S-1: Transportmiddelfordeling i Norge og studiebyene[2] i 2013/14. RVU 2013/14.

RVU består imidlertid av data samlet inn gjennom hele året. De andre datakildene er samlet inn på vår og sommer. Derfor er det interessant å undersøke hvordan sykkelandelen (ifølge RVU) varierer over året. Sesongvariasjoner er vist i tabellen nedenfor.

Tabell S-1: Sykkelandeler etter sesong i 2013/14. Prosent. RVU 2013/14.

	Vinter	Vår	Sommer	Høst
Oslo	2	7	10	11
Bergen	2	5	4	3
Stavanger	6	9	8	10
Trondheim	7	11	12	11

I alle byene er sykkelandelen høyere på vår og sommer enn på vinteren. Forskjellene mellom byene opprettholdes imidlertid gjennom året.

I alle byene finner vi også at en stor andel av sykkelturene foretas for å reise til og fra arbeid eller skole. Det er mer sykkelaktivitet i ukedagene, og spesielt på morgenen og ettermiddagen.

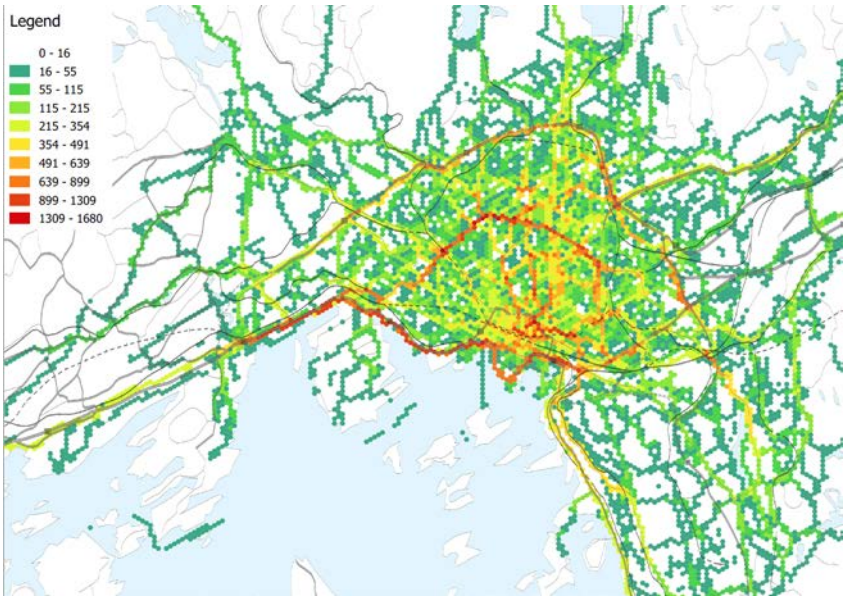
Vi finner også at menn sykler mer enn kvinner, mens kvinner oftere enn menn bruker elsykkel.

Rutevalg

Vi har brukt appdataene for å se nærmere på syklisters rutevalg. De fleste sykkelturer finner sted i eller rundt bysentrum. Det er også mange sykkelturer på enkelte innfartsårer inn mot byene.

[2] N: Norge=196035, Oslo=20680, Stavanger=8913, Bergen=9330, Trondheim=7037

I Oslo (Figur S-2) er de mest brukte sykkelveiene inn til sentrum langs E18 fra vest og langs Mosseveien fra sør. Ring 2 og Ring 3 er ofte brukt, i tillegg til veiene langs fjorden, inkludert Dronning Eufemias gate.



Figur S-2: Rutevalg i Oslo. Antall turer registrert i datainnsamlingsperioden. Sense.Dat 2017.

I Bergen ser vi at mange sykler mellom sentrum og de sørlige områdene Nesttun og Flesland, mens i Trondheim er Elgsetergate den mest brukte veien inn mot sentrum. I Stavanger er syklingen mer spredt over et større område.

Opplevelse av trygghet

I spørreundersøkelsen har respondentene blitt bedt om å markere på et kart steder der de føler seg utrygge som syklister. Høy grad av utrygghet kan være en viktig barriere mott sykkelbruk.

Vi finner at mange av veiene der syklister føler seg utrygge er veier med sykkelinfrastruktur. I Oslo er Dronning Eufemias gate og Ring 2 blant veiene der mange føler seg utrygge. I Bergen er det områder i sentrum som Bryggen og Torgalmenningen som ofte markeres som utrygge.

I Trondheim og Stavanger er det imidlertid områder utenfor sentrum som oftest er markert som utrygge.

Samtidig er det mange respondenter som oppgir at de ikke unngår de utrygge områdene. Dette tyder på at det mangler gode, trygge og raske alternative ruter.

Respondentene har også blitt spurt om årsaker til at de føler seg utrygge. De oftest oppgitte årsakene er dårlig infrastruktur, mange biler og lite plass for syklister.

Sammenligning og konklusjon

Vi har sammenlignet de fire byene, og sett på forklaringer på hvorfor sykkelbruk varierer. Vi finner at syklister i Trondheim generelt sykler kortere avstander enn syklistene i Bergen. I tillegg er syklister i Bergen noe mindre fornøyd med sykkelforholdene i sin by.

Disse faktorene, distanse og tilfredshet, kan være deler av forklaringen på hvorfor sykkelandelen er lavere i Bergen.

En annen forklaring kan være hvordan sykkelbruk har blitt prioritert i planleggingen av disse byene. I Trondheim har det lenge vært et tydelig fokus på å fremme sykling, men Bergen har fokusert mer på kollektivtransport.

1 Introduction

A major political ambition in Norway is that all growth in passenger transport in the larger cities shall be in sustainable transport modes (walking, cycling and public transport). This ambitious goal is stated in the National Transport Plan (NTP) (Meld.st.33, 2016-17). It implies that not only shall the sustainable transport modes maintain their current market shares in growing cities, but their share shall also increase as the population in the city region increases, so that the absolute number of kilometres travelled by car is maintained or reduced.

Around four percent of the total number of trips in Norway are taken on bicycle (Hjorthol et al. 2014). There is a stated goal that this share should increase, and in the city regions, there is a goal to double the cycling share (Meld.st.33, 2016-17). There is also a stated goal that the cities should reach a cycling share of 20 percent, measured in number of trips (Meld.st.33, 2016-2017). The city of Oslo has ambitions to reach a cycle share of 25 percent by 2025 (Municipality of Oslo 2016).

An increase in cycling will have favourable effects both for local communities, energy use and in CO_2-emissions. A previous study also shows that there is a potential for increased cycling in Norway (Lodden 2002). Almost half of the trips registered in the National Travel Survey (NTS) are under 5 km, and half of these trips were taken with cars (Hjorthol et al. 2014). Calculations have shown that around a third of the car trips can be transferred to walking and cycling. The potential for increased cycling is largest in the city areas (Lodden 2002).

One way to achieve this increase could be to implement targeted measures and increased development of cycling infrastructure. This again requires knowledge about how the existing infrastructure is utilized, what characterizes todays cyclists, and which specific areas in the cities have the largest potential for increased cycling.

1.1 Cycle-2-zero

This report is a result of the research project *Reducing fossil energy use and CO_2 emissions from transport by paving the way for more bicycles and e-bikes (Cycle-2-zero)* financed under the aegis of the research programme ENERGIX (Project Number: 255628) of The Norwegian Research Council (NRC). Parts of data and analysis presented here are part of the PhD study by Tineke de Jong, which will later look in more detail into this data.

The empirical data collection, through the app called Sense.Dat and the questionnaire survey, has been conducted in association with the following two projects also headed by the Institute of Transport Economics – the research project Push-and-Show funded by the NRC, and the Bicycling Survey (Sykkeltelledugnaden), funded by several Norwegian municipalities. This joint data collection is hereafter named Bicycle Survey 2017 in the report.

1.2 Study topics

This report looks at the following topics about cyclists in the four largest cities in Norway (Oslo, Bergen, Stavanger, Trondheim):

1. Cyclist's demographic characteristics
2. Cycle use and cycling modal split
3. Cyclist's experience of cycling conditions in the cities
4. Cyclist's route choices and speed

In this report, we will mainly use data from the Bicycle Survey 2017. To supplement this data, we will also use data from the National Travel Survey (2013/14). The different data sources are described in chapter 2.

1.3 Report structure

Chapter 2 gives a description of the datasets and methods used in the report, as well as a description of some background variables for the respondents.

In chapter 3, we present some statistics about cycling in Norway, and especially in the four largest cities. In chapter 4-7, we present findings from Oslo, Bergen, Stavanger and Trondheim respectively.

The last part of the report concludes with a comparison of the findings from the four cities.

2 Method and data sources

In order to build a cohesive picture of cycling in the case cities, this report uses three data sources:

- Data from the National Travel Survey (2013/14)
- Data from the Bicycle Survey 2017
- Data from the trip mapping app Sense.Dat

2.1 Study area

The study area of this report is the four largest cities in Norway: Oslo, Bergen, Stavanger and Trondheim.

At the data collection stage, we collected data from nine Norwegian cities. In addition to the four cities studied in this document, we have also collected data for Bodø, Tromsø, Moss, Nedre Glomma and Buskerudbyen. The findings from these cities are documented in other reports[3].

In Oslo and Bergen, the area is defined by the border of Oslo and Bergen municipalities respectively. In Trondheim, the area includes Trondheim and Malvik municipalities. In Stavanger, the area includes Stavanger, Sandnes, Sola and Randaberg municipalities.

From the National Travel Survey (2013/14) we have studied trips that end in one of the four study areas, that are conducted by respondents living in the study areas. From the Bicycle Survey, we have drawn respondents that have stated that they live in one of the four study areas. From the app data, we have drawn cycling trips that starts and/or ends within one of the four study areas, regardless of residential location.

2.2 The National Travel Survey 2013/14

The National Travel Survey 2013/14 (NTS) is the seventh national travel survey conducted in Norway. The survey gives information on all types of trips conducted by the Norwegian population. The survey is used by the transport authorities for numerous planning purposes, especially in informing the National Transport Plan (Hjorthol et al. 2014). The main survey consists of around 60 000 interviews and almost 200 000 trips.

The respondents in the NTS are 13 years and older, and are recruited through two different rounds of selection. Around 10 000 people are drawn to give a picture of the national travel patterns, and to provide a basis for calibration of national transport models etc. In addition,

[3] Aarhaug et al. (2017) *På to hjul i Bodø – sykling og mulighet for sykkelbruk i Bodø*, TØI-report 1586/2017. Lunke et al. (2017a) *Tellesykkel Moss,* TØI-report 1600/2017. Lunke et al. (2017b) *Tellesykkel Buskerudbyen*, TØI-report 1601/2017. Lunke et al. (2017c) *Tellesykkel Tromsø*, TØI-report 1602/2017. Lunke et al. (2017d) *Tellesykkel – Nedre Glomma*, TØI-report 1603/2017. Lunke et al. (2017e) *Tellesykkel Trondheim*, TØI-report 1604/2017.

there are 50 000 respondents drawn from multiple local selections, in order to give a more detailed picture of travel patterns on a lower geographical level. In the four city regions studied in this report, such local supplementary selections were made adding to the sample drawn from the case cities.

2.3 Bicycle Survey 2017

In the Bicycle Survey 2017, we have collected data in two separate surveys on travel behaviour and cycling in Norway. The survey was conducted among residents in Oslo, Bergen, Stavanger and Trondheim, which was then supplemented by data collected by the travel mapping app Sense.Dat. The questionnaire is available in appendix 1.

The app registrations have been conducted for four to six weeks in May and June 2017. The first two weeks were used to calibrate the app.

2.3.1 Recruitment

As a common starting point for all the cities, the respondents were recruited through Falck's bike register, consisting of email addresses to a vast number of bike owners in Norway. The table below shows the data need in each city. We initially wanted 3 100 persons to use the app. Based on previous experience of how many respondents reply positively to use the app in a given population, we calculated a net number of respondents needed for the survey (12 400), and a gross number of people to receive invitation to the survey from Falck's register (49 600).

Table 2.1: Recruitment to the survey from Falck's register.

		Need			Result	
	Post code	**App**	**Survey net**	**Survey gross**	**Survey**	**App**
Tromsø	9000-9141	300	1200	4800	2196	137
Oslo	0001-1295	600	2400	9600	>9600	>600
Bergen	5000-5268	300	1200	4800	>4800	>300
Stavanger	4000-4085	300	1200	4800	>4800	244
Trondheim	7010-7099	300	1200	4800	>4800	>300
Bodø	8000-8100	300	1200	4800	1829	114
Buskerudbyen (primarily Drammen)	3001-3058; 3300-3301; 3400-3425; 3600-3648	400	1600	6400	4800	300
Nedre Glomma	1601-1679; 1701-1747	300	1200	4800	2740	171
Moss	1511-1599	300	1200	4800	2114	132
Sum		**3100**	**12400**	**49600**	**37679**	**2355**

In the two columns to the right, we see that most of the cities have reached the goal of respondents. However, some of the cities (Moss, Nedre Glomma, Bodø, Tromsø), had a lower number in Falck's register than stipulated, which led to a lower gross selection than we assumed.

2.3.2 Survey

In total, 7 346 people responded to the Bicycle Survey 2017.

Table 2.2: The survey sample.

Source	Sample size
Falck	6 185
Web page	1 161
Total	**7 346**

Most of the respondents (N = 6 185) were recruited from Falck's register. Since we got fewer respondents than wanted, we also recruited some respondents via a web page, via ads on Facebook, and through national and local media.

Among the questions in the survey are eleven questions about cycling satisfaction. The method is based on The Active Commuting Route Environment Scale (ACRES), developed by Wahlgren et al. (2010). The method has been further developed for the purpose of the Cycle-2-Zero project.

2.3.3 Sense.Dat

We have used an app called Sense.Dat, which is a travel survey app, to map people's route and mode choice. The app is "self-learning", and tracks travels conducted outside the user's home. The app uses the phone's location service to decide the geographical location of the user. The position can be decided from the mobile-network, wifi-network and GPS-data, or a combination of these. Data is registered when the user is moving with the phone and subsequently sent to a server where it gets processed. Since the app is a commercial software, all algorithms are not available. Identification of transport mode is one of the calculations that is done on the server. The measured positions are projected to the Open Street Map network.

To decide which trips are to be included in the model, we have used the automatic classification of transport modes done by the app. This classification is based on an algorithm that looks at the characteristics of the individual trip, such as speed and route. The app can also use different sensors in the phone, such as accelerometers, to decide the transport mode. The algorithm has, according to the supplier, an accuracy of 90 percent. The algorithm can identify cycling trips, but it cannot distinguish between regular bike and e-bikes.

The app also uses an algorithm to decide the purposes of trips. For example, it guesses that the users' location at night time is "home" and where they are most frequently during the day is "work". This algorithm is not as accurate as the one deciding transport mode.

The data from the app is used to map travel behaviour and route choice, as well as where, when and how the users travel. The data is anonymized and aggregated as shown on maps, tables and figures.

The app normally has a two-week test period to learn how to interpret the activity patterns in each city. In order to get the maximum possible data for the study, we have included trips from this test period as well. This was done after the data was filtered as part of a quality-check. Our study show that the registrations in the test period does not deviate considerably from the rest of the registrations concerning the transport modes and activity patterns.

Table 2.3: Overview of time points for data collection via Sense.Dat, 2017.

Week	Non-working days	Activity
18	May 1st	Survey sent to all selections in Falck's register (4.5)
19		Reminder to all respondents (11.5), app invitation sent
20	Constitutional day	First test week, app invitation to late-comers
21	Christ's ascension	Second test week
22	Pentecost	First week data collection
23		Second week data collection
24		Third week data collection
25		Fourth week data collection

Figure 2.1 shows the number of registered trips with Sense.Dat by week.

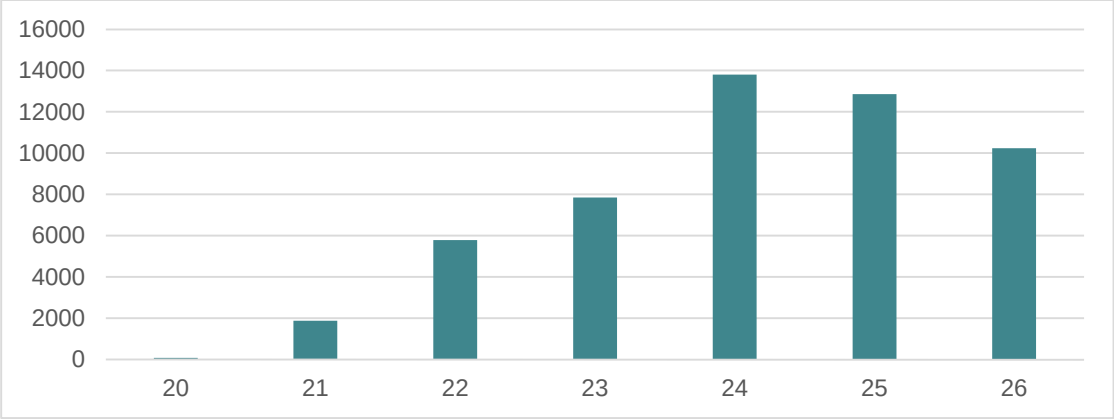


Figure 2.1: Number of registered trips, by week number (May-June 2017).

The week with most registered trips is week 24, from 12th June to 18th June. In the following weeks, the number of trips decreases, probably because some users uninstalled the app during the period.

Processing app data

App data has been filtered to exclude false registrations. For bike trips, we have used certain criteria and trips with the following characteristics are excluded:

- Trips with an average speed below 5 km/h
- Trips with an average speed above 60 km/h
- Trips with less than eleven GPS observations (points)
- Trips that are not included in both of the Sense.Dat datasets[4]
- Trips which are obviously not bike trips based on observations. For example, trips plotted on water bodies or extremely long distances.

In addition to these criteria, we have further excluded some trips. Trips on roads with very few observations are excluded in order to hide identifiable information about the users.

[4] Sense.Dat operates with two datasets: One with multiple observations in each trip (points) and one with general information for each trip.

To identify trips taken with e-bikes, we have used the users' manual registrations in the app. Users were asked, after cycling trips were registered, to specify the type of bike used on the trip.

2.4 Sample and background variables

The three data sources give three different samples. The recruitment process is different in the three samples, which gives reasons to believe that they may differ in composition and characteristics. In this chapter, we show the samples' characteristics based on the following background variables: Gender, age, share of respondents who are working, and if the respondents have access to car and bike.

Table 2.4 shows the sample size and background variables for the full samples. From NTS, we use the weighted national sample. For the Bicycle Survey 2017 and the app users, the figures in the table are from all the case cities together.

Table 2.4: Background variables, all respondents. Percentage.

	NTS[5]	Bicycle Survey 2017	Sense.Dat app
Share men	50.8	53.2	57.7
13-17 years	7.4	0.2	0.2
18-24 years	10.8	2.3	1.4
25-34 years	16.9	16.8	21.6
35-44 years	19.0	26.2	32.1
45-54 years	17.1	24.8	26.8
55-66 years	15.9	21.0	15.0
67-74 years	6.8	5.6	2.1
75+ years	6.1	1.0	0.2
Share employed	58.8	82.9	89.7
Access to car	76.9	86.4	86.6
Access to bike	74.9	97.7	98.9
N	60 541	7 346	2 307

The table above shows that the samples from this project (survey and sample) are smaller than the sample from the NTS. We also see that we have quite few respondents from the youngest and the oldest age groups (13-24 years and over 75 years) in the Bicycle Survey and the app data. The survey and app samples are also to a greater degree employed, and a larger proportion have access to a car and bike. Background variables for each of the four cities is shown in the appendix.

The number of respondents in the four cities also vary (Table 2.5). We have the largest samples in Oslo, and the smallest samples in Stavanger. Samples from the NTS are larger in all case cities.

[5] This column uses weighted output from the NTS for internal consistency. For description and discussions of weights, NTS methodology etc. see Hjorthol et al. (2014), and Gregersen (2017). The unweighted sample of the NTS is presented in appendix 2.

Table 2.5: Sample size, number of respondents (unweighted).

	NTS	Bicycle Survey 2017	Sense.Dat app
Oslo	7 532	2 087	734
Bergen	3 248	979	311
Stavanger	2 754	861	244
Trondheim	2 364	963	357

3 Cycling in Norway

3.1 The National Travel Survey (NTS)

From the NTS, we find the modal share of the respondents (Figure 3.1).

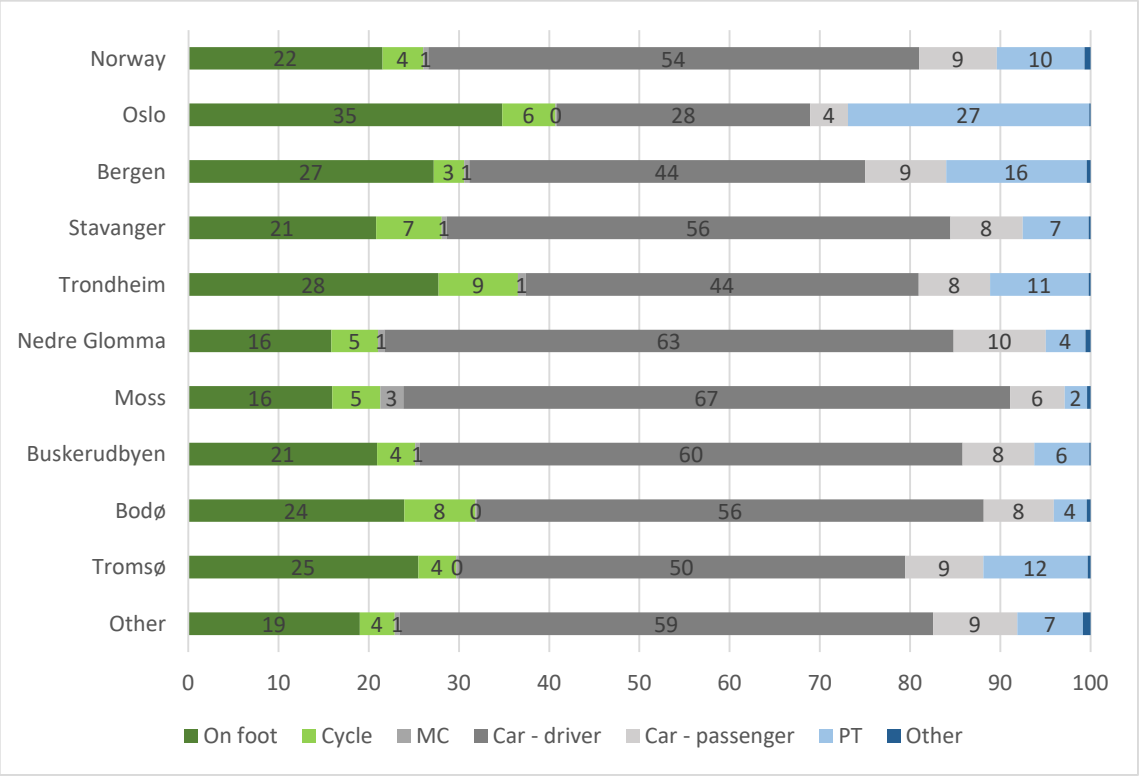


Figure 3.1: Modal share in Norway and selected cities in 2013/14[6]. Percent. NTS 2013/14.

Of the four cities, Trondheim has the highest cycling share, while the lowest cycling share is in Bergen.

The NTS includes data collected through the year, in all seasons. Our data collection in the Bicycle Survey 2017 was conducted in spring/summer (May-June). This means that our surveys should include more cyclists than an annual average, as shown by cross-tabulation on cycling with season in the NTS (Table 3.1).

[6] N: Norway=196035, Oslo=20680, Stavanger=8913, Bergen=9330, Trondheim=4441, Nedre Glomma=1842, Moss=4962, Buskerudbyen=7037, Bodø=1876, Tromsø=2648, Other=134306

Table 3.1: Cycling share by season. Percentage. NTS 2013/14.

	Winter	Spring	Summer	Autumn
Oslo	2	7	10	11
Trondheim	7	11	12	11
Bergen	2	5	4	3
Stavanger	6	9	8	10

In all the cities, the cycling share is higher in spring and summer, than in winter. The differences between the cities however, are maintained through the year.

The cycling share also varies by age (Figure 3.2).

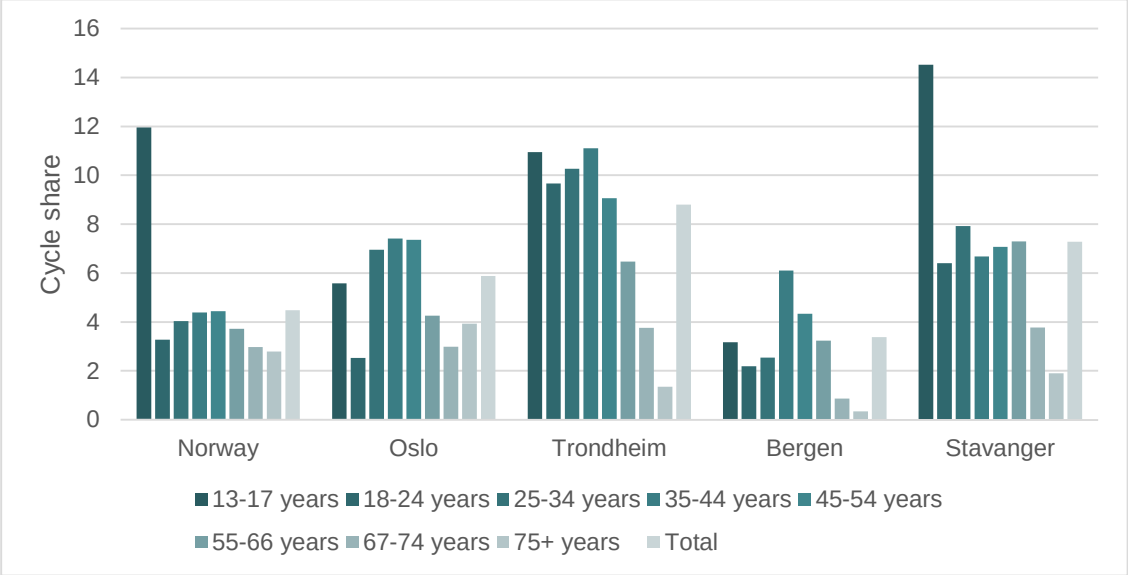


Figure 3.2: Cycling share by age. NTS 2013/14.

The youngest age group (13-17 years) has a quite high cycling share in Norway as a whole, as well as in Stavanger and Trondheim. As mentioned, this is a group that is underrepresented in the Sense.Dat samples. The cycling share is also lower among the oldest part of the population.

3.2 Bicycle Survey 2017

The registered travel behaviour is quite different in the Bicycle Survey 2017, compared to the NTS (Figure 3.3).

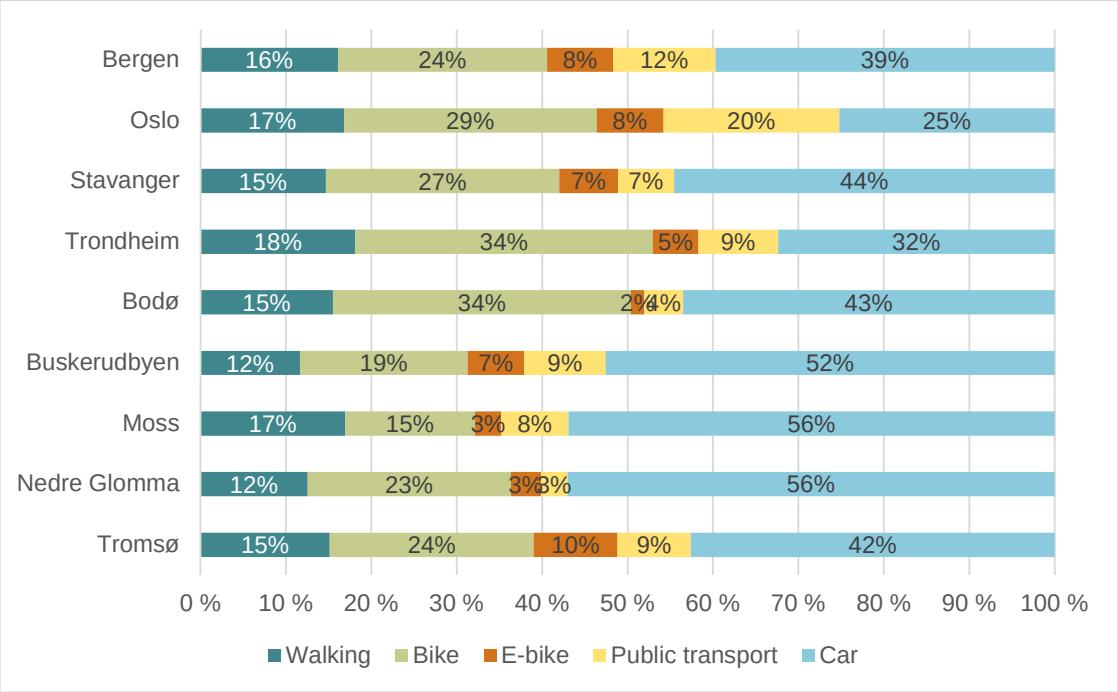


Figure 3.3: Modal share (in km travelled) per city[7]. Bicycle Survey 2017.

We have registered a higher cycling share in our survey, approximately five times higher than in the NTS, which comes as no surprise considering the respondents are mostly cyclists. However, the differences between the cities follow the same pattern as in the NTS. The respondents in the four cities studied in this report have quite high cycling shares compared to the other cities.

We have also investigated use of different cycling equipment among the respondents, as shown in Table 3.2.

Table 3.2: Share of respondents using helmet and other cycling equipment. Bicycle Survey 2017.

	Helmet	Cycle shorts/tights, jacket and shoes	N
Bergen	70 %	18 %	820
Oslo	70 %	12 %	1 754
Stavanger	72 %	14 %	780
Trondheim	76 %	11 %	815
Bodø	76 %	6 %	315
Buskerudbyen	69 %	13 %	682
Moss	57 %	7 %	295
Nedre Glomma	63 %	15 %	391
Tromsø	78 %	8 %	474

[7] N: Bergen=654, Oslo=1406, Stavanger=631, Trondheim=646, Bodø=237, Buskerudbyen=510, Moss=210, Nedre Glomma=286, Tromsø=375.

The use of helmet is significantly higher in Trondheim than in Oslo, Bergen and Stavanger. The use of other equipment such as cycling shorts/tights, cycling jacket and shoes is more common in Bergen than in the other cities. This difference is also significant.

In the survey, we also ask the respondents the type of cycle they own (Figure 3.4).

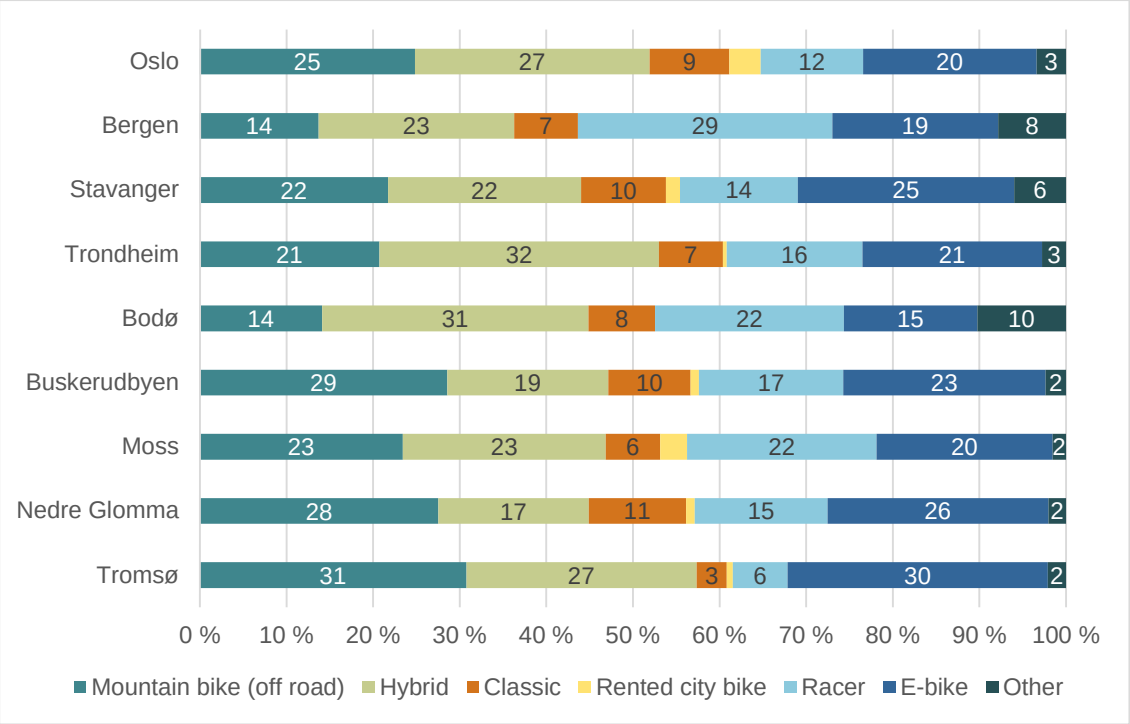


Figure 3.4: Use of different bicycle types. Numbers in percent[8]. Bicycle Survey 2017.

The results show that the most common bike types are mountain bike, hybrid (a combination of a racer and city bike), racer and e-bike. We do not find significant differences between the cities, except for the use of racer bikes, which is significantly more common in Bergen than in the other three cities.

[8] N: Oslo=204, Bergen=499, Stavanger=184, Trondheim=217, Bodø=78, Buskerudbyen=210, Moss=64, Nedre Glomma=98, Tromsø=143.

3.3 Sense.Dat application

We have also measured travel behaviour and modal split in the app registrations (Figure 3.5).

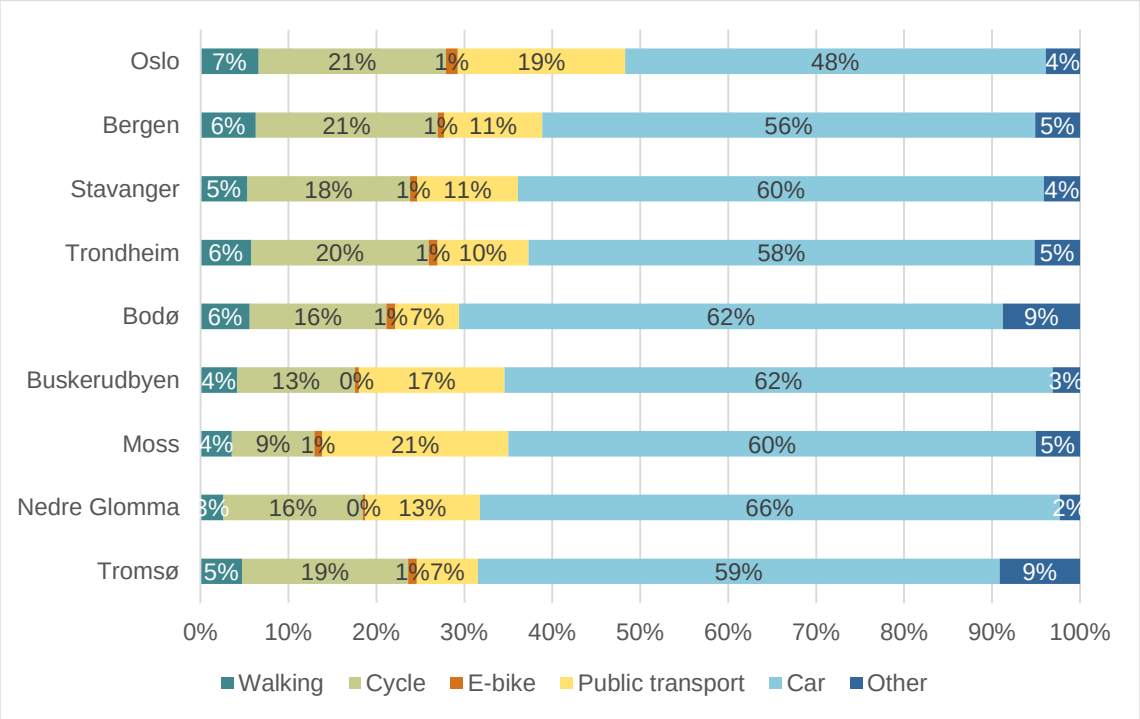


Figure 3.5: Modal split (in km travelled) per city[9]. Sense.Dat 2017.

The results from the app data show a smaller cycling share than in the Bicycle Survey data. Walking share is also smaller in the app data, public transport is approximately the same, while car share is higher than in the survey data. This can indicate that people claim they cycle more (in the survey) than they actually do. The relative difference between the cities is roughly the same in the two data sets.

3.4 Summary

In this chapter we have showed that Trondheim has a quite high cycling share, while the cycling share in Bergen is lower than in the other study cities. In the next chapters, we go more in detail on the cycling behaviour in the four cities, the demography of cyclists, cyclists' experiences, as well as route choice and speed.

The data used in these chapters come from the Bicycle Survey 2017 and the Sense.Dat application.

[9] N: Oslo=725, Bergen=308, Stavanger=241, Trondheim=353, Bodø=104, Buskerudbyen=195, Moss=76, Nedre Glomma=119, Tromsø=159.

4 Oslo

4.1 General cycling behaviour in Oslo

4.1.1 Cycling distances

Figure 4.1 shows the share of car and cycle users disaggregated by travel distances from home to work for respondents in Oslo.

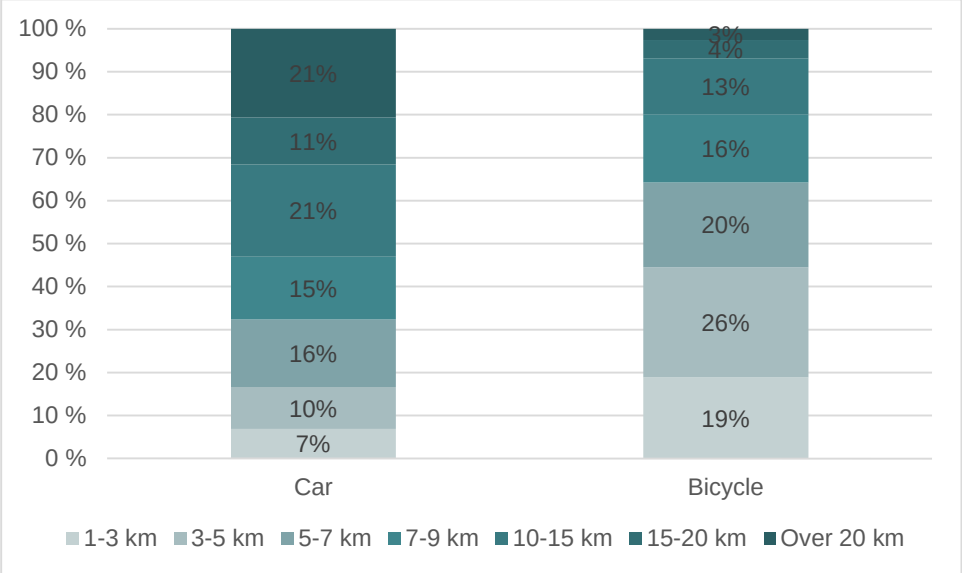


Figure 4.1: Distance to work/school for car drivers and cyclists[10]. Bicycle Survey 2017.

The figure shows that cyclists generally have a shorter commute than car users. More than 40 percent of cyclists have less than 5 km to work. Among the car users, we find that almost half of the respondents have less than 10 km to work. This finding, in isolation, indicates that there is a potential for some car users to start cycling to work. However, there may be other factors than just distance that restrict the opportunity to cycle.

4.1.2 Time of cycling

We have investigated at what times the cycling trips are registered in the app. We have looked at trips per day of the week (Figure 4.2) and per hour of the day (Figure 4.3, Figure 4.4).

[10] N: Car=247, Bicycle=1061.

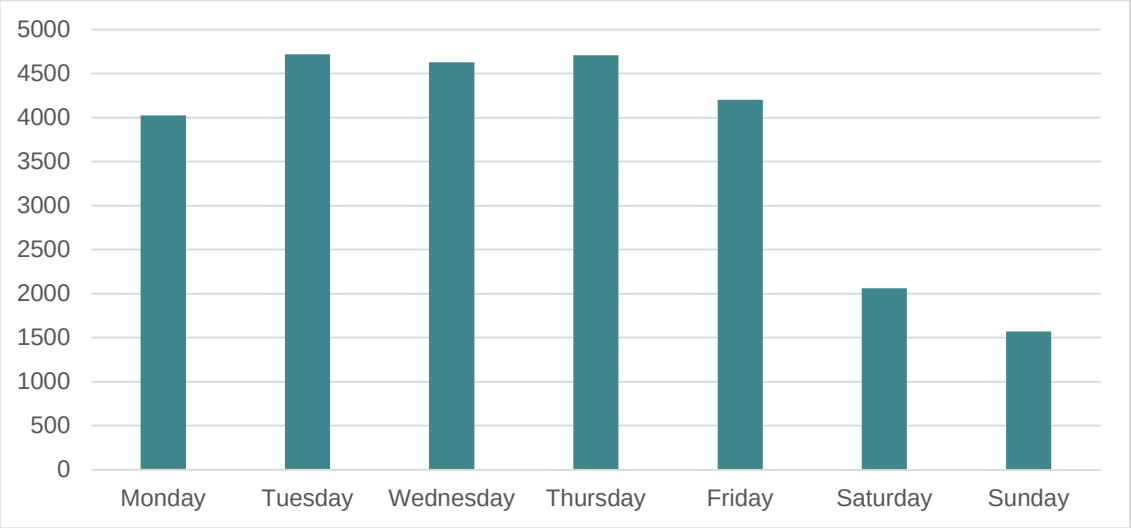


Figure 4.2: Registered cycle trips per day over the week (N=25915). Sense.Dat 2017.

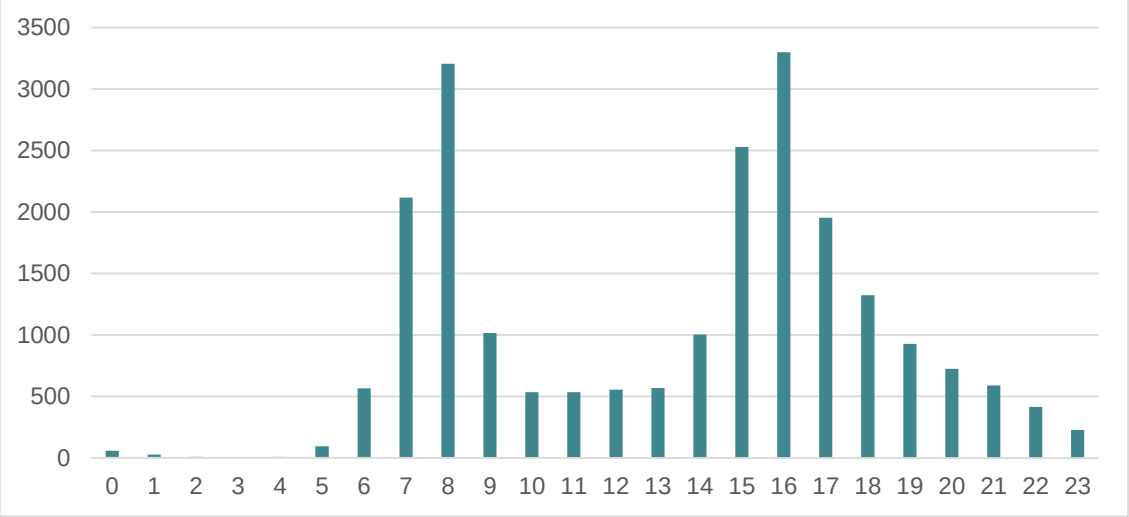


Figure 4.3: Registered cycle trips per hour (Monday-Friday) (N=22284). Sense.Dat 2017.

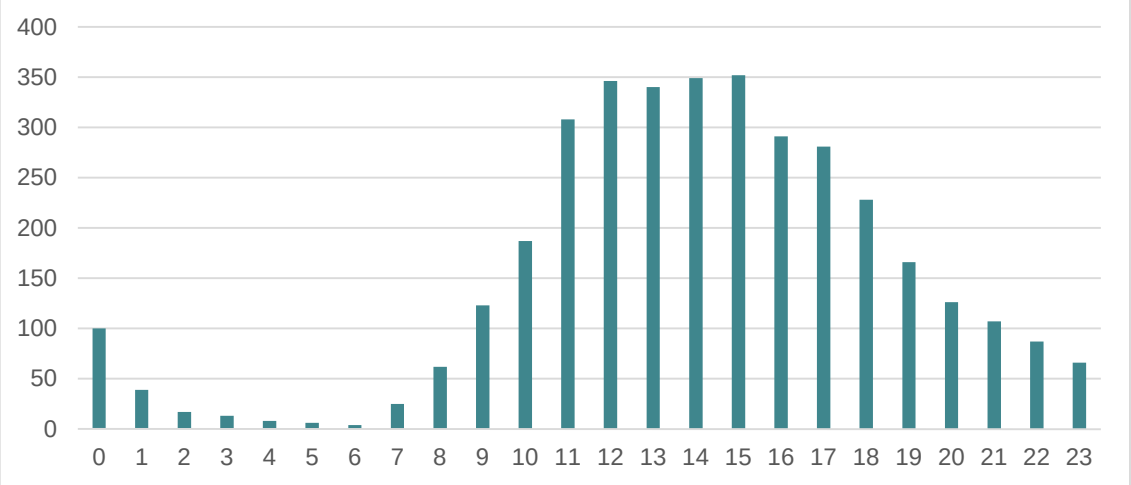


Figure 4.4: Registered cycle trips per hour (weekends) (N=3631). Sense.Dat 2017.

The results confirm the finding from chapter 3, that most of the cycling is carried out to travel to and from work. There are more cycling trips registered Monday to Friday, and during these days, a majority of the trips are registered between 7 and 9 in the morning and between 15 and 17 in the afternoon.

4.2 Demographics

4.2.1 Bicycle survey

Using the Bicycle survey data, we have investigated the cycling share on regular bike and e-bike in different age groups (Figure 4.5) and between men and women (Figure 4.6).

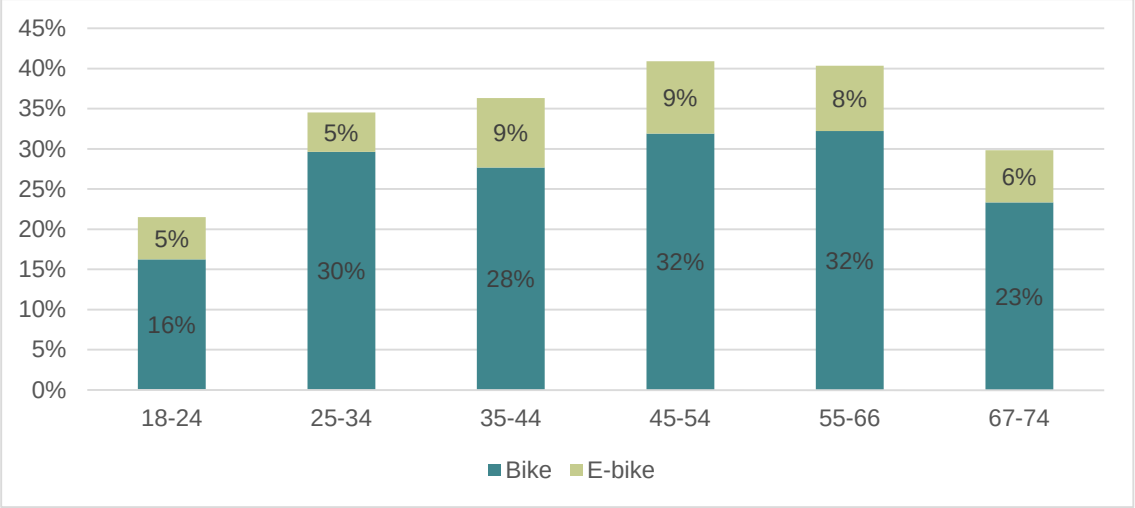


Figure 4.5: Bicycle share (regular bike and e-bike) by age, based on kilometres travelled (N=1406). Bicycle survey 2017.

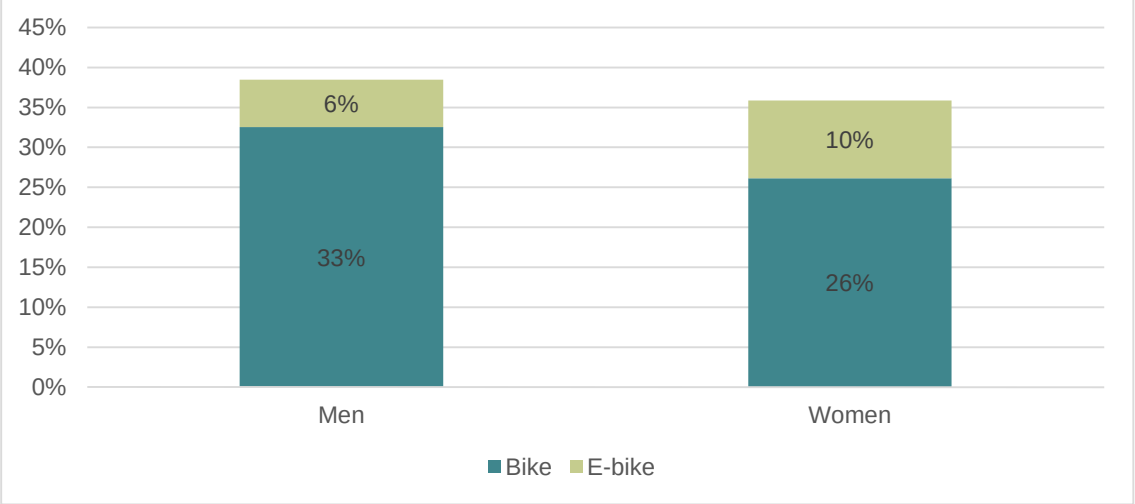


Figure 4.6: Bicycle share (regular bike and e-bike) by gender, based on kilometres travelled (N=1406). Bicycle survey 2017.

The cycling share in Oslo increases by age up to age 45-54 years. We also see that the men in the survey have a slightly higher cycling share than women, but the difference is not significant. This is in line with other data sources: In the NTS (Hjorthol et al. 2014) 40 percent of all cyclists are women, and a travel survey from 2013 in Oslo (Oslo kommune

2013) shows that 39 percent of cycling trips are made by women compared to 61 percent by men.

E-bike use is a bit more common among women than men, and also among those of age 35-66 years. These differences are significant.

In the Bicycle survey, we have also asked how often the respondents cycle for different purposes (Figure 4.7, Figure 4.8 and Figure 4.9).

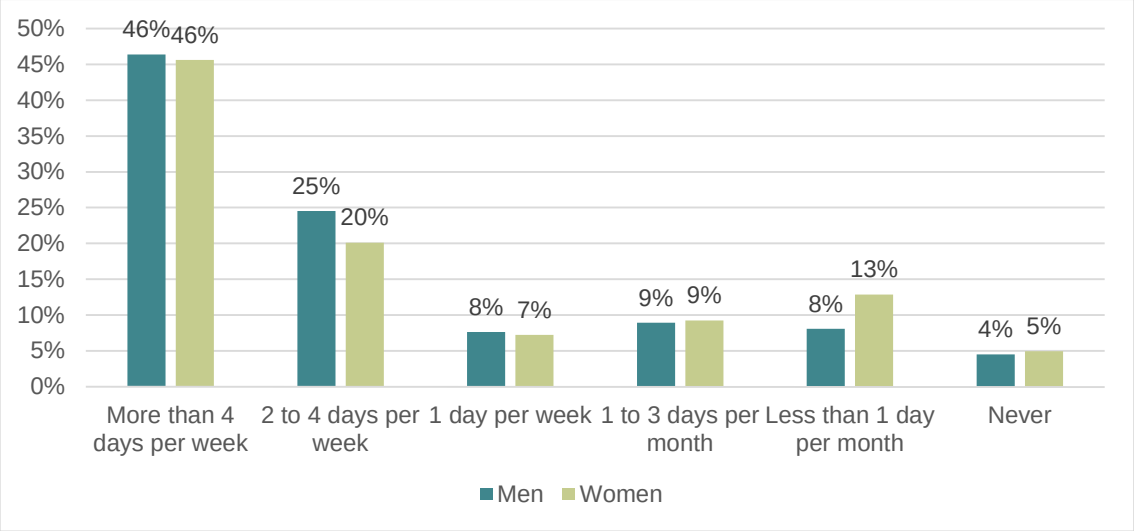


Figure 4.7: "How often do you cycle to and from work/school at this time of the year?" By gender (N=2084). Bicycle survey 2017.

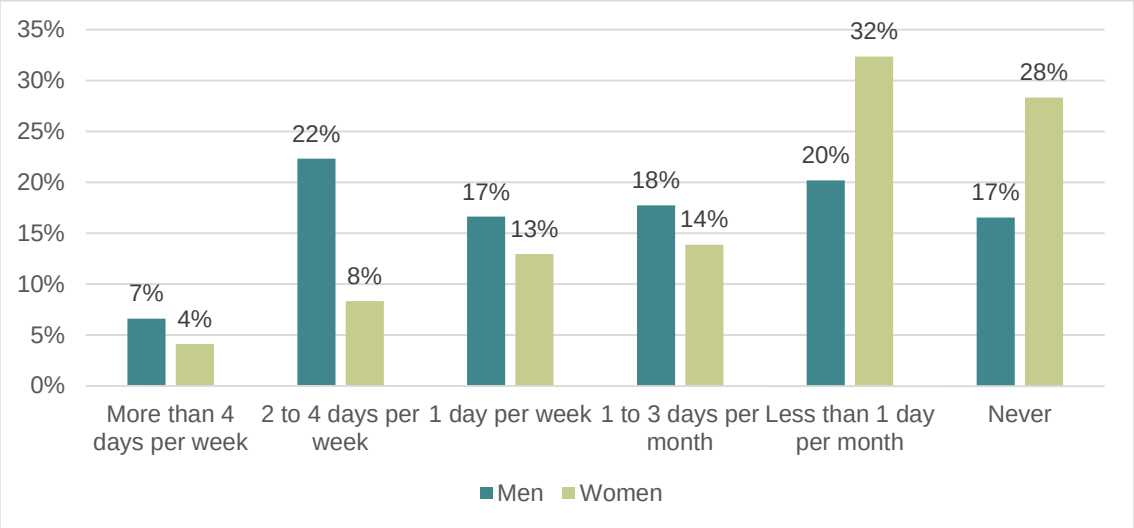


Figure 4.8: "How often do you cycle for exercise purposes at this time of the year?" By gender (N=2084). Bicycle survey 2017.

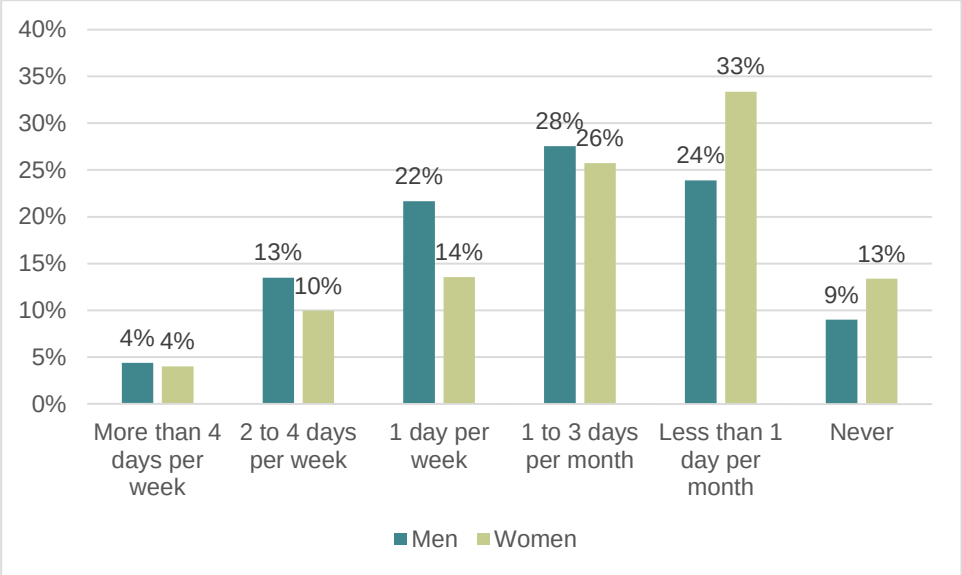


Figure 4.9: "How often do you cycle for recreational purposes at this time of the year?" By gender (N=2084). Bicycle survey 2017.

Once again, we observe that cycling to and from work is the most common purpose. We also see that men cycle even more than women for exercise and recreational purposes.

4.3 Route choice and speed

The following maps show the distribution of cycling trips carried out in and around Oslo (Figure 4.10, Figure 4.11).

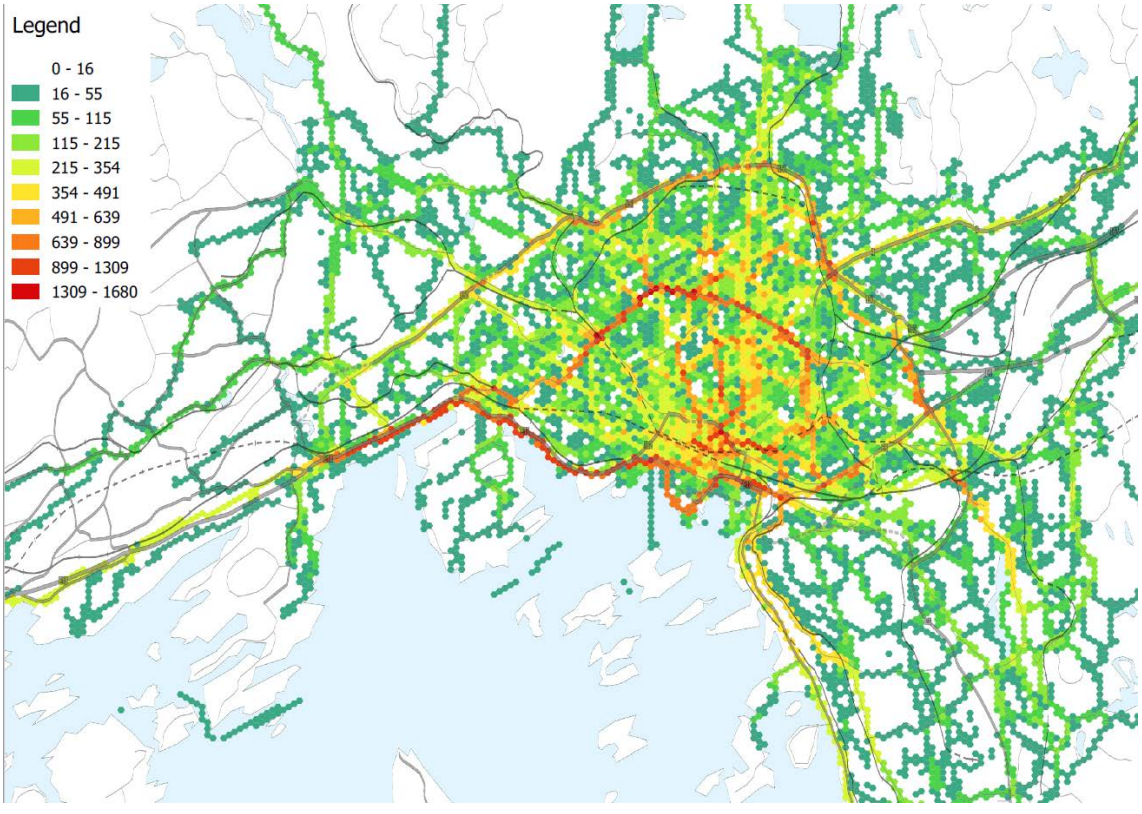


Figure 4.10: Cycling pattern, Oslo. Number of trips registered in the data collection period. Sense.Dat 2017.

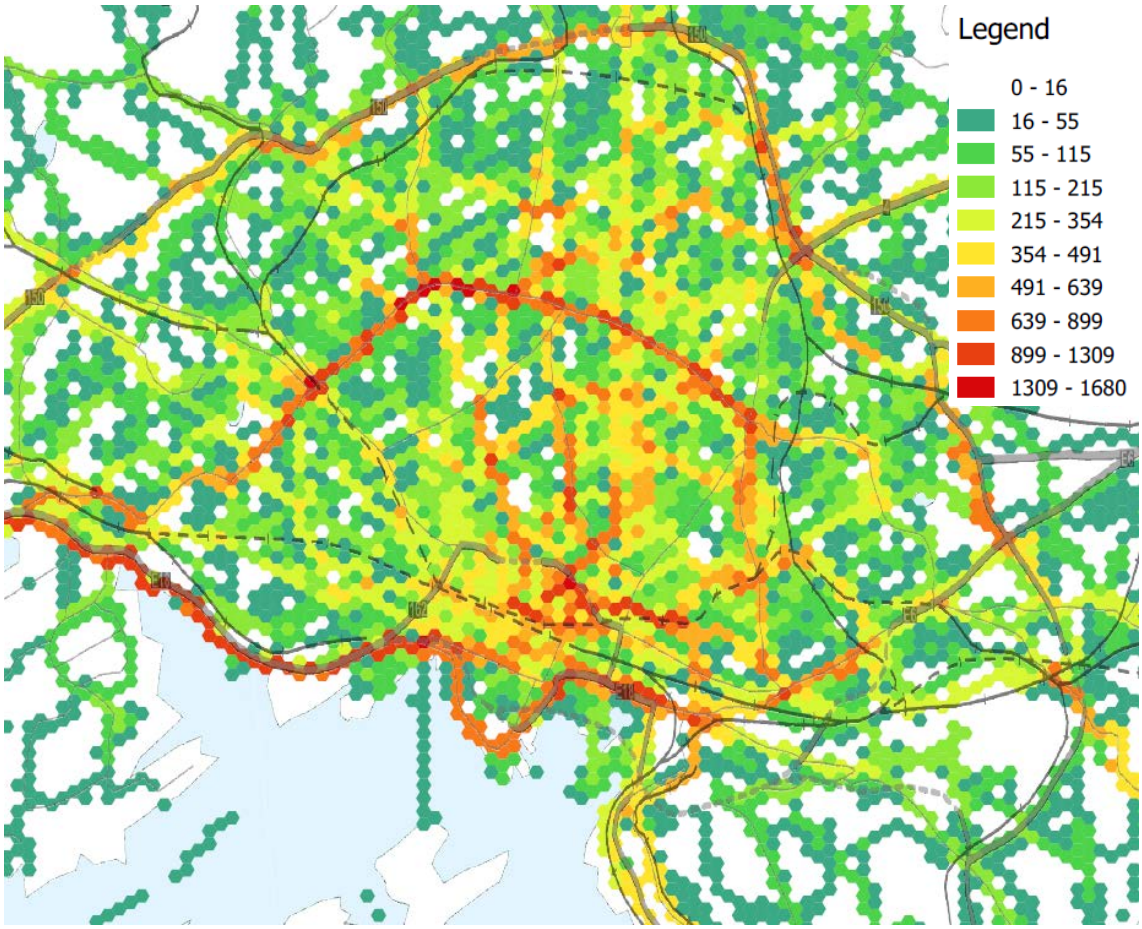


Figure 4.11: Cycling pattern, central Oslo. Number of trips registered in the data collection period. Sense.Dat 2017.

The maps show that the majority of cycling trips take place in inner Oslo and the city centre, as well as the roads leading to the city centre. There are also many trips located on the ring roads (Ring 2 and Ring 3), as well as along road E18 from Bærum in the west into the city centre.

In the following figures, we present the average speed of the cycling trips. The figures show the number of trips within different average speed levels (Figure 4.12, Figure 4.13).

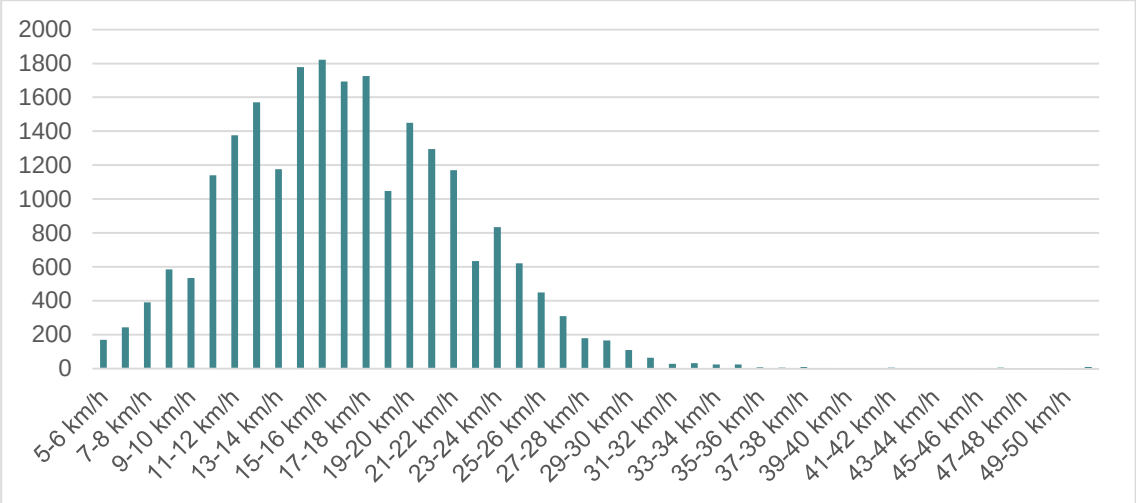


Figure 4.12: Distribution of cycling trips per average speed, regular bicycle. Number of trips (N=22704). Sense.Dat 2017.

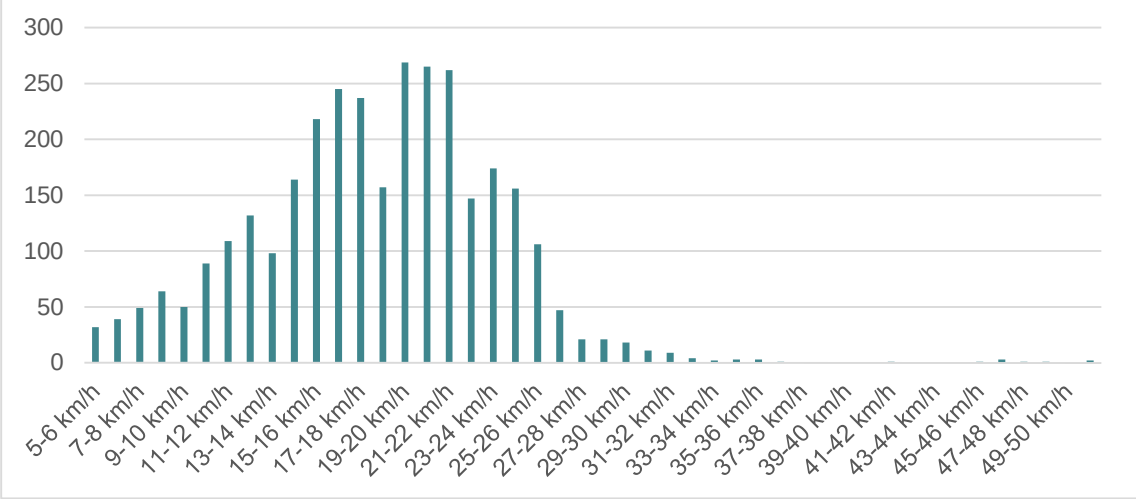


Figure 4.13: Distribution of cycling trips per average speed, e-bike. Number of trips (N=3211). Sense.Dat 2017.

The figures show that trips taken with e-bikes usually have a higher average speed than trips with regular bicycles.

We have also conducted a regression analysis, to investigate which other factors affect the cycling speed (appendix 3, Speed Oslo). The analysis show that e-bike users' speed on average is 1,8 km/h faster than cyclists with regular bicycles. Men's speed is on average 1,5 km/h faster than women's. We also find that age affects speed, but the relationship is not linear. The fastest age group is between 45 and 66 years.

4.4 Experiences of cycling infrastructure

In the survey, the respondents answered how satisfied they generally are with the cycling conditions in their city on a 7 point scale, where 7 is very satisfied and 1 is very unsatisfied. (Table 4.1). They also answer how they perceived different conditions on their last cycling trip.

Table 4.1: Cyclists' satisfaction, Oslo[11]. Bicycle survey 2017.

		Average	Standard deviation	N
To what extent are you satisfied with…	your city as a cycling city?	3.8	1.5	1752
	the extent of cycling paths?	3.7	1.6	1752
	the quality of cycling paths?	3.8	1.6	1752
The last time you cycled, all in all,	how did you perceive the noise conditions?	3.7	1.5	677
	how did you perceive the air pollution?	3.5	1.6	677
	how did you perceive the number of cars?	3.0	1.6	677
	how did you perceive the speed of motorized vehicles	3.1	1.6	677
	how did you perceive interaction with other road users?	3.2	1.5	677
	how safe did you feel as a cyclist?	4.4	1.4	677

The respondents in the survey were also asked to mark problematic places on the map, where they felt uncomfortable or difficult to cycle from the viewpoint of traffic safety. In Oslo, 552 respondents have marked 787 places on the map (Figure 4.14 and Figure 4.15). The respondents could select two places and choose between marking a point or to mark a linear section. Around 50 percent have marked a point and 50 percent a linear section. On these selections, the respondents have additionally indicated how unsafe they feel (Figure 4.15), and to what degree they avoided the marked place or road section (Figure 4.16). The latter two answers are indicated on a scale from 1 to 7.

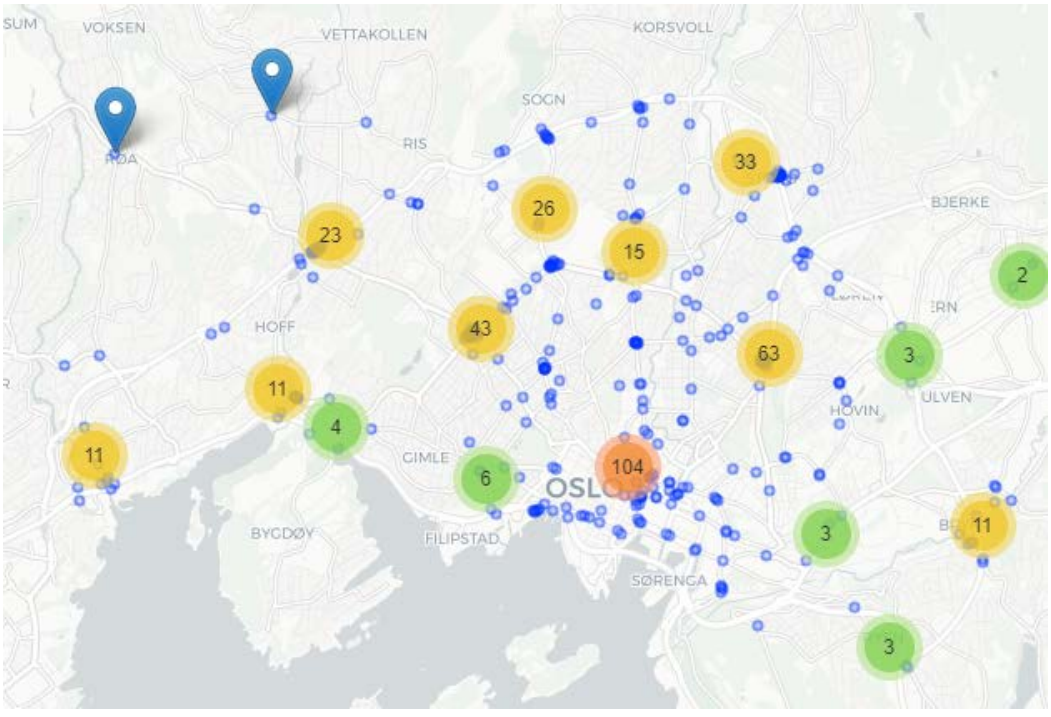


Figure 4.14: Problematic points, Oslo. Numbers indicate clusters of points. Bicycle Survey 2017.

[11] On a scale from 1 (very dissatisfied/very problematic) to 7 (very satisfied/unproblematic).

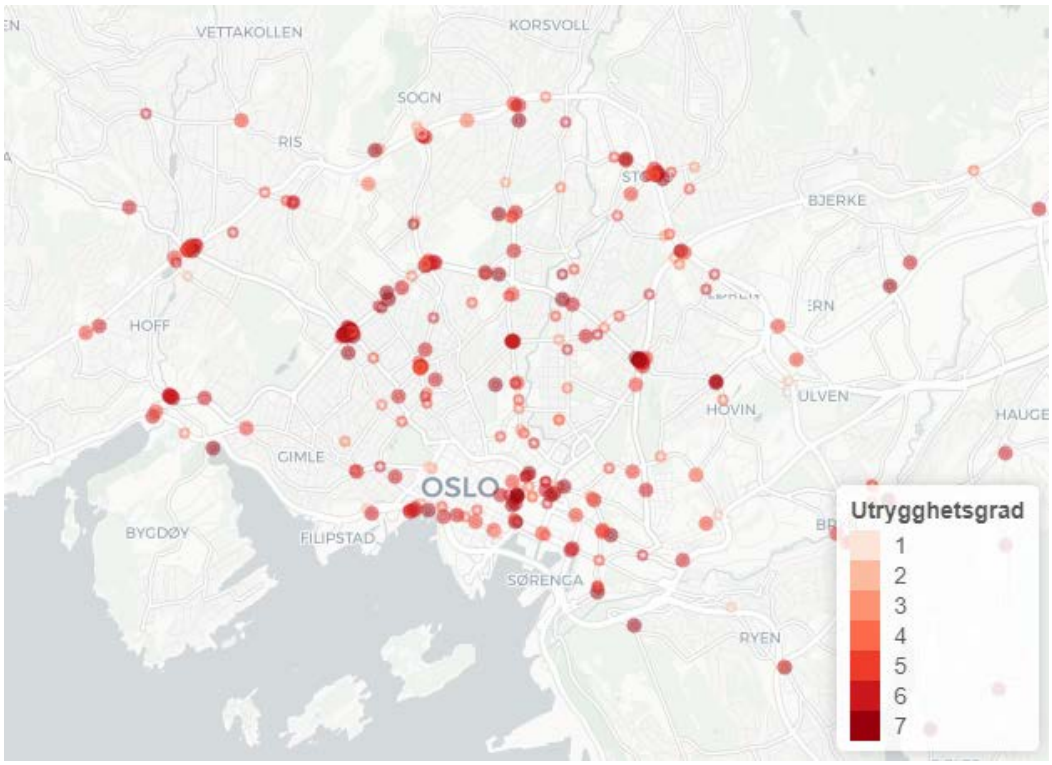


Figure 4.15: Degree of unsafety at indicated points, Oslo[12]. Bicycle Survey 2017.

[12] Utrygghetsgrad = Degree of unsafety.

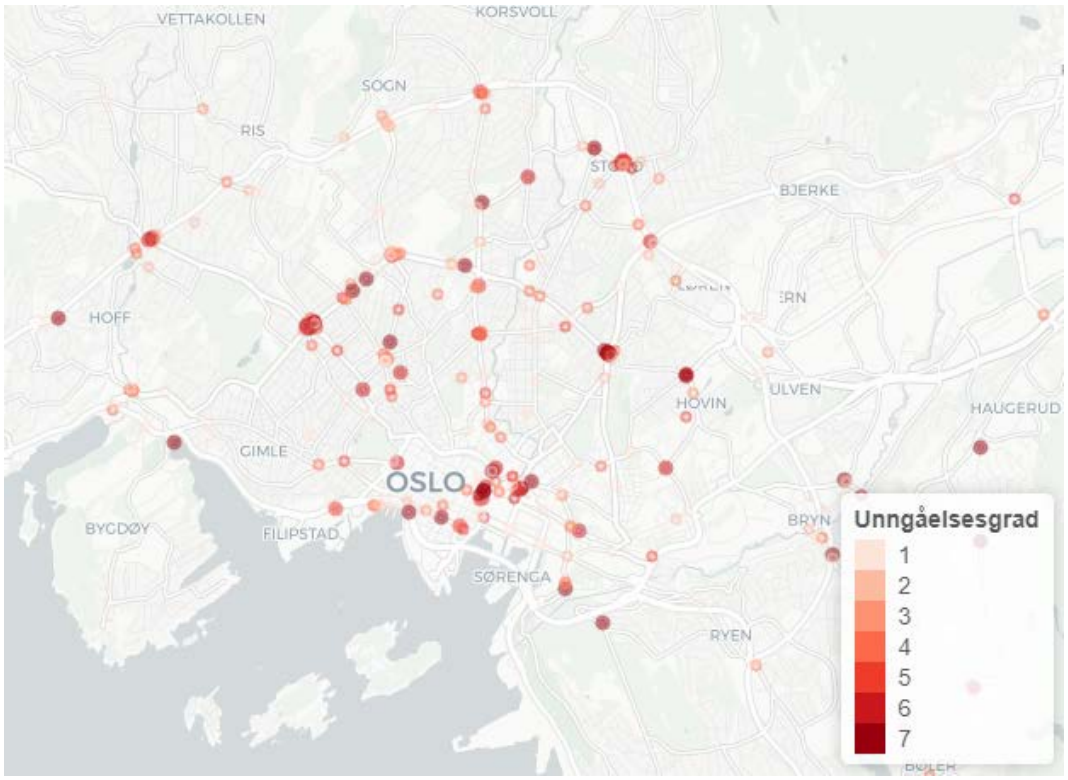


Figure 4.16: Degree of avoidance at indicated points, Oslo[13]. Bicycle Survey 2017.

The maps show that a majority of the unsafe spots are in the city centre, in intersections and some heavily trafficked areas.

Some of the unsafe points also have a high score on the avoidance scale, such as Carl Berner and Majorstukrysset. Other areas understood as unsafe, such as Alexander Kiellands plass and Smestadkrysset have a lower degree of avoidance.

[13] Unngåelsesgrad = Degree of avoidance.

Figure 4.17: Problematic linear sections[14], Oslo. Bicycle Survey 2017.

Figure 4.18: Degree of unsafety at indicated linear sections[14], Oslo. Bicycle Survey 2017.

[14] The maps show all the sections which are indicated by respondents. Blue indicates relatively few records, yellow indicates quite many records and red very many records.

Figure 4.19: Degree of avoidance at indicated linear sections[14], Oslo. Bicycle Survey 2017.

The maps above show the linear segments which were regarded as uncomfortable or difficult to cycle by the respondents (Figure 4.17). On these selections, the respondents have also indicated how unsafe they feel (Figure 4.18), and to what degree they avoided this place (Figure 4.19). The latter two answers are indicated on a scale from 1 to 7.

Large parts of the current main bicycle infrastructure are indicated as difficult or uncomfortable to cycle, even if there is specific infrastructure for cyclists available. One reason for this could be that these are of the most frequently used roads for cyclists.

Road sections like Ring 2, Dronning Eufemias gate and Bogstadveien are the streets indicated most often. Also some other central routes, leading from east to west, like Rådhusgata, Grønlandsleiret and Grensen are marked many times. The reported degree of unsafety at these road sections is high, while the degree of avoidance at these sections, is slightly lower than the reported feeling of unsafety. It seems like some respondents cycle here, despite feeling unsafe.

5 Bergen

5.1 General cycling behaviour in Bergen

5.1.1 Cycling distances

Bergen has the lowest cycling share among the cities studied in this report. One of the reasons can be that people in Bergen tend to live quite far from their workplace. This could also reflect the way in which the case cities have been geographically defined in this study. While the city of Oslo only includes the municipality of Oslo, which is more or less a mono-centric municipality, not including the outer suburbs, the municipality of Bergen also includes large suburban centres. In the case of Oslo, these large suburban centres are located in other neighbouring municipalities and therefore excluded from the study area.

Figure 5.1 shows the distance to work for car users and cyclists in Bergen based on information on how they usually travel to and from work.

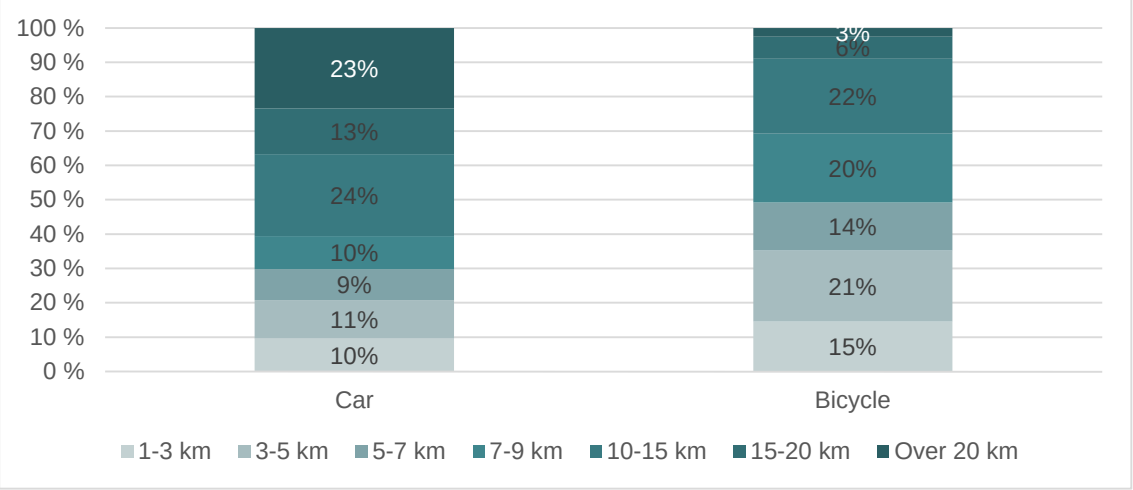


Figure 5.1: Distance to work/school for car drivers and cyclists[15]. Bicycle Survey 2017.

We see that cyclists usually have a shorter commute than car drivers. Almost 70 percent of the cyclists have less than 10 km to work, while only 40 percent of the car users live within the same distance to their work place.

[15] N: Car=188, Bicycle=468.

5.1.2 Time of cycling

In Bergen, most of the cycling trips take place between Monday and Friday (Figure 5.2).

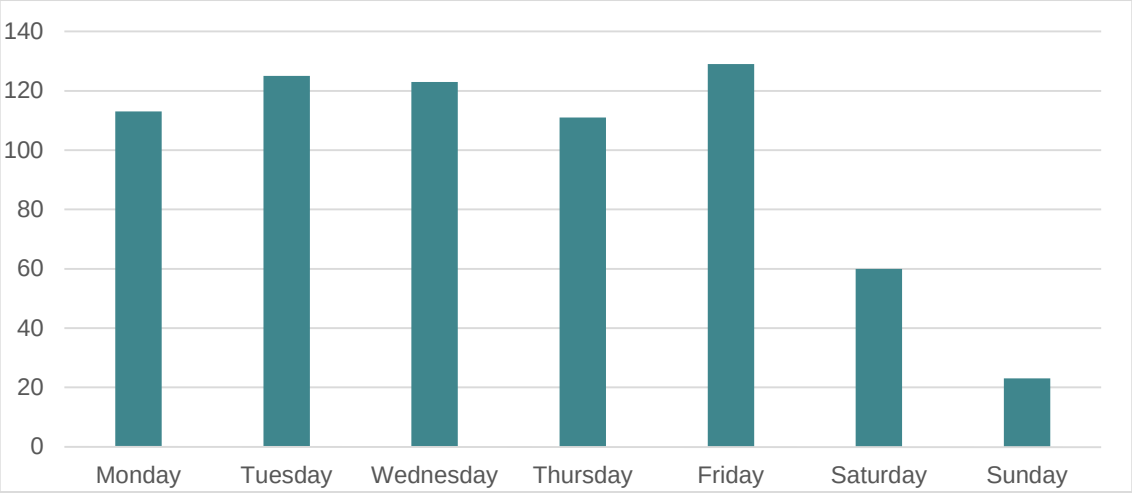


Figure 5.2: Registered cycle trips per day of the week (N=7858). Sense.Dat 2017.

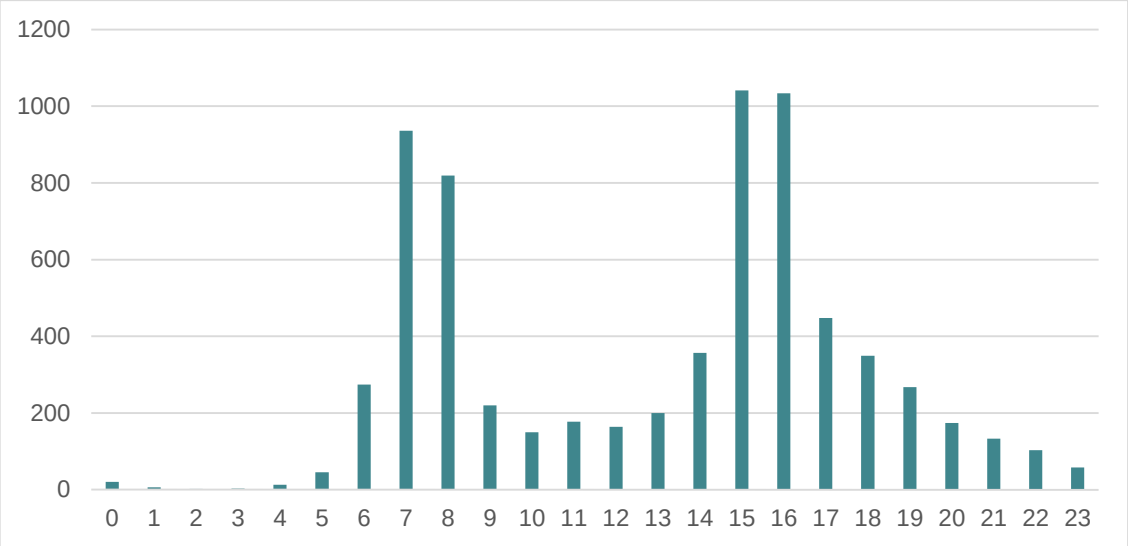


Figure 5.3: Registered cycle trips per hour (Monday- Friday) (N=6993). Sense.Dat 2017.

On weekdays, we observe peaks in the morning and the afternoon, which confirms that most of the cycling is to travel to and from work or school (Figure 5.3).

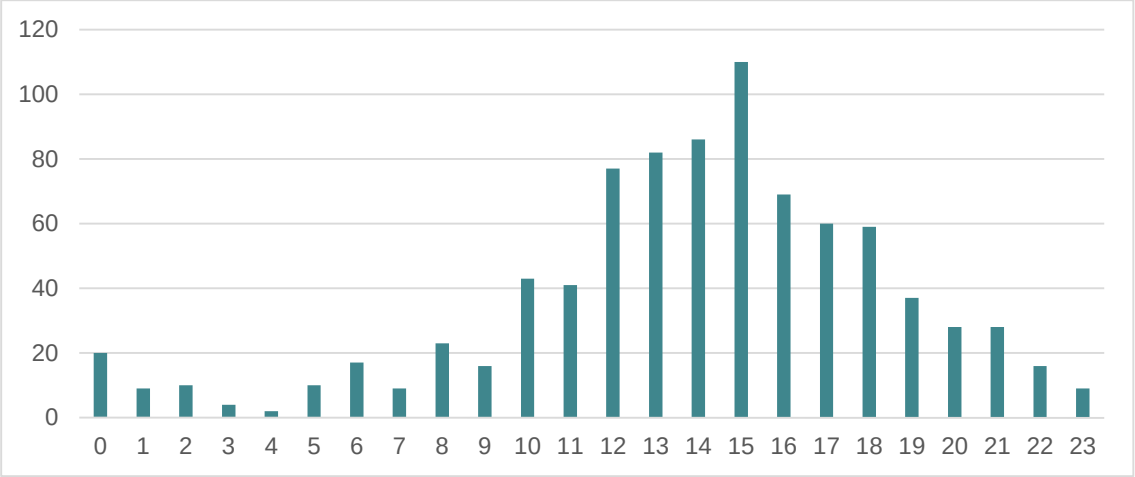


Figure 5.4: Registered cycle trips per hour (weekends) (N=865). Sense.Dat 2017.

Only one tenth of the registered trips in Bergen are done during the weekend (Figure 5.4). On Saturdays and Sundays, we observe a different pattern than in the week days, with a peak in the afternoon.

5.2 Demographics

5.2.1 Bicycle survey

The following figures show the bicycle share of different age groups, and between the genders in Bergen (Figure 5.5, Figure 5.6).

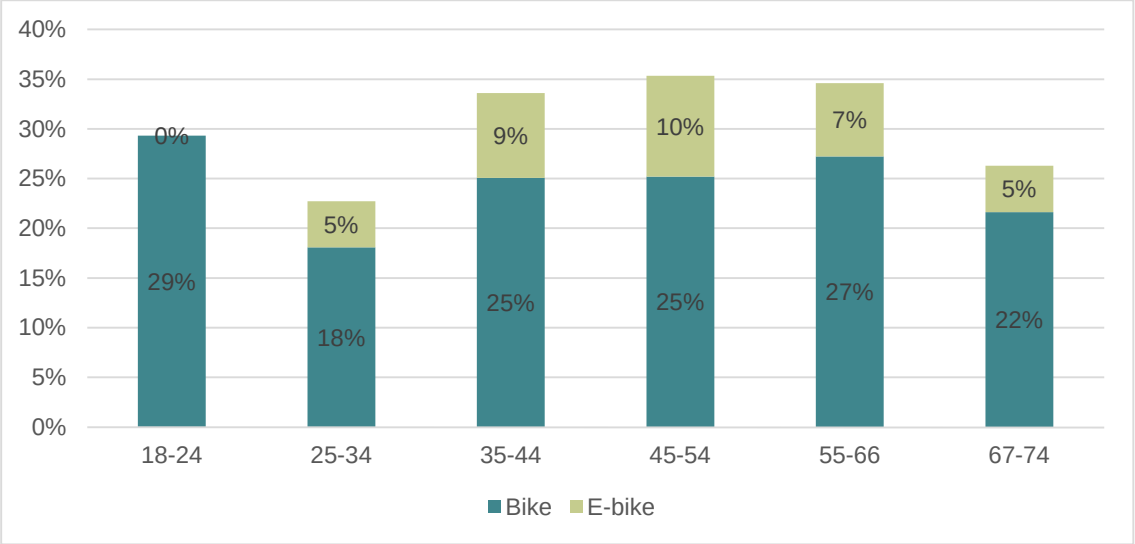


Figure 5.5: Bike share (regular bike and e-bike) by age, based on kilometres travelled (N=653). Bicycle Survey 2017.

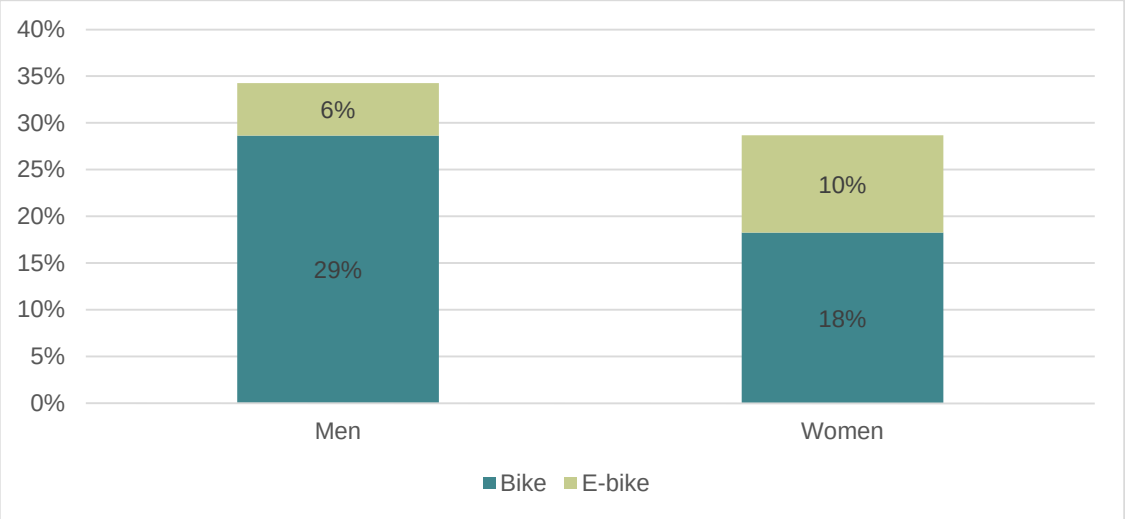


Figure 5.6: Bike share (regular bike and e-bike) by gender, based on kilometres travelled (N=653). Bicycle Survey 2017.

There is little difference between the age groups, except for a higher degree of e-bike use among those aged 35 to 54 years. Men cycle significantly more than women, while women are using e-bikes more than men.

The following three figures show how often men and women in Bergen cycle for different purposes (Figure 5.7, Figure 5.8, Figure 5.9).

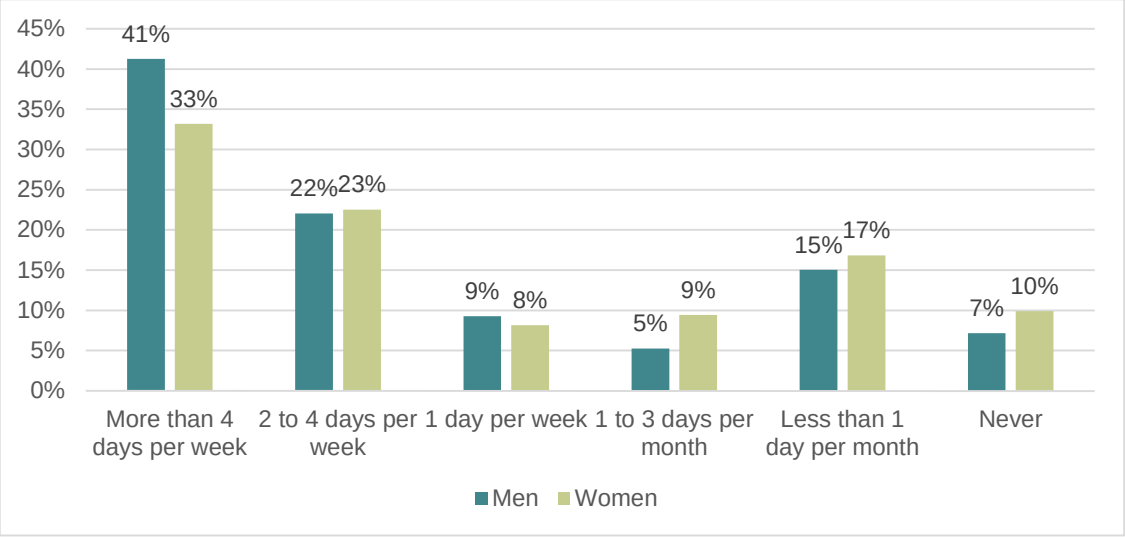


Figure 5.7: "How often do you cycle to and from work/school at this time of the year?" By gender (N=976). Bicycle Survey 2017.

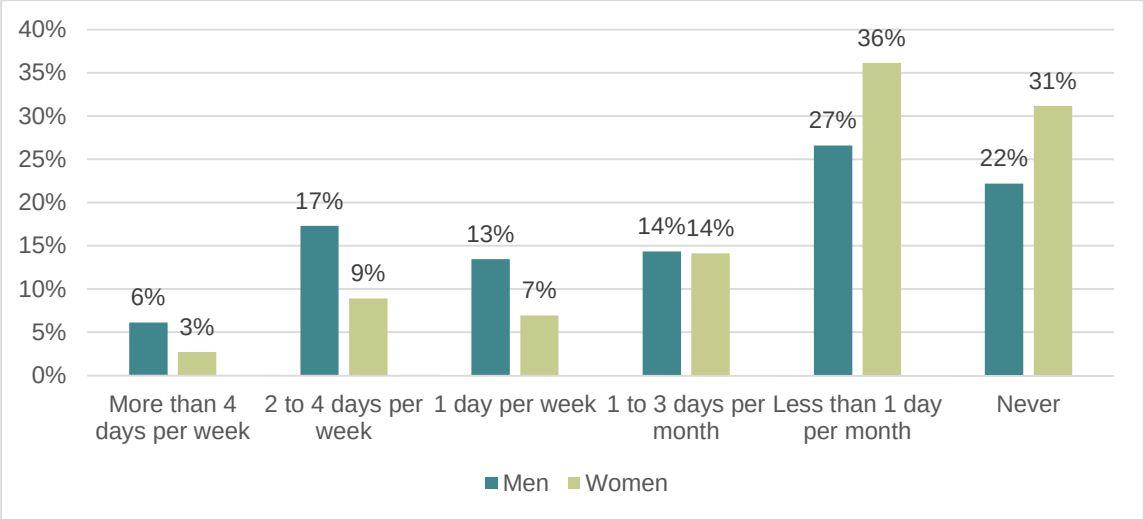


Figure 5.8: "How often do you cycle for exercise purposes at this time of the year?" By gender (N=976). Bicycle Survey 2017.

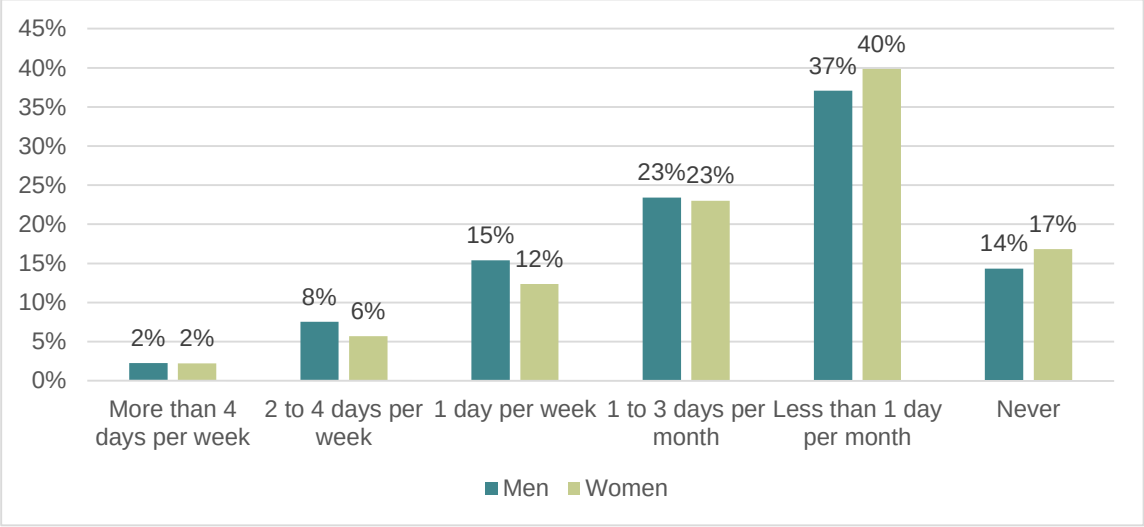


Figure 5.9: "How often do you travel for recreational purposes at this time of the year?" By gender (N=976). Bicycle Survey 2017.

Men cycle more often than women for all trip purposes, but this difference is especially pronounced when the trip is taken for the purpose of physical training.

5.3 Route choice and speed

Most of the cycling in Bergen takes place in the city centre, and towards the southern boroughs Nesttun and Flesland (Figure 5.10, Figure 5.11). There is also some cycling on other roads leading into the inner city, from the north, east and west.

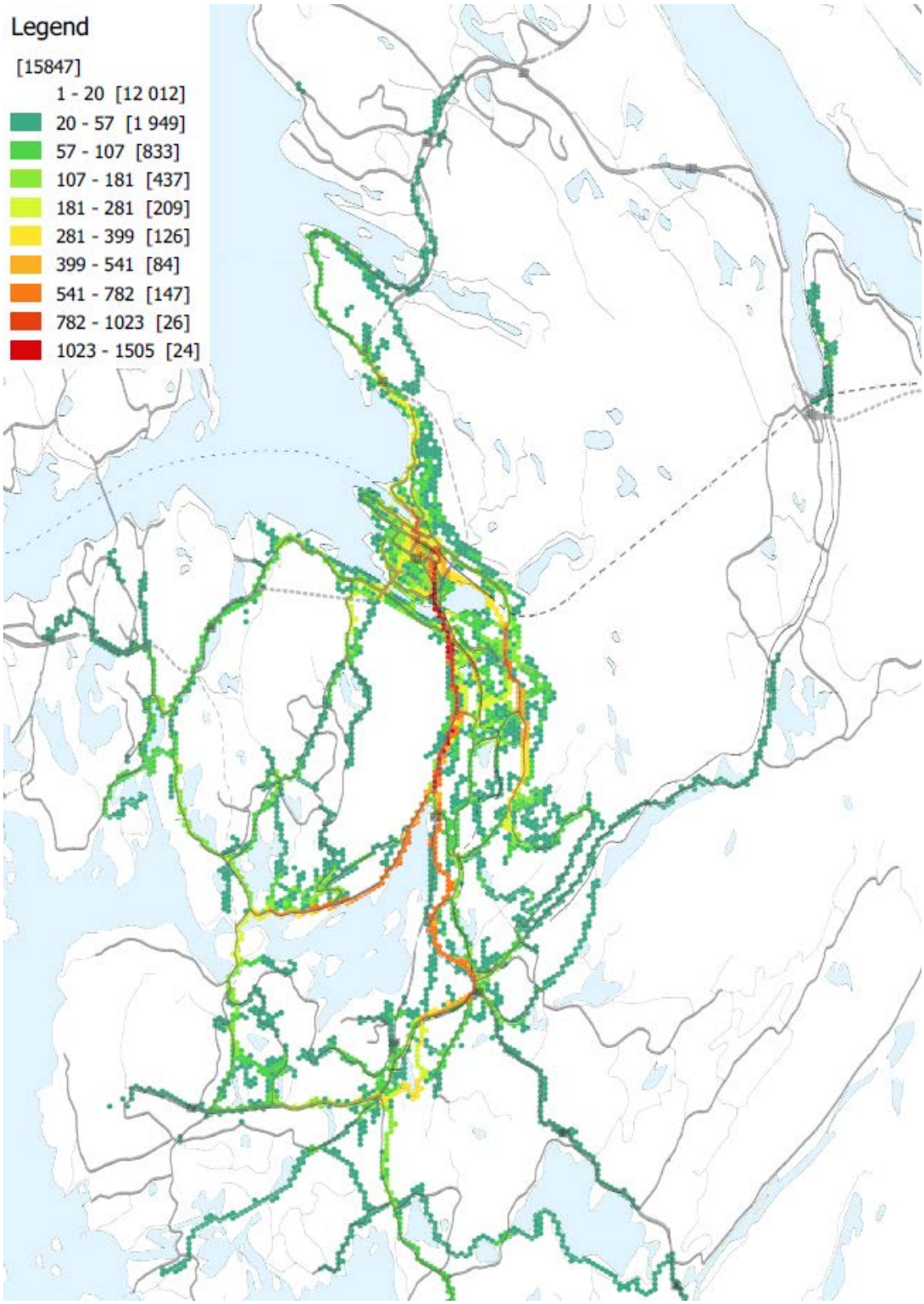


Figure 5.10: Cycling pattern, Bergen. Number of trips registered in the data collection period. Sense.Dat 2017.

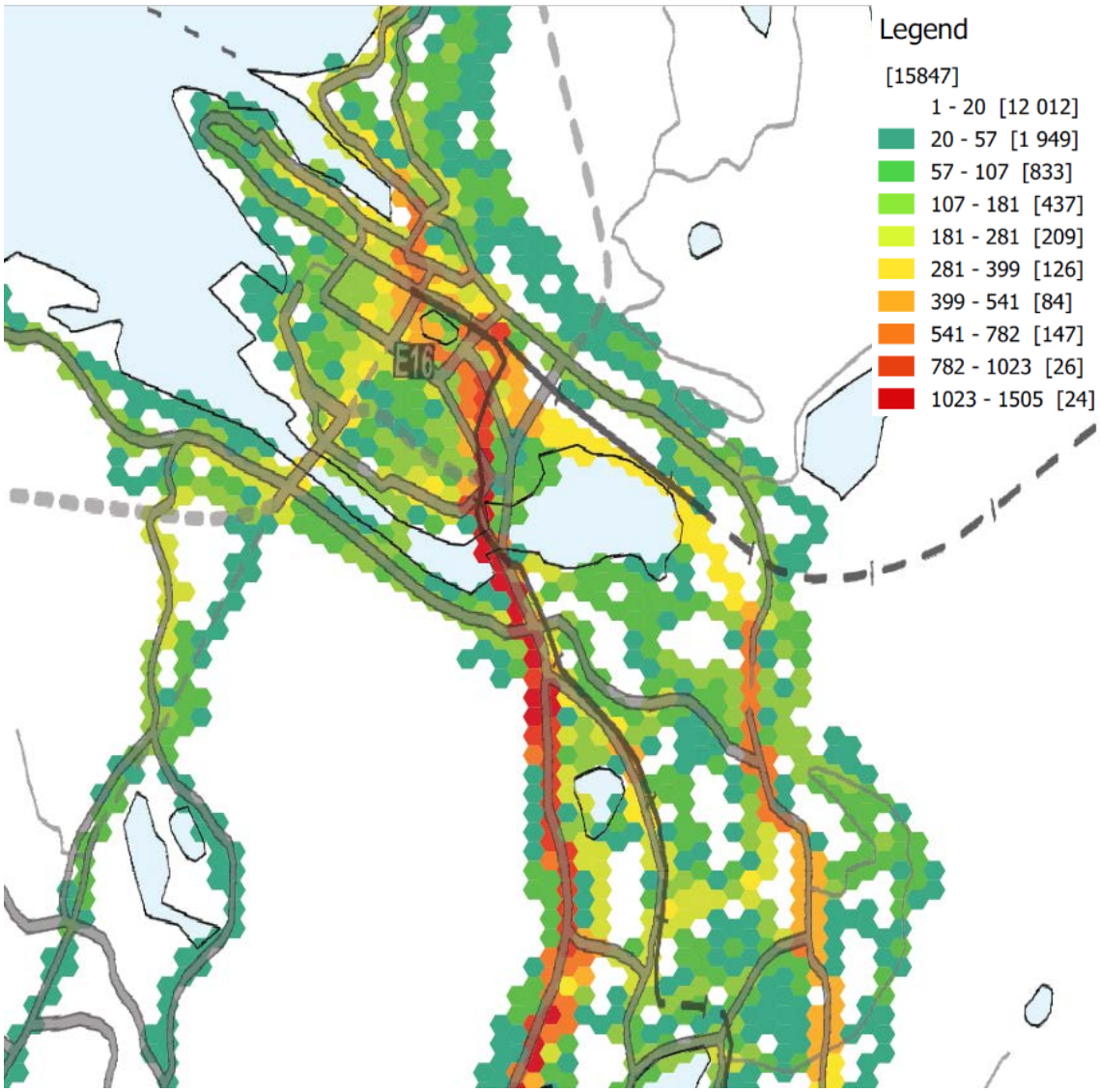


Figure 5.11: Cycling pattern, central Bergen. Number of trips registered in the data collection period. Sense.Dat 2017.

Figure 5.12 and Figure 5.13 show the distribution of average speed among the registered cycling trips done with regular bikes and e-bikes.

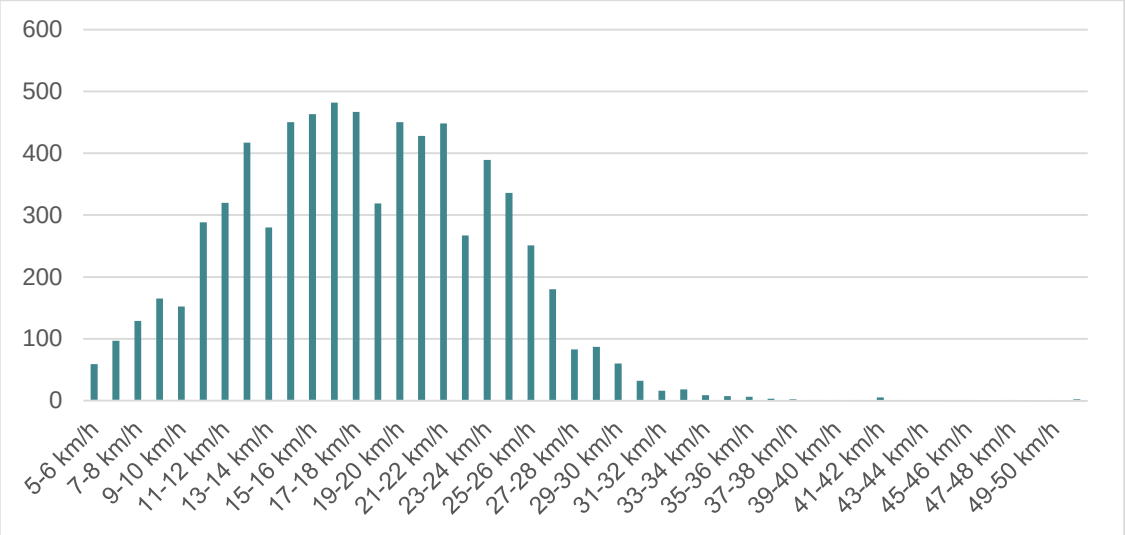


Figure 5.12: Distribution of cycling trips per average speed, regular bicycle. Number of trips (N=7174). Sense.Dat 2017.

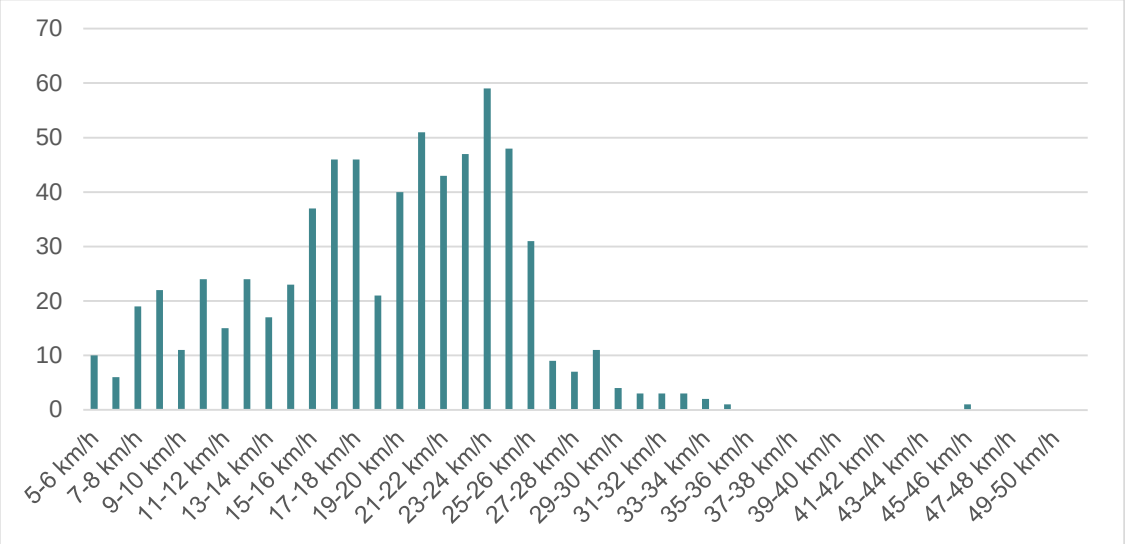


Figure 5.13: Distribution of cycling trips per average speed, e-bike. Number of trips (N=684). Sense.Dat 2017.

Trips with e-bike generally have a higher average speed than the rest of the bikes. However, the sample of e-bike trips is quite small compared to trips with regular bikes.

In our regression analysis, we also see that e-bike trips have a slightly higher average speed than other (Appendix 3, Speed Bergen). However, the difference between men and women is even larger, and we also see some effect of age on cycling speed.

5.4 Experiences of cycling infrastructure

The table below shows how the respondents in Bergen answer on questions related to satisfaction - how satisfied they are and how problematic they think the different factors for cycling are (Table 5.1). The answers were given on a 7 point scale. Where 7 is very satisfied and 1 is very unsatisfied.

Table 5.1: Cyclists' satisfaction, Bergen[16]. Bicycle Survey 2017.

		Average	Standard deviation	N
To what extent are you satisfied with…	your city as a cycling city?	3.4	1.7	820
	the extent of cycling paths?	3.3	1.6	820
	the quality of cycling paths?	3.5	1.7	820
The last time you cycled, all in all,	how did you perceive the noise conditions?	3.6	1.5	282
	how did you perceive the air pollution?	3.4	1.7	282
	how did you perceive the number of cars?	3.0	1.6	282
	how did you perceive the speed of motorized vehicles	3.3	1.5	282
	how did you perceive interaction with other road users?	3.2	1.4	282
	how safe did you feel as a cyclist?	4.6	1.3	282

The question on safety gets the highest score, while the other questions are quite similar. The following figures show problematic areas in Bergen (Figure 5.14), as well as the score of unsafety (Figure 5.15) and avoidance (Figure 5.16).

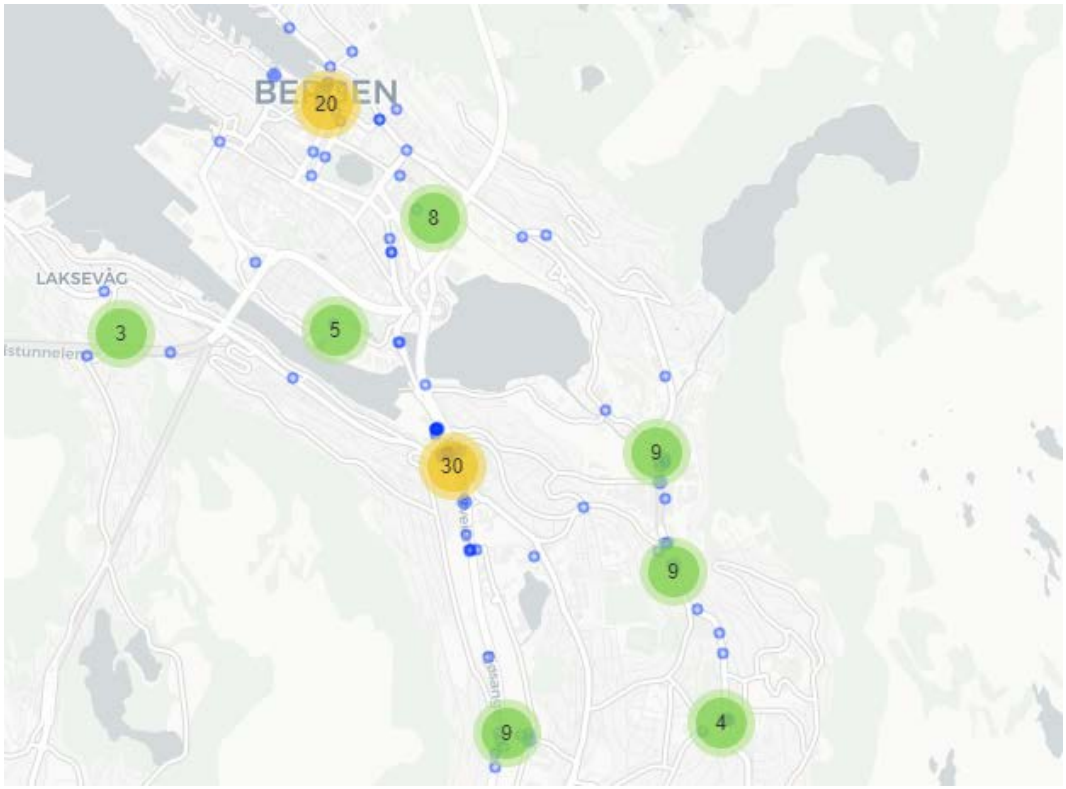


Figure 5.14: Problematic points, Bergen. Numbers indicate clusters of points. Bicycle Survey 2017.

[16] On a scale from 1 (very dissatisfied/very problematic) to 7 (very satisfied/unproblematic).

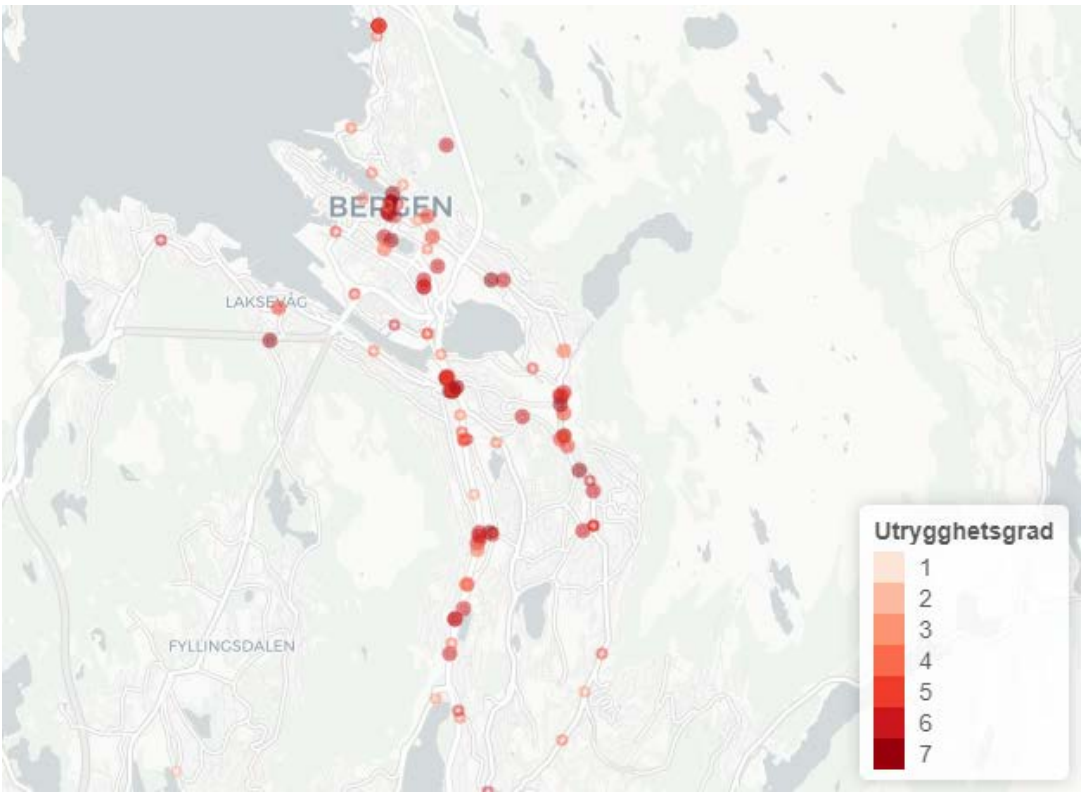


Figure 5.15: Degree of unsafety points, Bergen[17]. Bicycle Survey 2017.

[17] Utrygghetsgrad = Degree of unsafety.

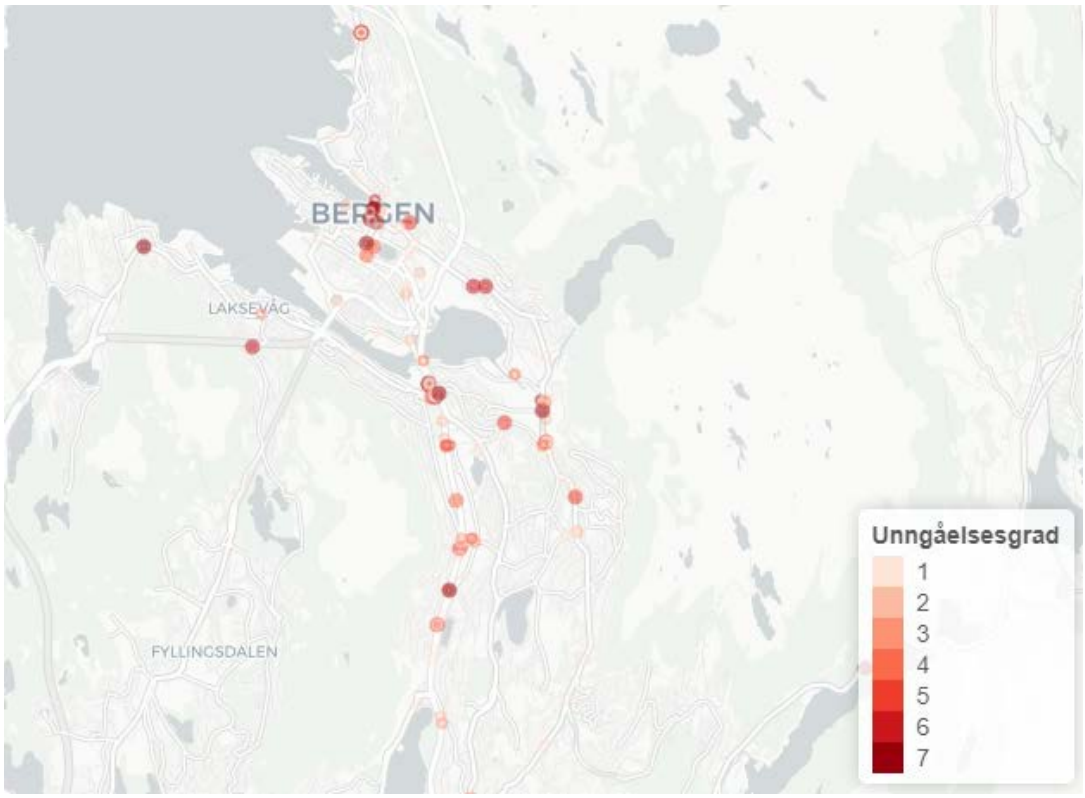


Figure 5.16: Degree of avoidance points, Bergen[18]. Bicycle Survey 2017.

[18] Unngåelsesgrad = Degree of avoidance.

According to the respondents, Danmarks plass and Fisketorget are among the most unsafe areas in Bergen. Both these areas also have a certain degree of avoidance, which could either mean that cyclists choose detours around these places or that they avoid cycling all in all.

The map below (Figure 5.17) shows the places where cyclists have indicated road sections as problematic to cycle in Bergen. This map does not show weighted results. On the map it is shown that large parts of the current main bicycle infrastructure are indicated as difficult or uncomfortable to cycle, even if there is infrastructure for cyclists available. Most routes leading to the historical city centre from the north, south and west are indicated as problematic for cyclists, as well as routes within the city centre. The sections mostly marked here are Sjøgaten and Bryggen, Torgalmenningen/Torget and Christiesgate. A bit more out of the centre we find the road, Nattlangsveien, which people have marked relatively often.

The other maps show the selections where the respondents have indicated how unsafe they feel (Figure 5.18), and to what degree they avoided this place (Figure 5.19). The latter two answers are indicated on a scale from 1 to 7. The degree of feeling unsafe on these routes is larger than the degree of avoidance.

Figure 5.17: Problematic linear sections, Bergen[14]. Bicycle Survey 2017.

Figure 5.18: Degree of unsafety at linear sections, Bergen[14]. Bicycle Survey 2017.

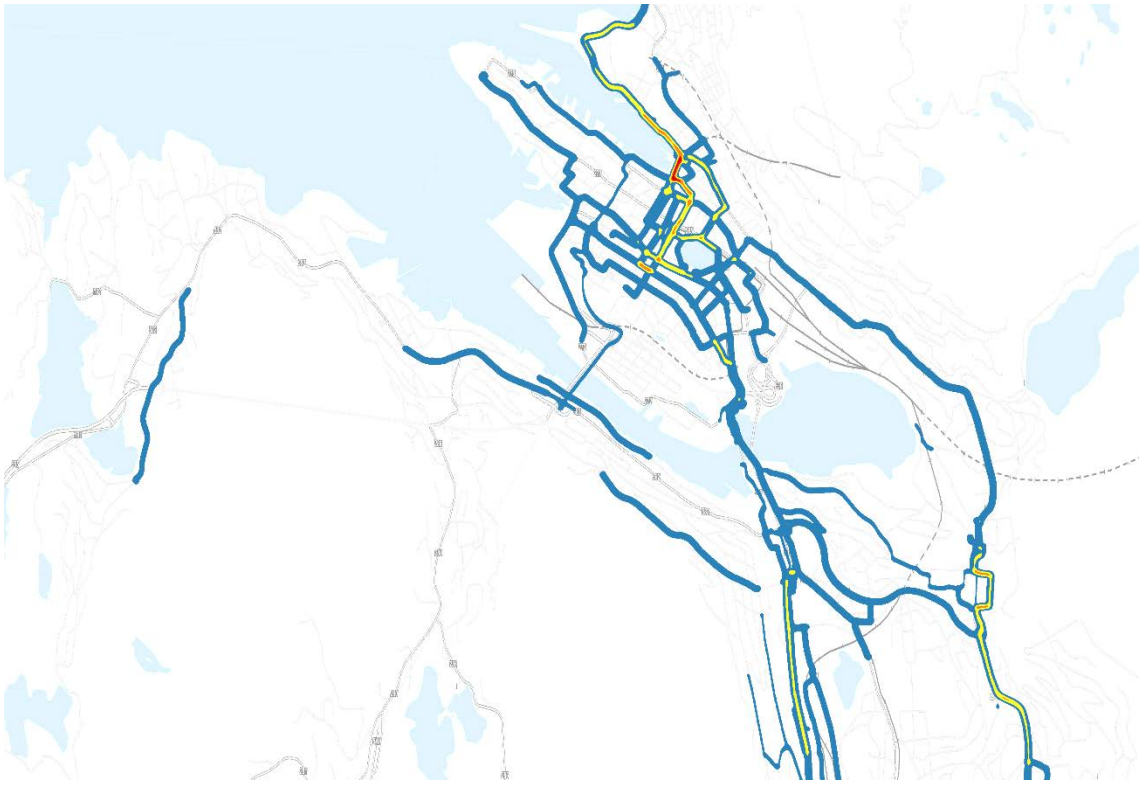


Figure 5.19: Degree of avoidance at linear sections, Bergen[14]. Bicycle Survey 2017.

6 Stavanger

6.1 General cycling behaviour in Stavanger

6.1.1 Cycling distances

Among the Norwegian cities, Stavanger has a relatively high cycling share, as we observed in chapter 3. One reason for this could be, as in Trondheim, that the distances people travel is quite short. Cyclists mostly live quite close to their workplace, whereas car users generally have a longer distance to work (Figure 6.1).

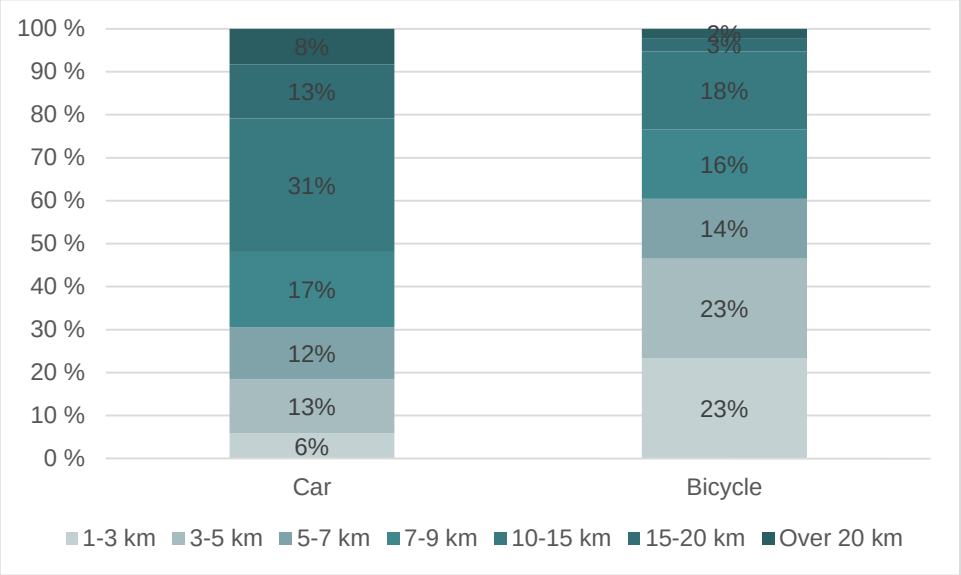


Figure 6.1: Distance to work/school for car drivers and cyclists[19]. Bicycle Survey 2017.

6.1.2 Time of cycling

Similar to the other cities, most of the cycling in Stavanger takes place on weekdays during morning and afternoon (Figure 6.2, Figure 6.3, Figure 6.4).

[19] N: Car= 206, Bicycle=417.

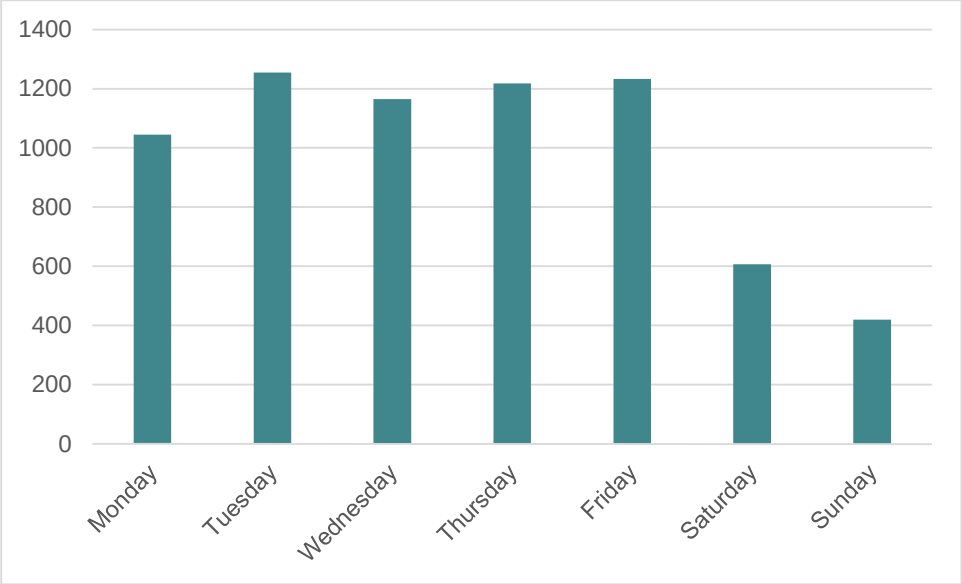


Figure 6.2: Registered cycle trips per day of the week (N=6943). Sense.Dat 2017.

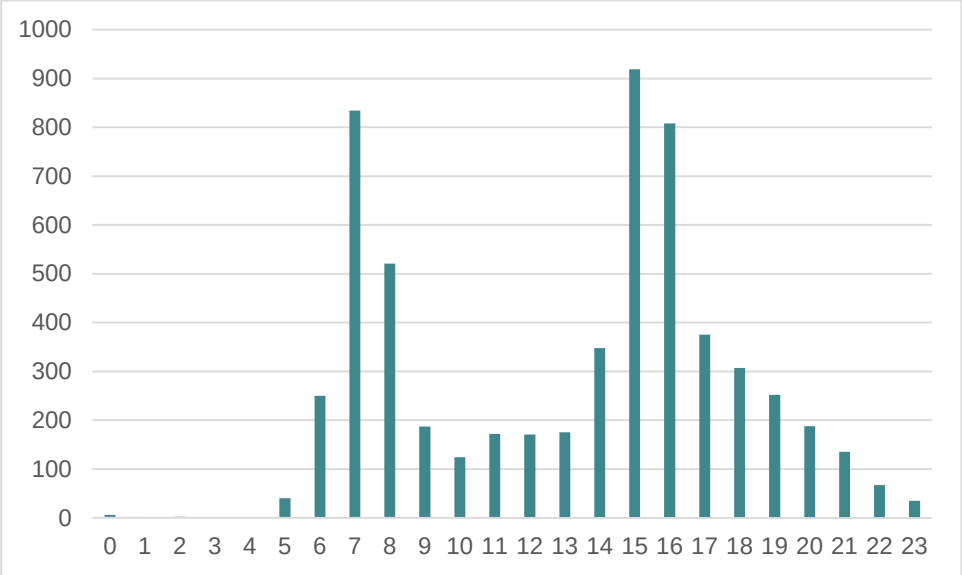


Figure 6.3: Registered cycle trips per hour (Monday-Friday) (N=5916). Sense.Dat 2017.

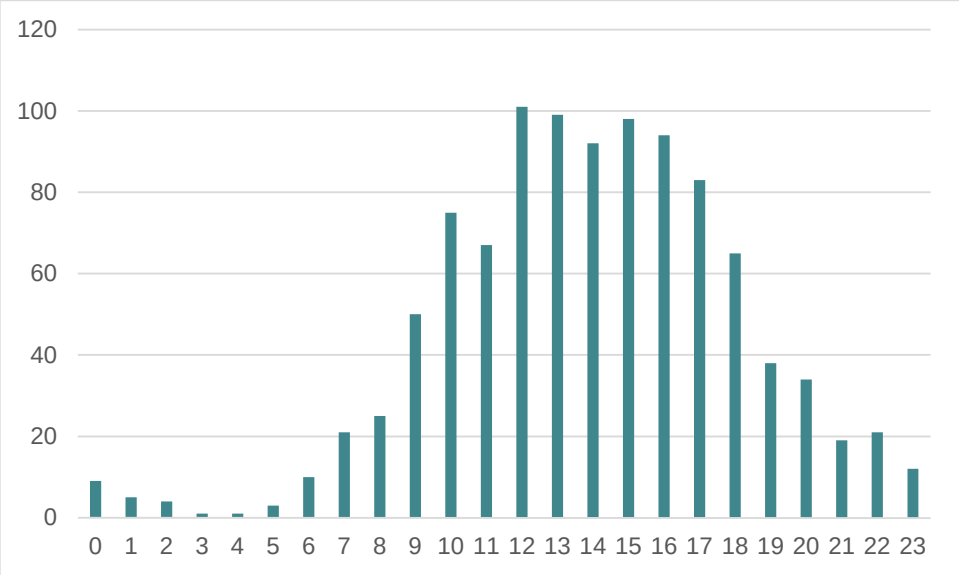


Figure 6.4: Registered cycle trips per hour (weekends) (N=1027). Sense.Dat 2017.

6.2 Demographics

6.2.1 Bicycle survey

In Stavanger, the age groups with the highest cycling share is 35-66 years. This group also uses e-bike the most (Figure 6.5).

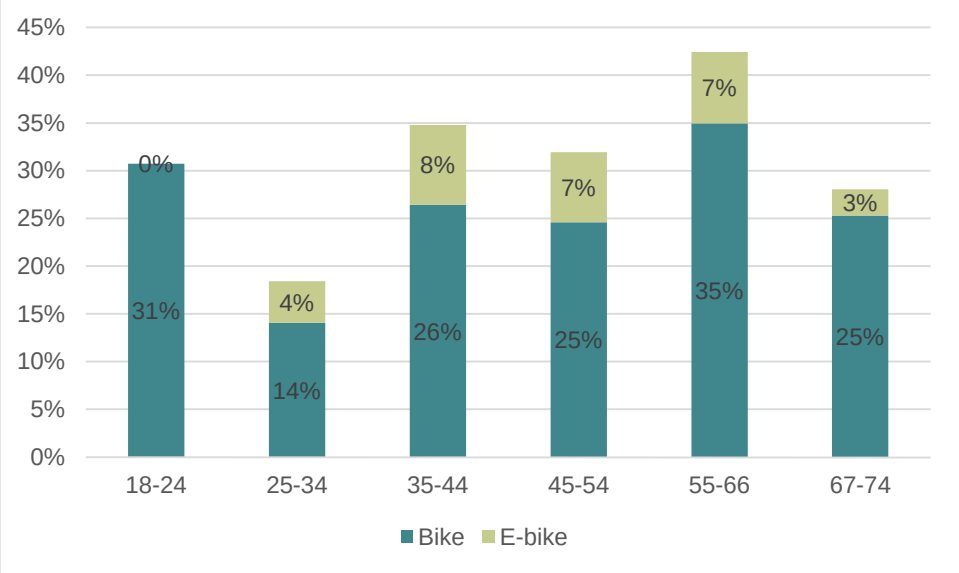


Figure 6.5: Bicycle share (regular bike and e-bike) by age, based on kilometres travelled (N=631). Bicycle Survey 2017.

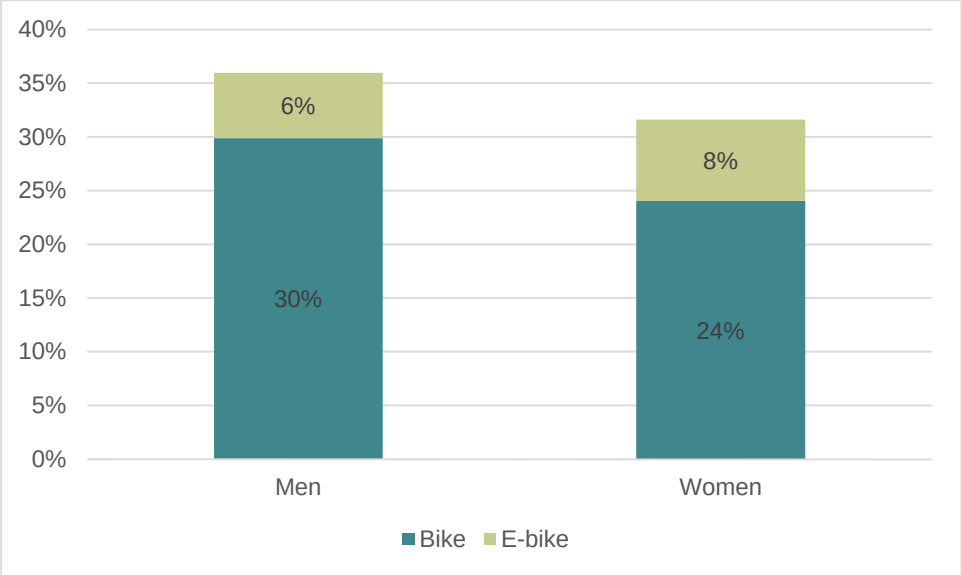


Figure 6.6: Bike share (regular bike and e-bike) by gender, based on kilometres travelled (N=631). Bicycle Survey 2017.

There is no significant difference between men and women in Stavanger, neither on e-bike use or on cycling in general (Figure 6.6).

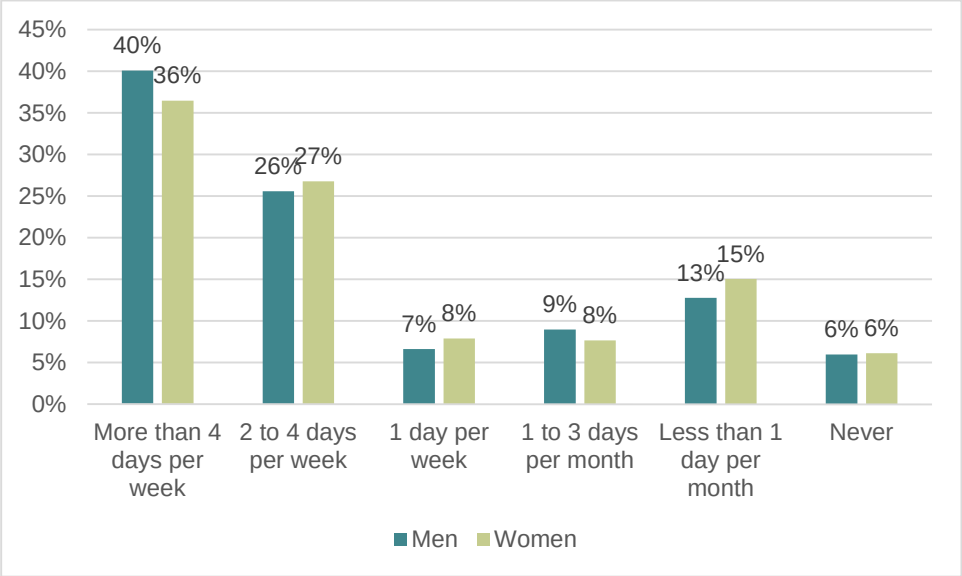


Figure 6.7: "How often do you cycle to and from work/school at this time of the year?" By gender (N=861). Bicycle Survey 2017.

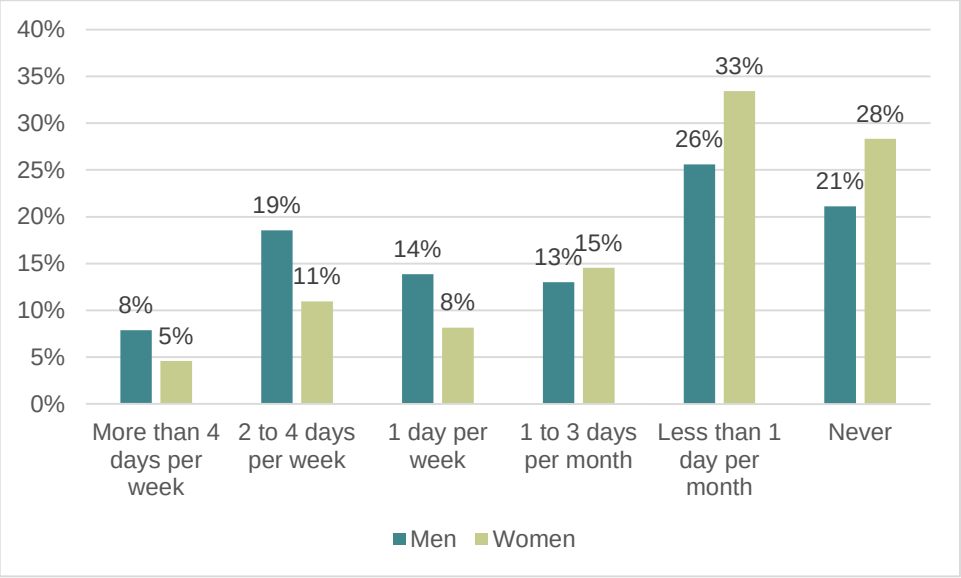


Figure 6.8: "How often do you cycle for exercise purposes at this time of the year?" By gender (N=861). Bicycle Survey 2017.

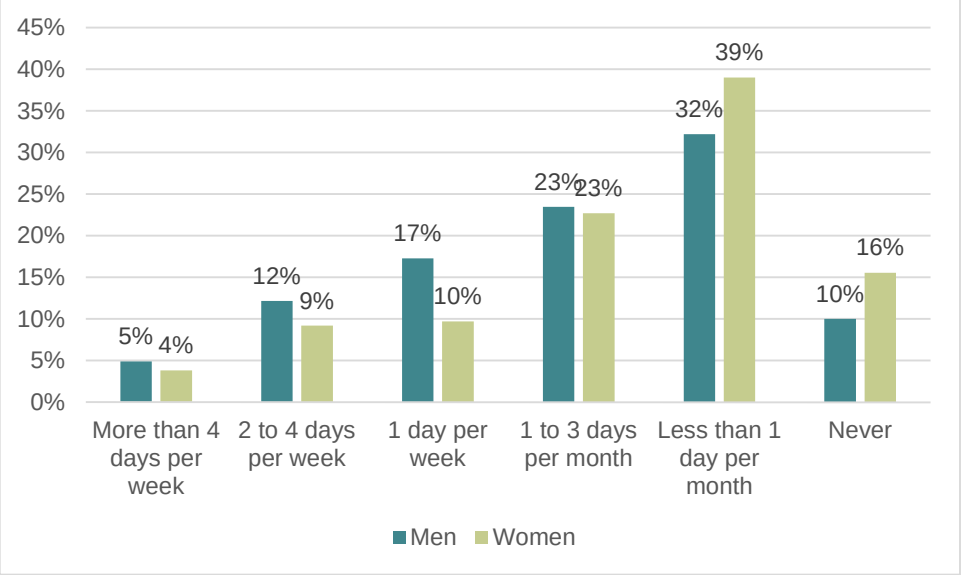


Figure 6.9: "How often do you cycle for recreational purposes at this time of the year?" By gender (N=861). Bicycle Survey 2017.

The three figures above show that cycling to and from work is the most common purpose (Figure 6.7, Figure 6.8, Figure 6.9). The figures also show that men cycle more for exercise than women.

6.3 Route choice and speed

Much of the cycling in Stavanger is concentrated in the city centre and to the south towards Forus and Sandnes (Figure 6.10). The region is quite flat, which could be a reason why many cycle quite long distances towards Sola, Jæren, etc.

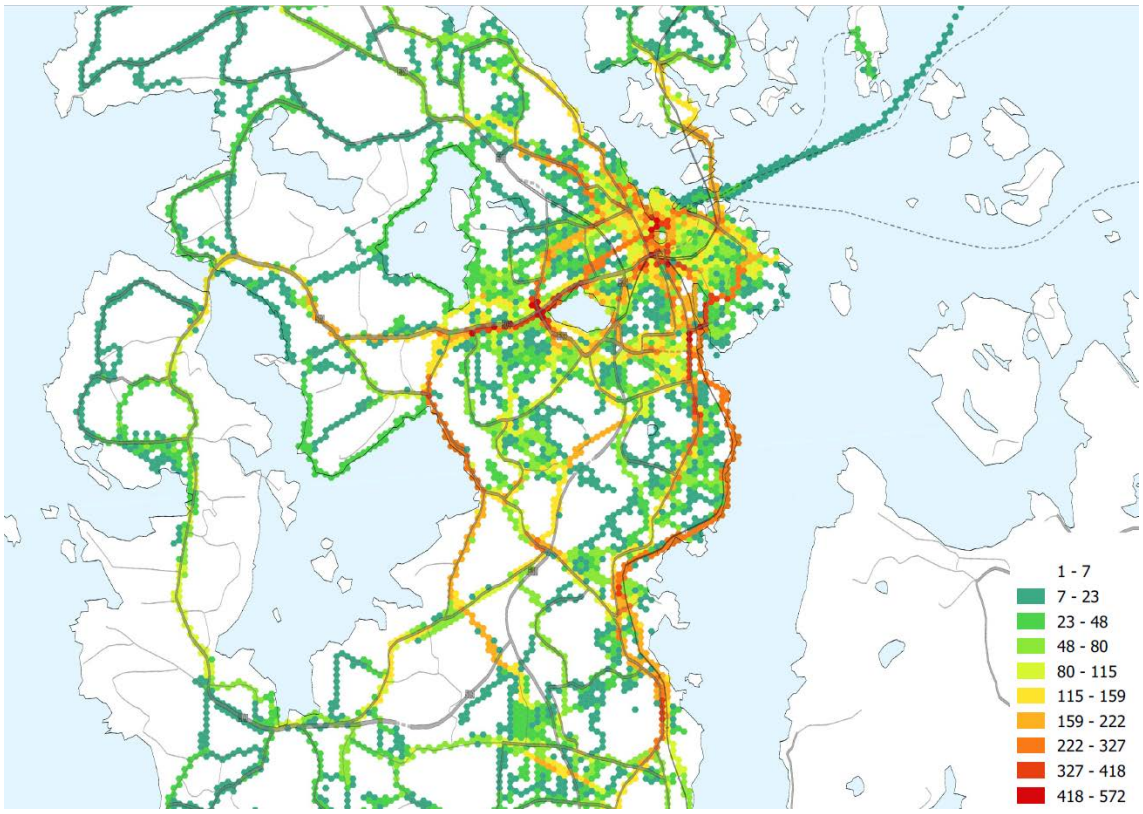


Figure 6.10: Cycling pattern, Stavanger. Number of trips registered in the data collection period. Sense.Dat 2017.

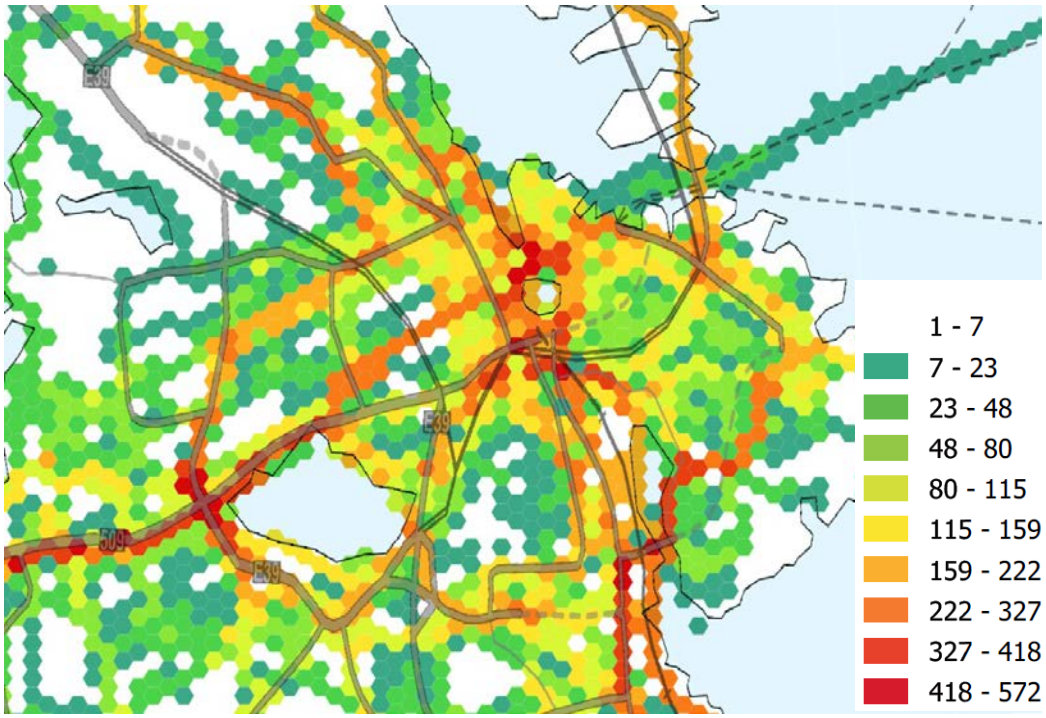


Figure 6.11: Cycling pattern, central Stavanger. Number of trips registered in the data collection period. Sense.Dat 2017.

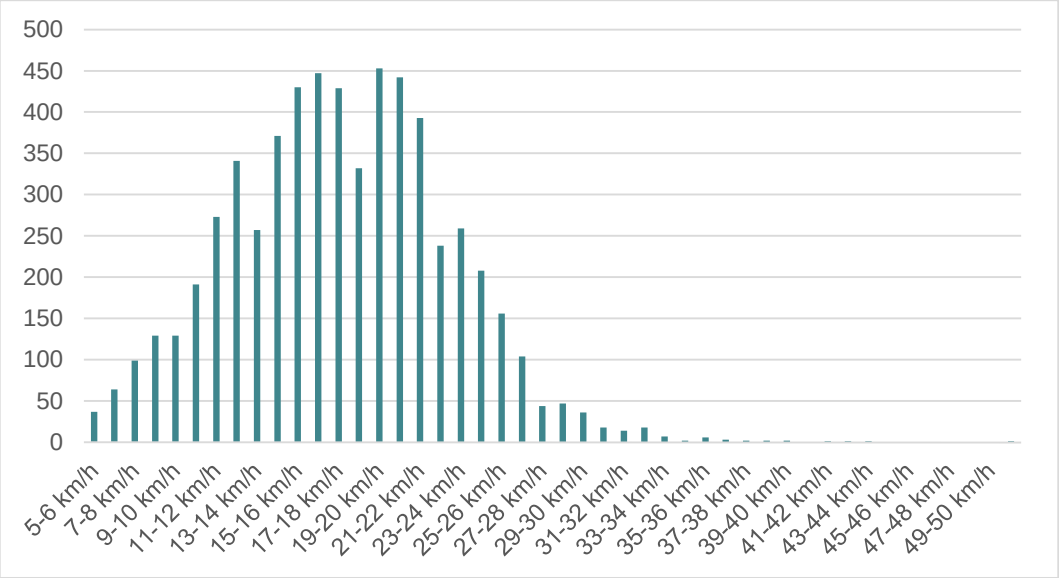


Figure 6.12: Distribution of cycling trips per average speed, regular bicycle. Number of trips (N=5987). Sense.Dat 2017.

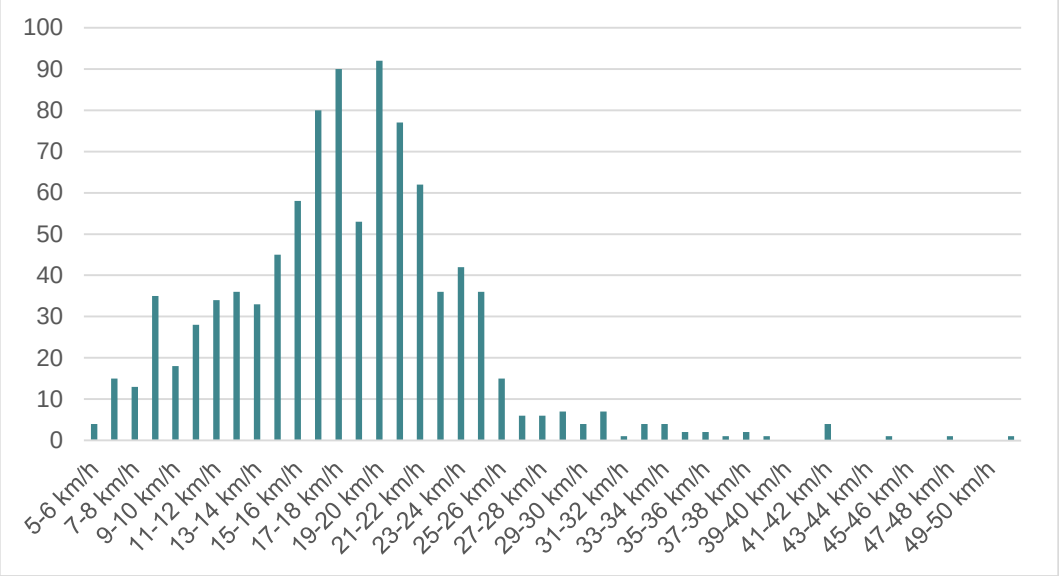


Figure 6.13: Distribution of cycling trips per average speed, e-bike. Number of trips (N=956). Sense.Dat 2017.

There is less difference between e-bike users and other cyclists when it comes to speed in Stavanger, than in the other cities (Figure 6.12, Figure 6.13). The regression analysis (Appendix 3, Speed Stavanger) show that e-bike users cycle just 0,5 km/h faster than the rest, when we control for gender and age.

6.4 Experiences of cycling infrastructure

As mentioned earlier, there is little that separates the four cities when it comes to satisfaction and problematic factors. Cyclists in Stavanger are medium satisfied with cycling conditions and other factors regarding their cycling experience (Table 6.1). These questions were asked on a scale of 7 very satisfied to 1, very unsatisfied.

Table 6.1: Cyclists' satisfaction, Stavanger[20]. Bicycle Survey 2017.

		Average	Standard deviation	N
To what extent are you satisfied with…	your city as a cycling city?	4.5	1.5	780
	the extent of cycling paths?	4.4	1.5	780
	the quality of cycling paths?	4.4	1.5	780
The last time you cycled, all in all,	how did you perceive the noise conditions?	3.7	1.5	343
	how did you perceive the air pollution?	3.7	1.5	343
	how did you perceive the number of cars?	3.4	1.5	343
	how did you perceive the speed of motorized vehicles	3.5	1.5	343
	how did you perceive interaction with other road users?	3.6	1.4	343
	how safe did you feel as a cyclist?	4.8	1.3	343

The problematic areas in Stavanger, as indicated by the survey respondents, are distributed throughout the city. There is however, a cluster of points in the area around the train station and Breiavatnet (Figure 6.14).

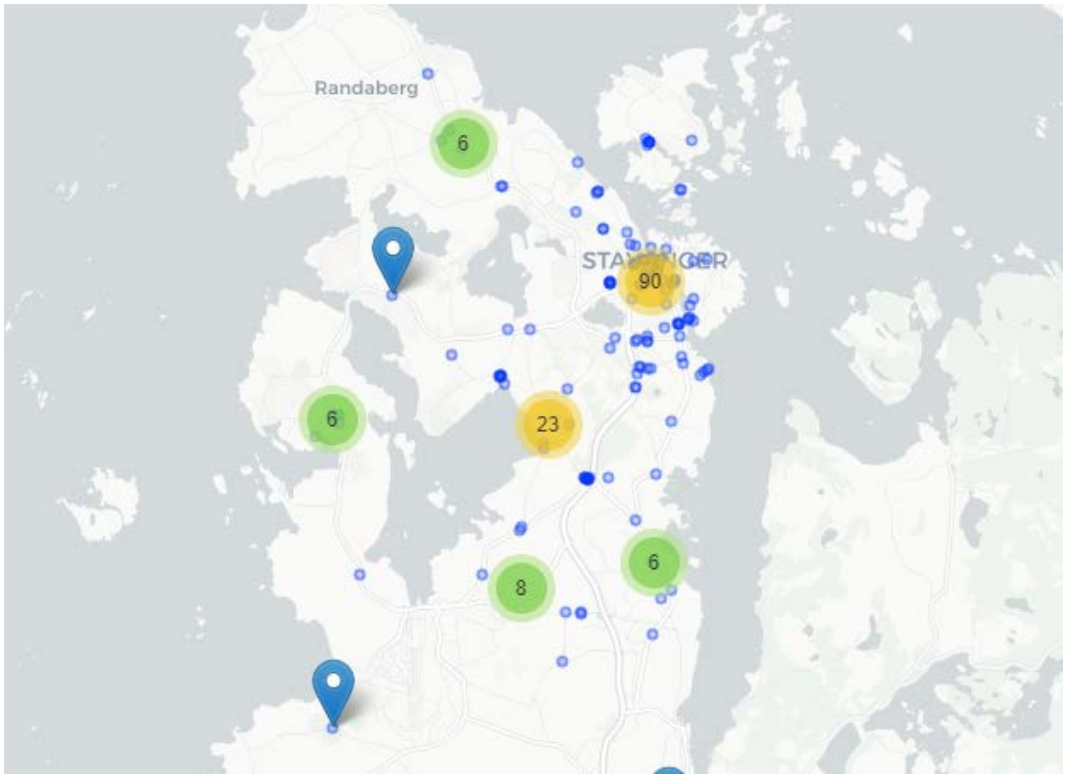


Figure 6.14: Problematic areas, Stavanger. Numbers indicate clusters of points. Bicycle Survey 2017.

[20] On a scale from 1 (very dissatisfied/very problematic) to 7 (very satisfied/unproblematic).

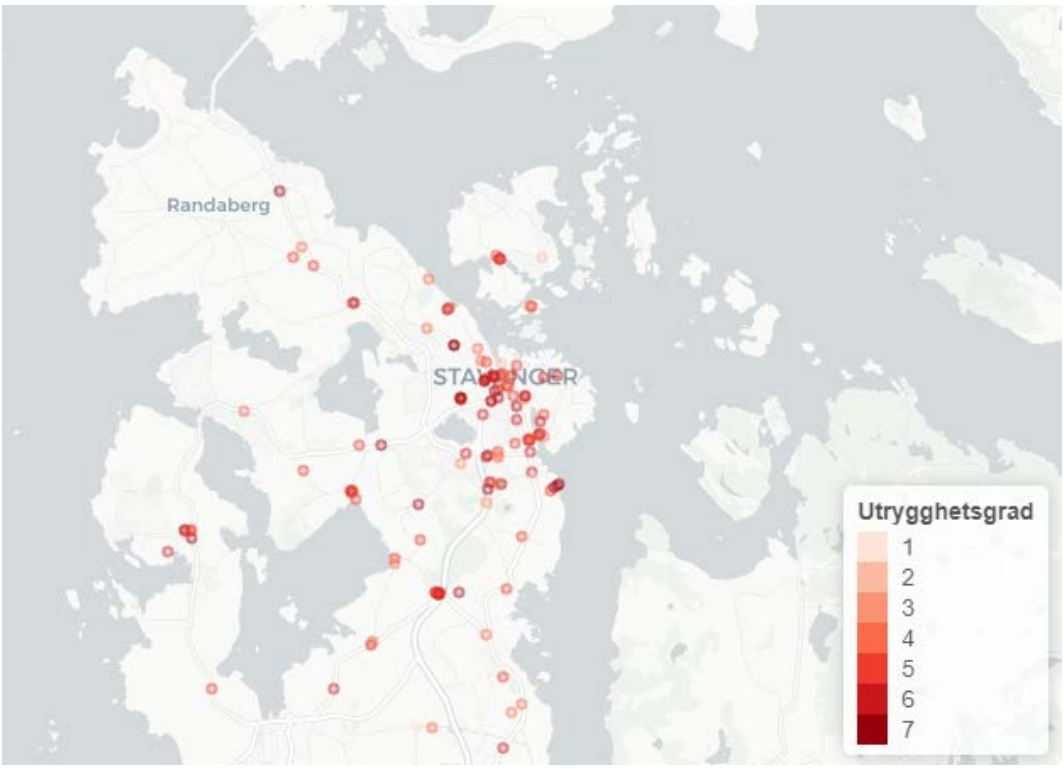


Figure 6.15: Degree of unsafety, Stavanger[21]. Bicycle Survey 2017.

[21] Utrygghetsgrad = Degree of unsafety.

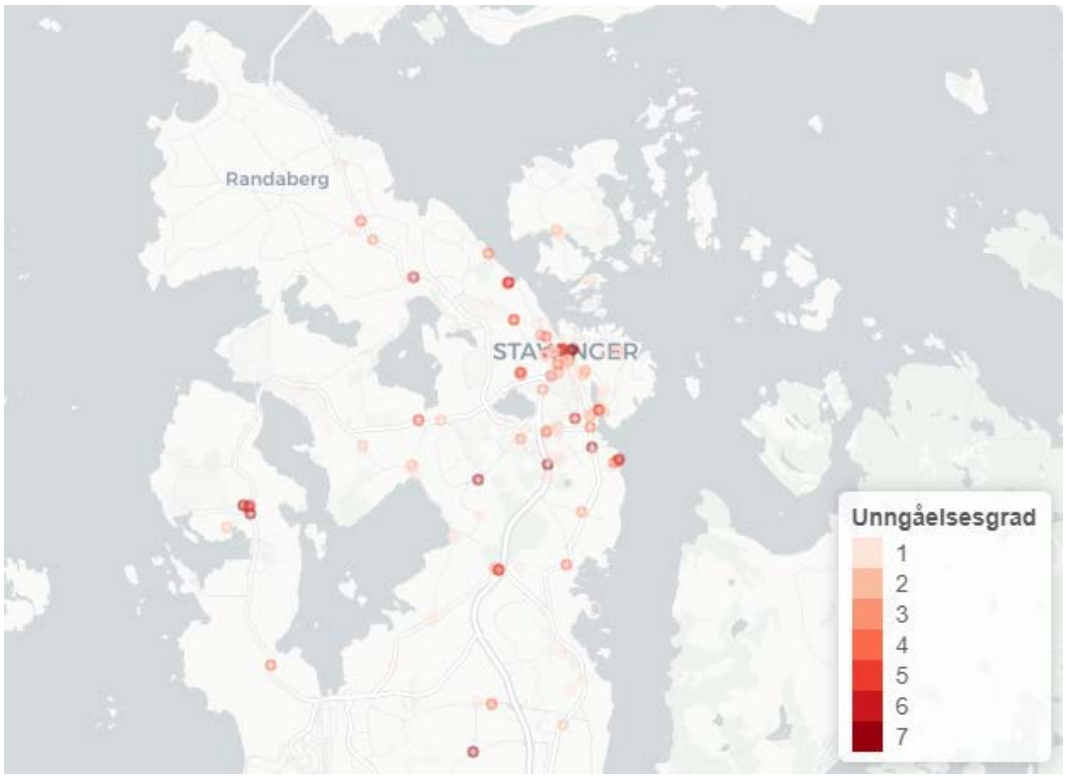


Figure 6.16: Degree of avoidance, Stavanger[22]. Bicycle Survey 2017.

Many of the problematic areas have quite a high score on the unsafety scale (Figure 6.15). However, the level of avoidance is mostly quite low (Figure 6.16). The exception is Kongsgata, on the east side of Breiavatnet, which has a high degree of avoidance.

The following map (Figure 6.17) shows the linear segments in Stavanger which were regarded as uncomfortable or difficult to cycle. The answers are indicated on a scale from 1 to 7. Compared to Bergen and Oslo relative few stretches were indicated. Compared to other cities the road section most indicated, Hinnasvingene, is located quite far out of the city centre as shown on the map below.

[22] Unngåelsesgrad = Degree of avoidance.

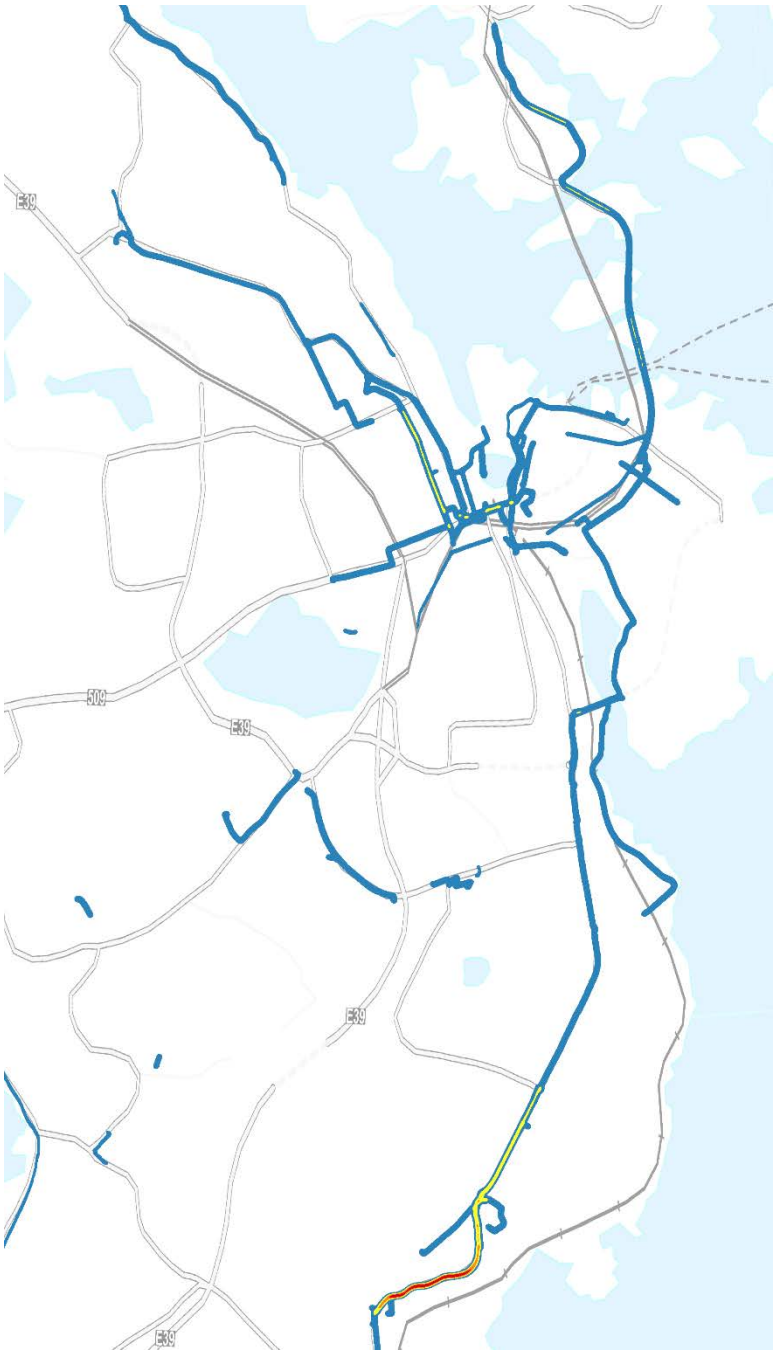


Figure 6.17: Problematic linear sections, Stavanger[14]. Bicycle Survey 2017.

On these selections, the respondents have also indicated how unsafe they feel (Figure 6.18), and to what degree they avoided this place (Figure 6.19). The latter two answers are indicated on a scale from 1 to 7. Here areas nearer to the city centre are marked more often as unsafe or avoided.

Main stretches which are indicated with a high grade of unsafety are the FV435 road connecting several islands on the east of the centre, and Møllegate, Løkkeveien, Arne Rettedalsgate and Haakon VIIs gate leading into the city centre. The stretches which people report to avoid correlate with these.

Figure 6.18: Degree of unsafety at linear sections, Stavanger[14]. Bicycle Survey 2017.

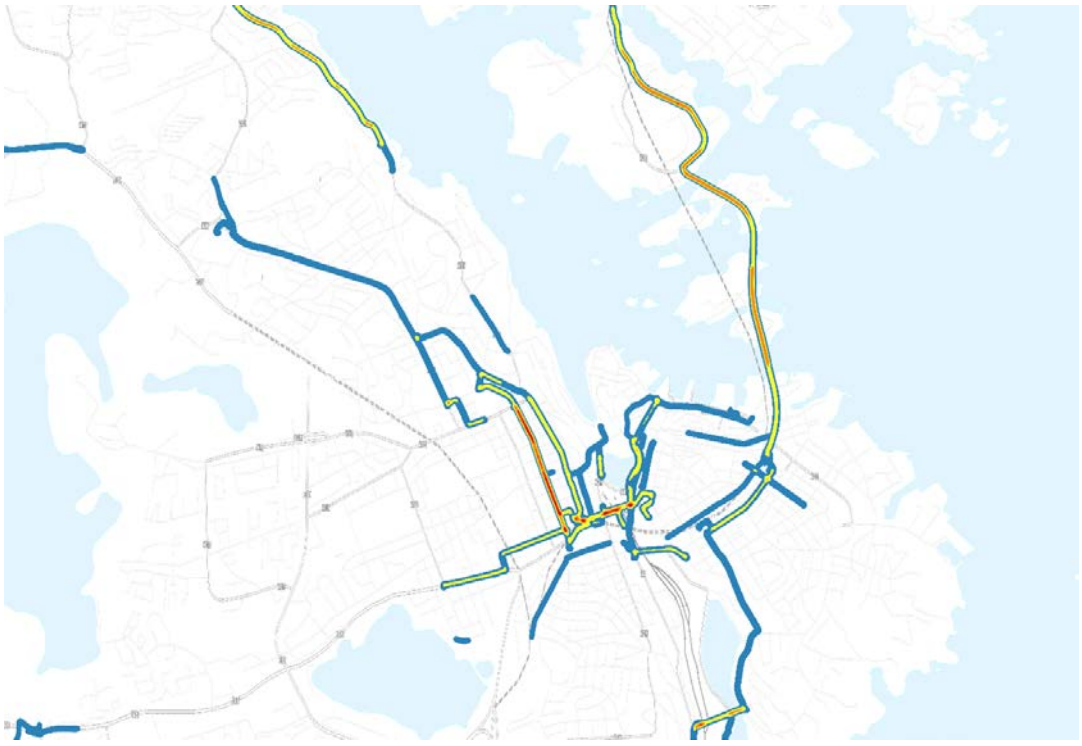


Figure 6.19: Degree of avoidance at linear sections, Stavanger[14]. Bicycle Survey 2017.

7 Trondheim

7.1 General cycling behaviour in Trondheim

7.1.1 Cycling distances

The figure below shows the distance to work for car users and cyclists in Trondheim.

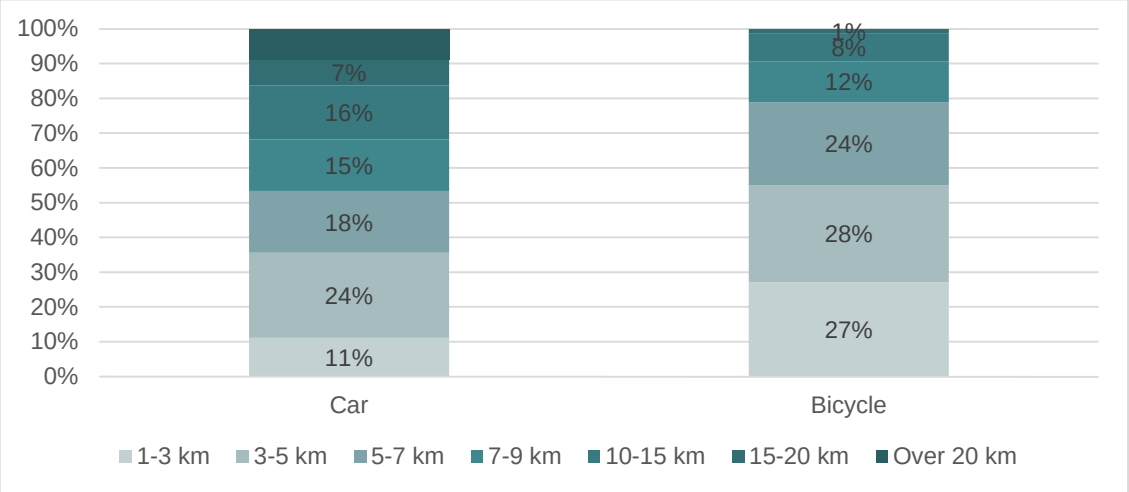


Figure 7.1: Distance to work/school for car drivers and cyclists[23]. Bicycle Survey 2017.

Trondheim is characterized by short distances, both among cyclists and car users. Almost 40 percent of the car users live within five km from their work place, and just 16 percent live farther than 15 km from their work place. Among cyclists the distances are even shorter, and only nine percent have a longer distance than ten km to work.

7.1.2 Time of cycling

The following figures show the days and hours of the day the when the app users conducted their cycling trips (Figure 7.2, Figure 7.3, Figure 7.4).

[23] N: Car=135, Bicycle=568.

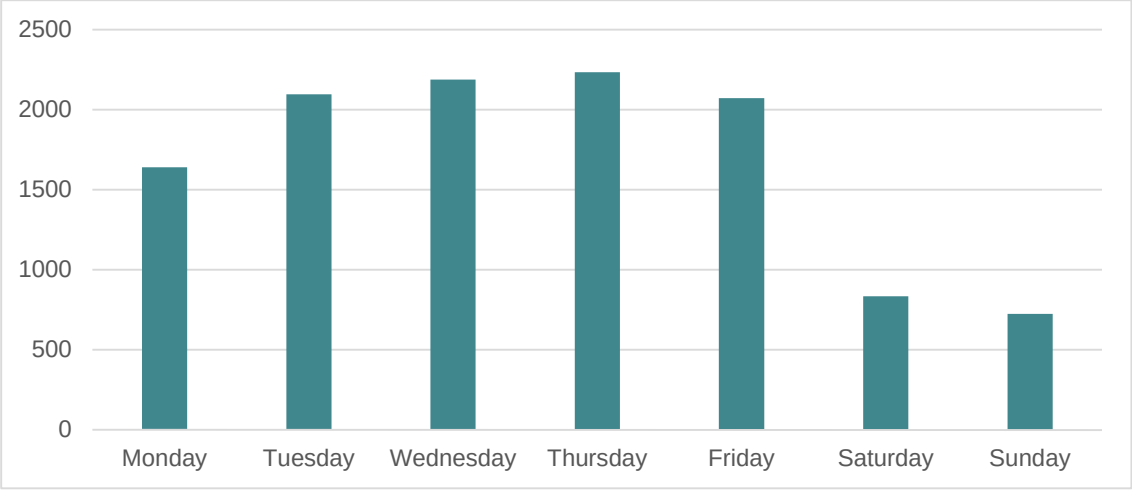


Figure 7.2: Registered cycle trips per day of the week (N=11786). Sense.Dat 2017.

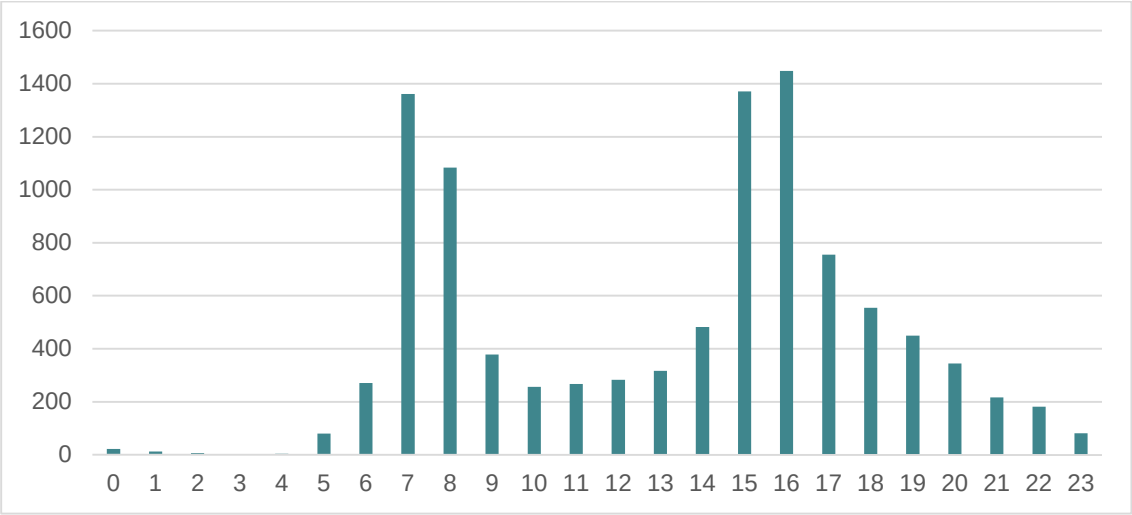


Figure 7.3: Registered cycle trips per hour (Monday-Friday) (N=10229). Sense.Dat 2017.

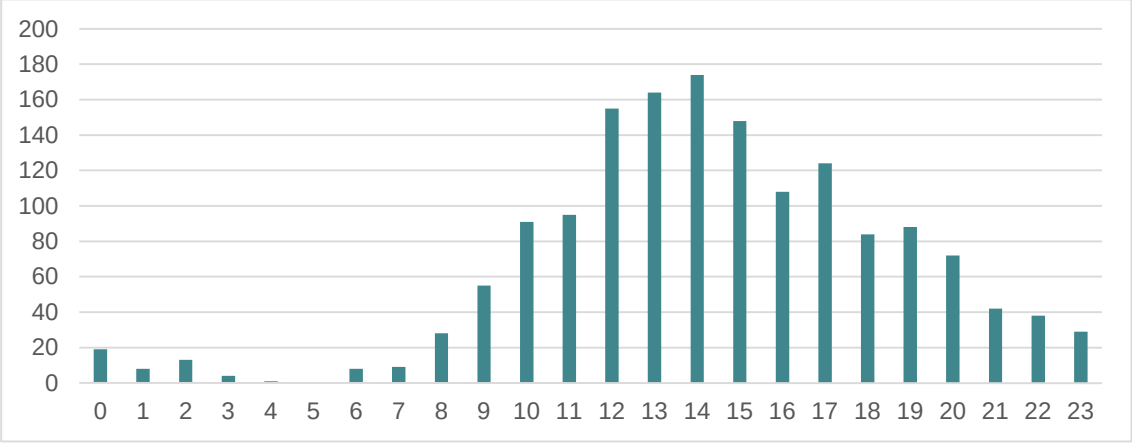


Figure 7.4: Registered cycle trips per hour (weekends) (N=1557). Sense.Dat 2017.

The majority of the cycling trips are done during the weekdays, and on these days, cycling is concentrated in the morning and afternoon.

7.2 Demographics

7.2.1 Bicycle survey

The following figures present the bicycle share among different age groups and among men and women in Trondheim.

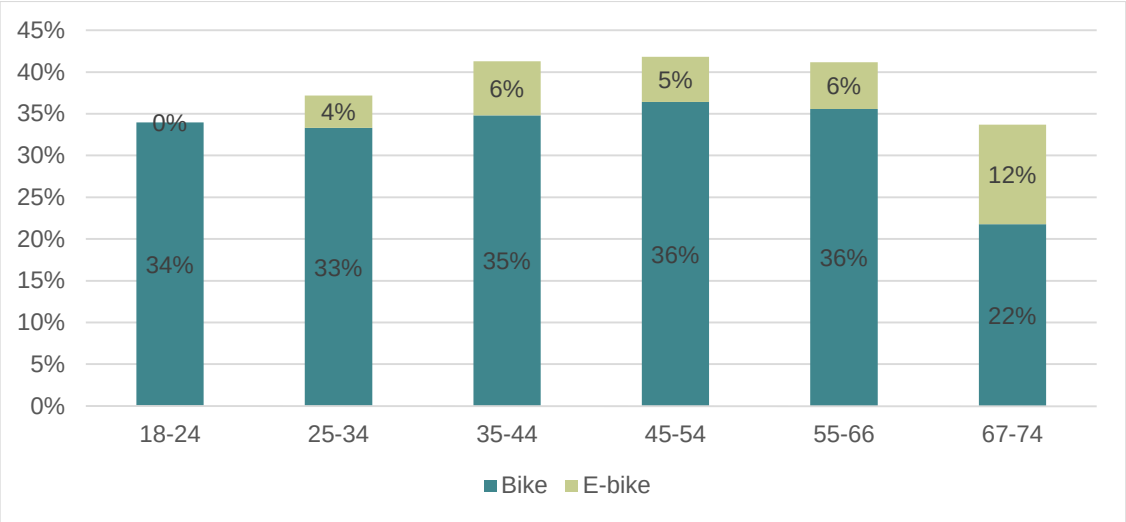


Figure 7.5: Bike share (regular bike and e-bike) by age, based on kilometres travelled (N=646). Bicycle Survey .2017

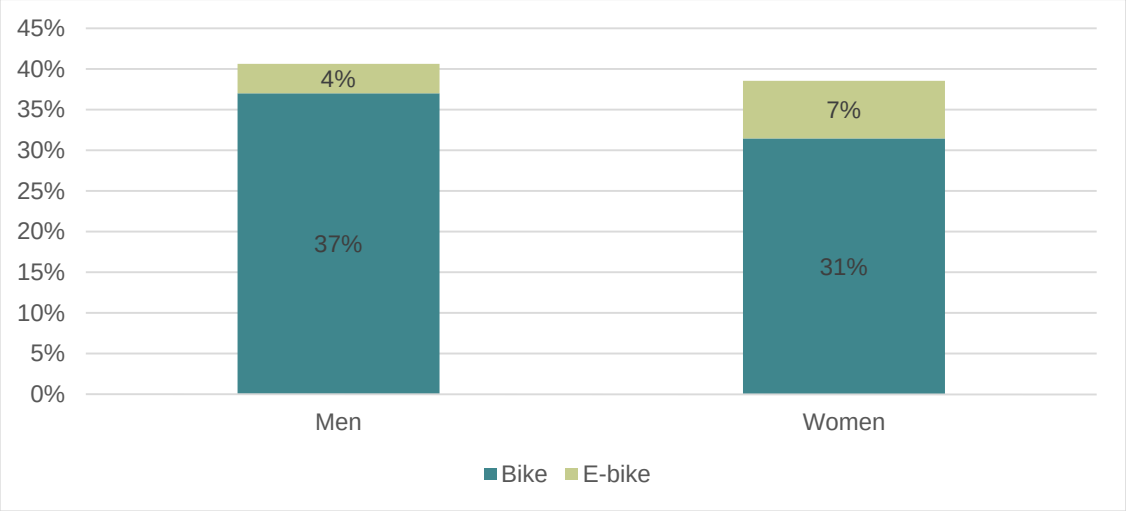


Figure 7.6: Bike share (regular bike and e-bike) by gender, based on kilometres travelled (N=645). Bicycle Survey 2017.

The bicycle share is quite even among the age groups. The oldest respondents, age 67 to 74 years, have a higher share of e-bike use than the rest. The difference between men and women on total cycling share is not significant. However, women have a significantly higher e-bike share than men.

The following figures show that cycling to and from work is the most common in Trondheim, and that men cycle more for exercise and recreational purposes than women (Figure 7.7, Figure 7.8, Figure 7.9).

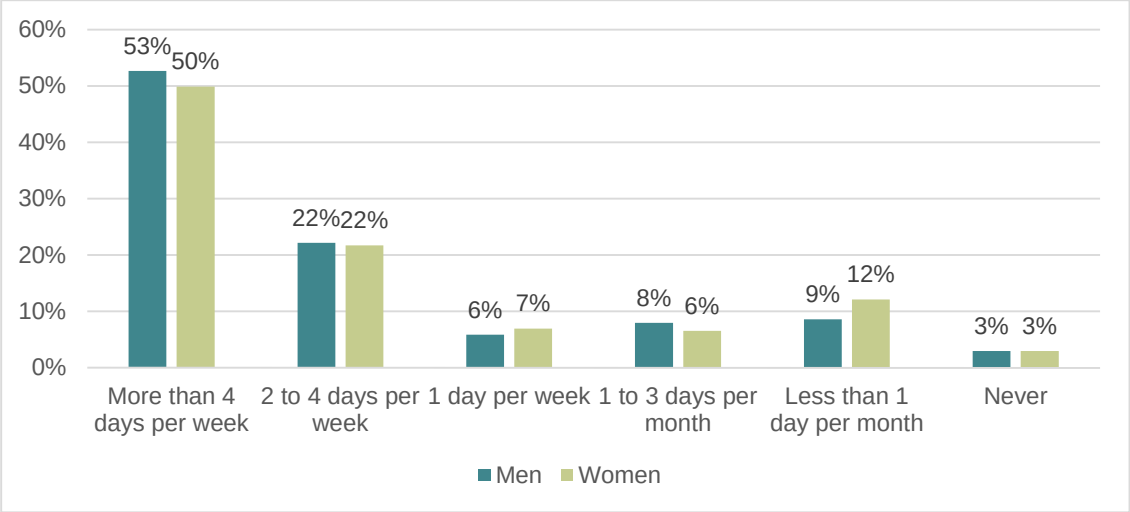


Figure 7.7: "How often do you cycle to and from work/school at this time of the year?" By gender (N=962). Bicycle Survey 2017.

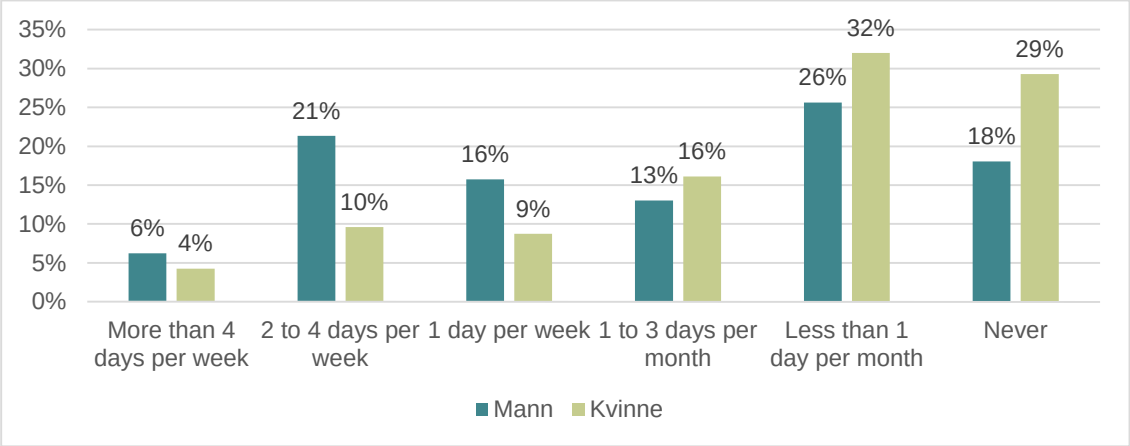


Figure 7.8: "How often do you cycle for exercise purposes at this time of the year?" By gender (N=962). Bicycle Survey 2017.

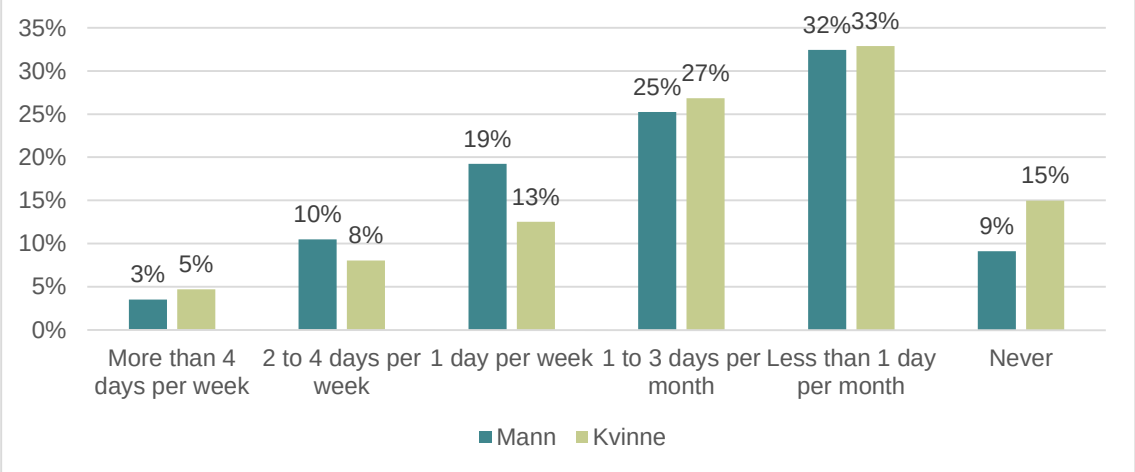


Figure 7.9: "How often do you cycle for recreational purposes at this time of the year?" By gender (N=962). Bicycle Survey 2017.

7.3 Route choice and speed

The following maps (Figure 7.10, Figure 7.11) show the cycling pattern in Trondheim. Into the city centre, most cycling takes place along Elgsetergate from the south, along Kongens gate from the west and across Bakke Bru from the east.

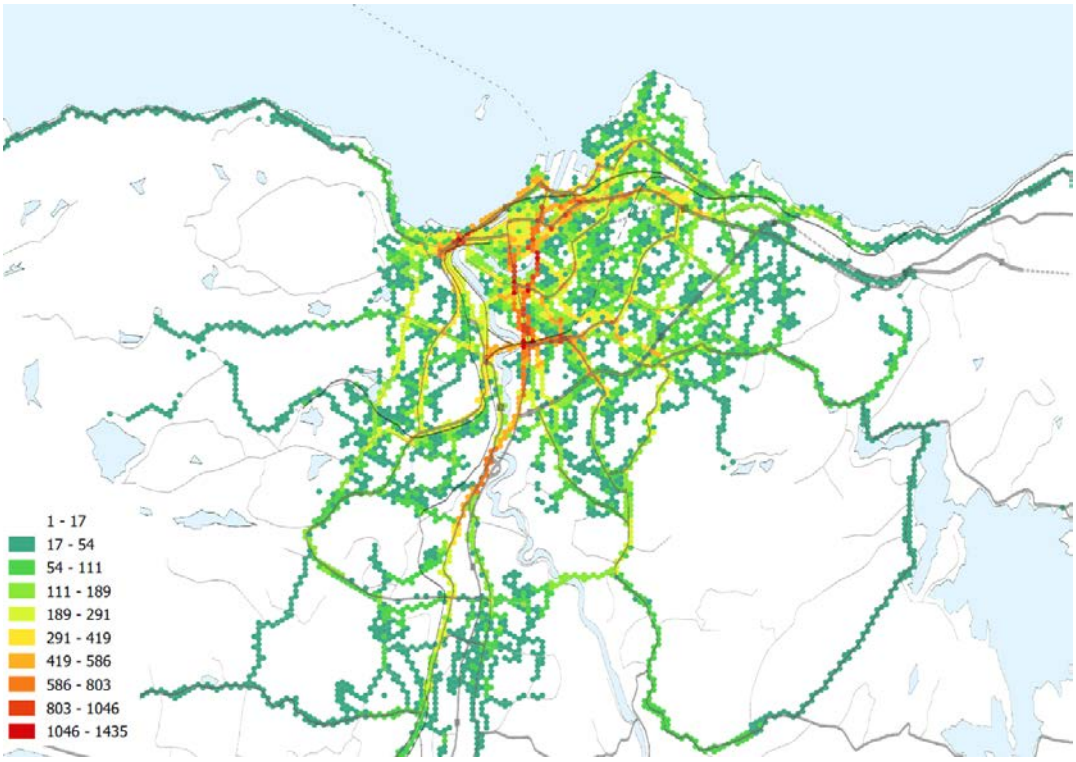


Figure 7.10: Cycling pattern, Trondheim. Number of trips registered in the data collection period. Sense.Dat 2017.

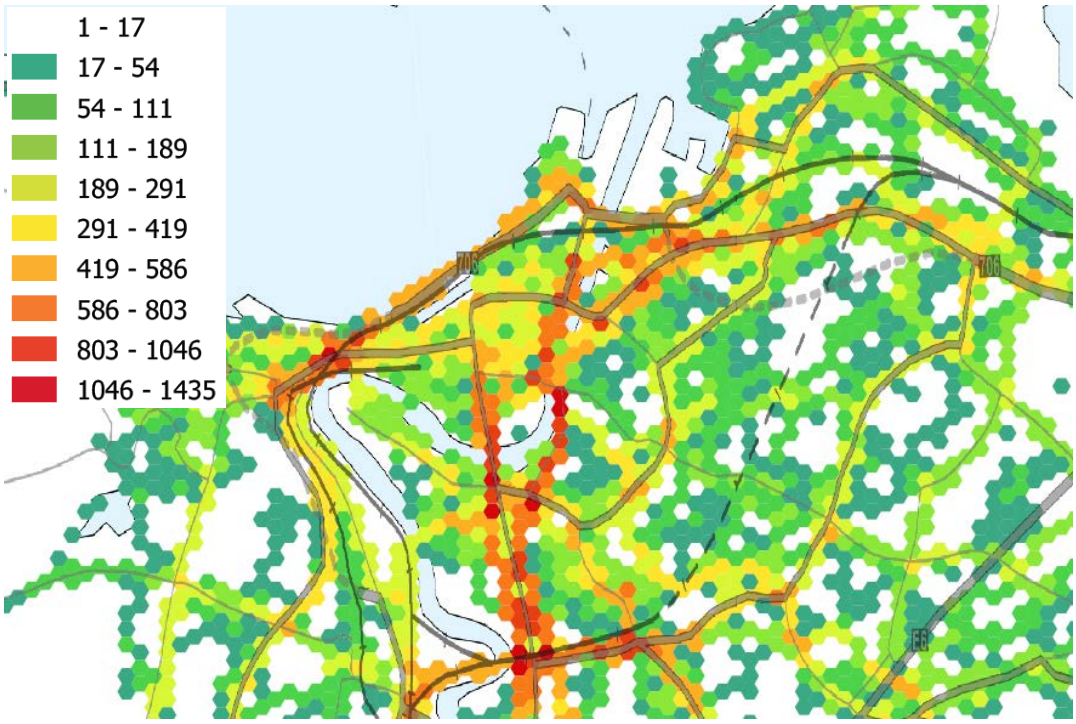


Figure 7.11: Cycling pattern, central Trondheim. Number of trips registered in the data collection period. Sense.Dat 2017.

The following figures show that cycling trips done with regular bike generally have a lower speed than trips with e-bikes (Figure 7.12, Figure 7.13).

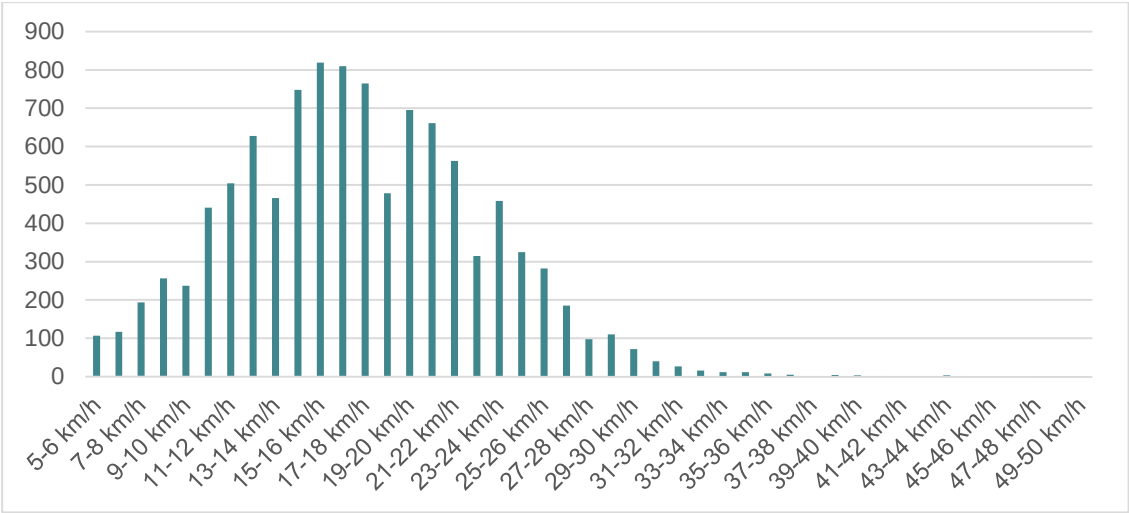


Figure 7.12: Distribution of cycling trips per average speed, regular bicycle. Number of trips (N=10470). Sense.Dat 2017.

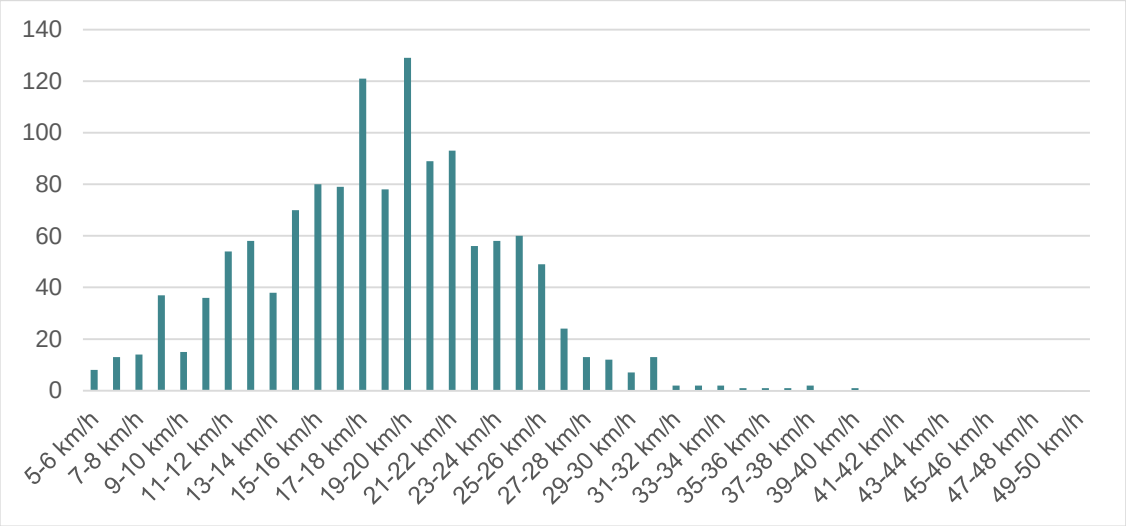


Figure 7.13: Distribution of cycling trips per average speed, e-bike. Number of trips (N=1316). Sense.Dat 2017.

Our regression analysis shows the same pattern (Appendix 3, Speed Trondheim). E-bike users cycle on average 1,1 km/h faster than others, when we control for gender and age. Men also cycle 1,3 km/h faster than women on average.

7.4 Experiences of cycling infrastructure

The table below shows how the respondents in Trondheim answer on questions related to satisfaction for the cycling conditions in their city (Table 5.1). The answers were given on a 7 point scale. Where 7 is very satisfied and 1 is very unsatisfied.

On most of the questions on satisfaction, Trondheim has a more positive score than the other cities (Table 7.1).

Table 7.1: Cyclists' satisfaction, Trondheim[24]. Bicycle Survey 2017.

		Average	Standard deviation	N
To what extent are you satisfied with…	your city as a cycling city?	4.8	1.4	815
	the extent of cycling paths?	4.7	1.4	815
	the quality of cycling paths?	4.5	1.5	815
The last time you cycled, all in all,	how did you perceive the noise conditions?	3.9	1.6	400
	how did you perceive the air pollution?	3.7	1.6	400
	how did you perceive the number of cars?	3.5	1.5	400
	how did you perceive the speed of motorized vehicles	3.7	1.5	400
	how did you perceive interaction with other road users?	3.7	1.5	400
	how safe did you feel as a cyclist?	5.0	1.3	400

A group of respondents were asked if they had specific areas they regarded as problematic. 189 repondents have marked one or more areas on the map. The areas that most respondents have marked as problematic in Trondheim are found in and around the

[24] On a scale from 1 (very dissatisfied/very problematic) to 7 (very satisfied/unproblematic)

Midtbyen borough in the inner city (Figure 7.14). We find clusters of markings on the bridges and roads leading into Midtbyen. The comments indicate that the bicycle infrastructure is of low quality, and also that there are some conflicts between cyclists and both cars and pedestrians.

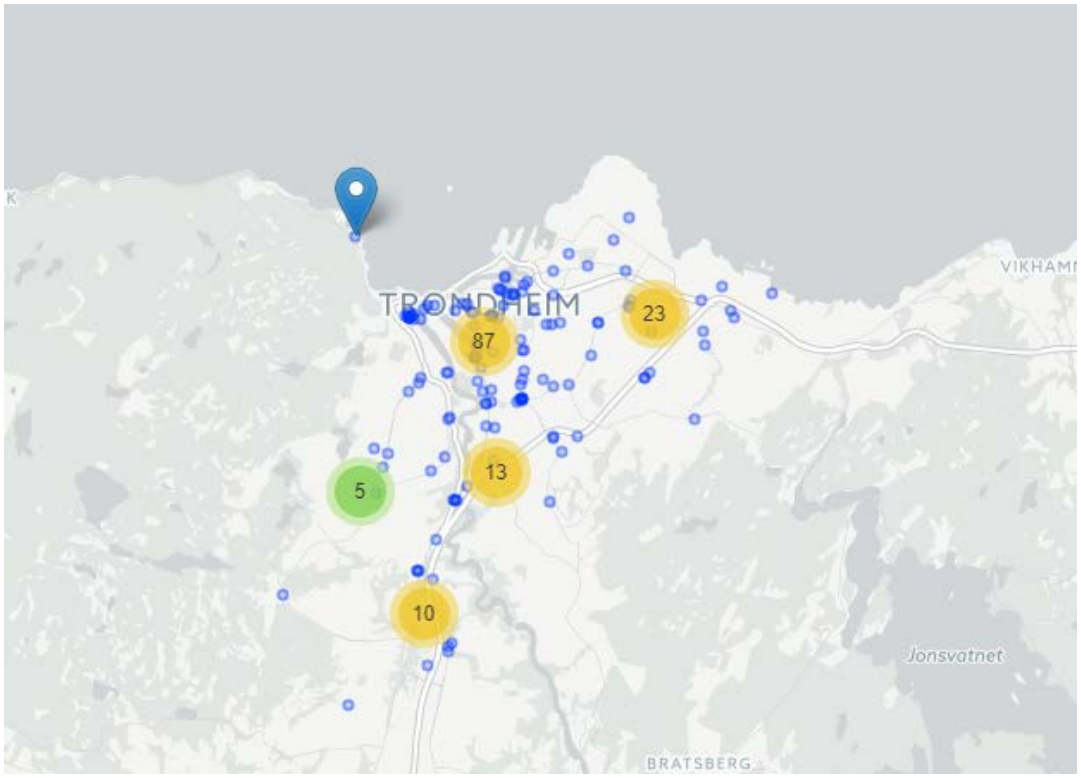


Figure 7.14: Problematic points, Trondheim. Numbers indicate clusters of points. Bicycle Survey 2017.

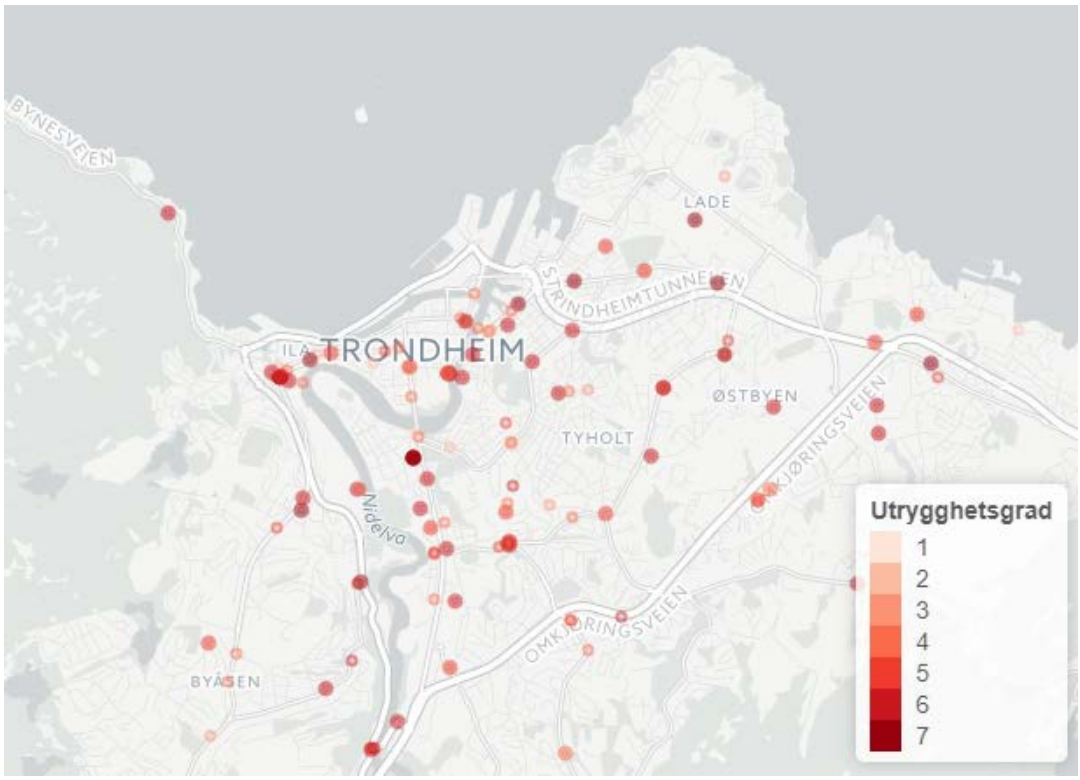


Figure 7.15: Degree of unsafety points, Trondheim[25]. Bicycle Survey 2017.

[25] Utrygghetsgrad = Degree of unsafety.

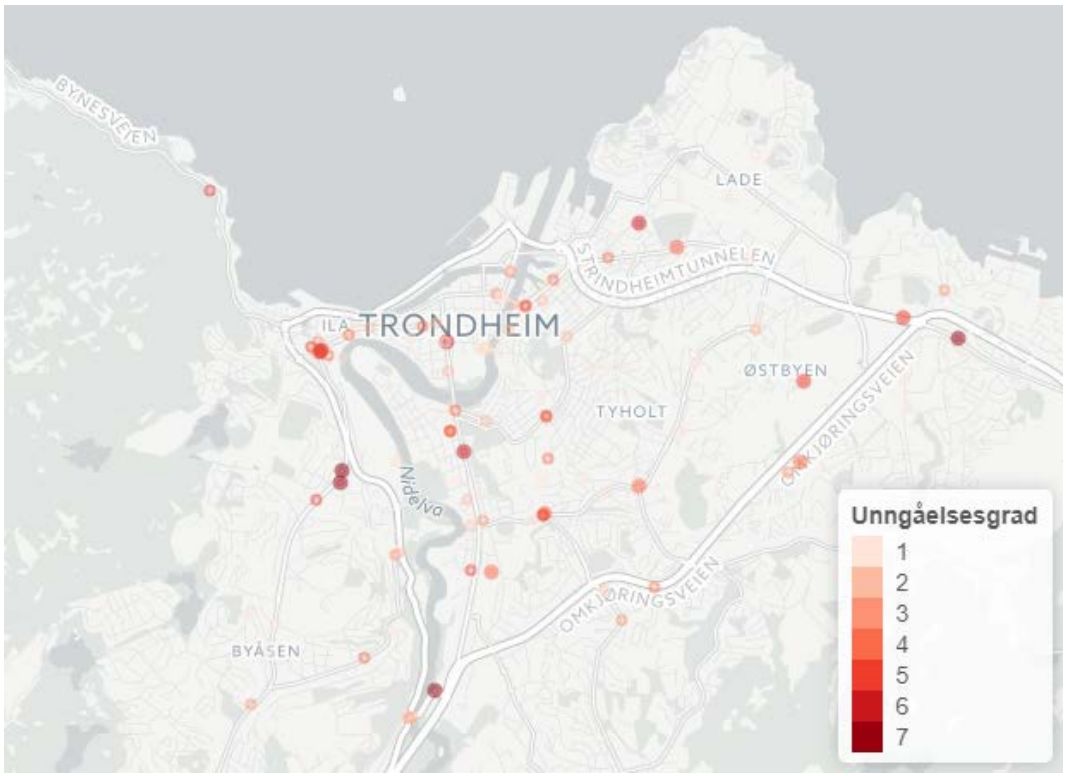


Figure 7.16: Degree of avoidance point, Trondheim[26]. Bicycle Survey 2017.

On the bridges on east side of the city centre, Bakke bru and Gamle bybru, cyclists claim they feel quite unsafe. At the same time, they don't seem to avoid these places.

The following map (Figure 7.17) shows the linear segments in Trondheim, which were regarded as uncomfortable or difficult to cycle. On these selections, the respondents have also indicated how unsafe they feel (Figure 7.18), and to what degree they avoided this place (Figure 7.19). The latter two answers are indicated on a scale from 1 to 7. Compared to other cities, the stretches indicated are concentrated on relatively few stretches.

[26] Unngåelsesgrad = Degree of avoidance.

Figure 7.17: Problematic linear sections, Trondheim[14]. Bicycle Survey 2017.

Figure 7.18: Degree of unsafety at linear sections, Trondheim[14]. Bicycle Survey 2017.

Figure 7.19: Degree of avoidance at linear sections, Trondheim[14]. Bicycle Survey 2017.

When looking at the indicated linear segments, Byåsveien and Bøckmans veg, both west of the centre, and Olav Tryggvasons gate are among the stretches most often marked. Also Innherredsveien on the eastside is often marked. The first two stretches, Byåsveien and Bøckmans veg, are also the stretches where cyclists felt most unsafe and which they reportedly avoided to a large extent.

8 Comparing the four case cities

We have seen that the cycling share varies in the four largest cities in Norway, and this remains a consistent finding among the different data sources. In the NTS, we find that Bergen has the lowest cycling share (four percent), while the cycling share is highest in Trondheim (nine percent). We assume that this is a description of the actual behaviour in those cities.

As expected, the cycling share is considerably higher in the Bicycle Survey 2017: Trondheim is on top with 39 percent, and Stavanger has the lowest share with 34 percent. In the app registrations, the cycling share is quite even between the cities, from 19 percent in Stavanger to 22 percent in both Oslo and Bergen. We expect a higher cycling share from our survey respondents and app users, as they have been recruited from a pool of individuals that have insured their bicycles and because the data collection is carried out during summer months, when cycling levels are higher.

Using the representative sample from the NTS, we can identify the differences in the amount of cycling and the share between different modes. To explain the differences, we use the other data sources, the Bicycle Survey 2017 and the Sense.Dat data, which give a more detailed picture of the cycling behaviour.

A possible explanation for the differences in cycling can be the distances between home and work. As we have seen, most of the cycling is conducted to travel to and from work, and travel distance varies greatly between car users and cyclists.

The figure below shows the length of the cycling trips from the app registrations.

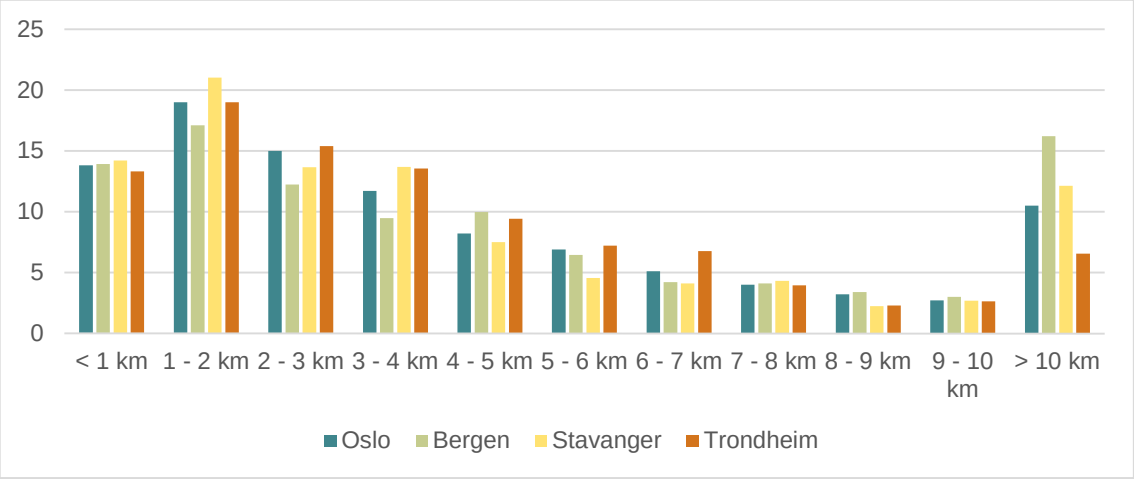


Figure 8.1: Share of trips per distance. Sense.Dat 2017.

In Bergen, over 15 percent of the trips are longer than 10 km. While in Trondheim, only six percent of the trips are of this length. This could be because cycling is being used for different purposes in the two cities, with more cycling for exercise in Bergen. The geographical delineation of the case cities in our dataset could also be affecting this finding: Bergen municipality includes more outlying suburbs than for example Oslo, as described in 5.1.1.

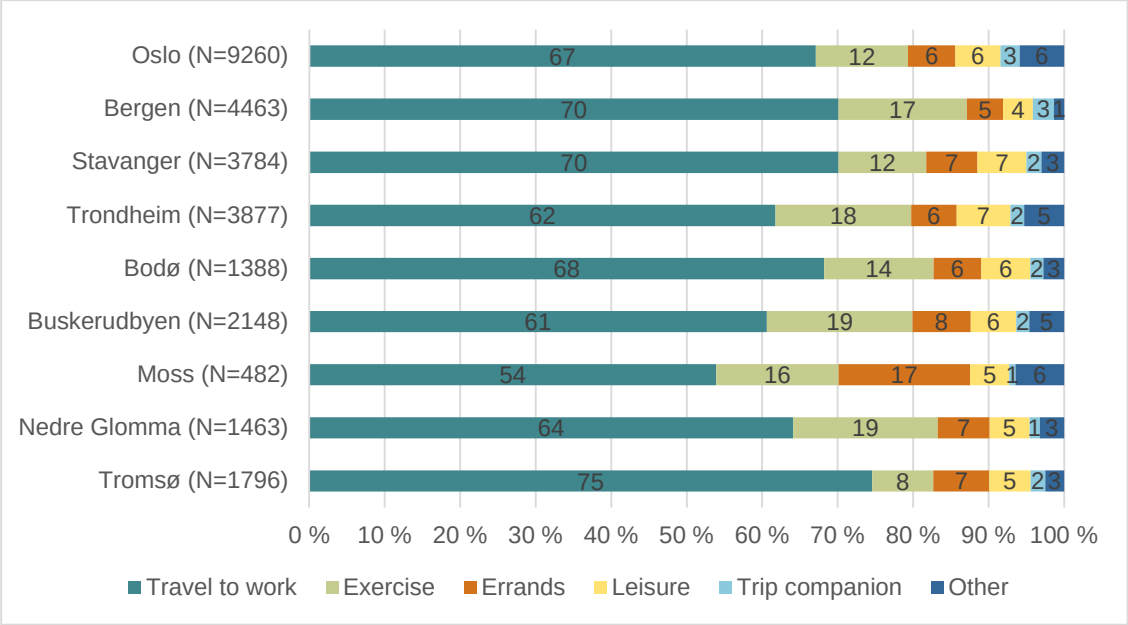


Figure 8.2: Share of travel purposes, of total km cycled last day. Numbers in percent. Bicycle Survey 2017.

In the figure above, the purposes of cycling trips are shown. The results show that the majority of cycling is carried out to travel to and from work or school. In Bergen and Oslo, as much as 70 percent of cycled kilometres are conducted for this purpose. Exercise is the second most common cycling purpose, and this purpose is significantly more common in Bergen (17 percent) and Trondheim (18 percent), than in Oslo and Stavanger (both 12 percent).

Another explanation for the differences in cycling, could be the cycling conditions and cyclists' disadvantages. The results from these questions are shown in Figure 8.3 and Figure 8.4.

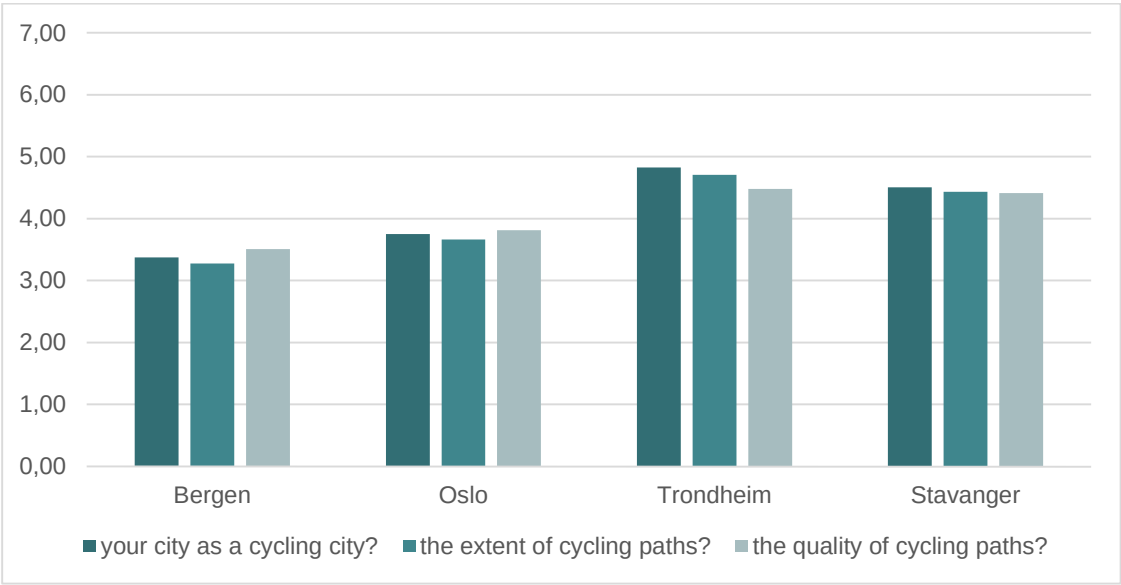


Figure 8.3: "To what extent are you satisfied with…"[27]. Bicycle Survey 2017.

[27] On a scale from 1 «very dissatisfied» to 8 «very satisfied».

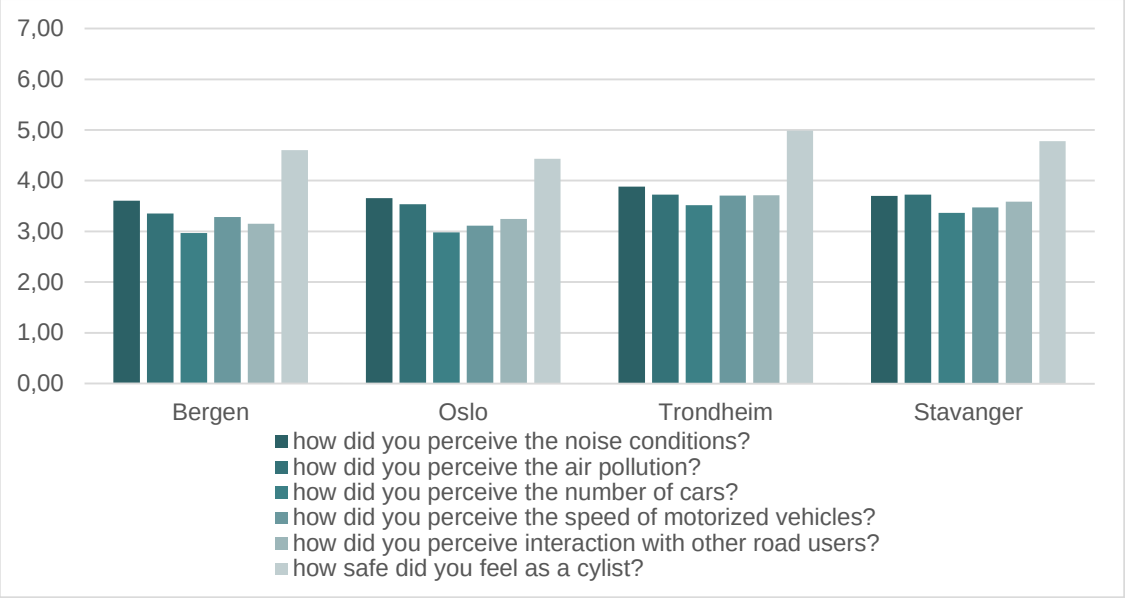


Figure 8.4: "The last time you cycled..."[28]. Bicycle Survey 2017.

On the questions about cycling conditions and problematic factors for cyclists, Trondheim has the highest average score (i.e. less problematic), while the score is lowest in Bergen and Oslo. Respondents in Trondheim are especially satisfied with the extent and quality of cycling paths, while respondents in Bergen are less satisfied with these conditions. This may very well be a result of different prioritization of cycling in city's planning processes.

Experience

In the different cities, respondents answered the question if they have cycled on streets or road crossings where they experienced uncomfort or difficulty.

The number of cyclists answering that they do perceive an area as problematic to cycle differs quite substantially between the cities (Figure 8.5). In Bergen and Oslo, 72 percent and 71 percent of cyclists answer that they perceive areas as uncomfortable or difficult to cycle. On the other hand, 55 percent and 53 percent in Stavanger and Trondheim answer that they know such areas.

[28] On a scale from 1 «very proclematic» to 7 «very unproblematic».

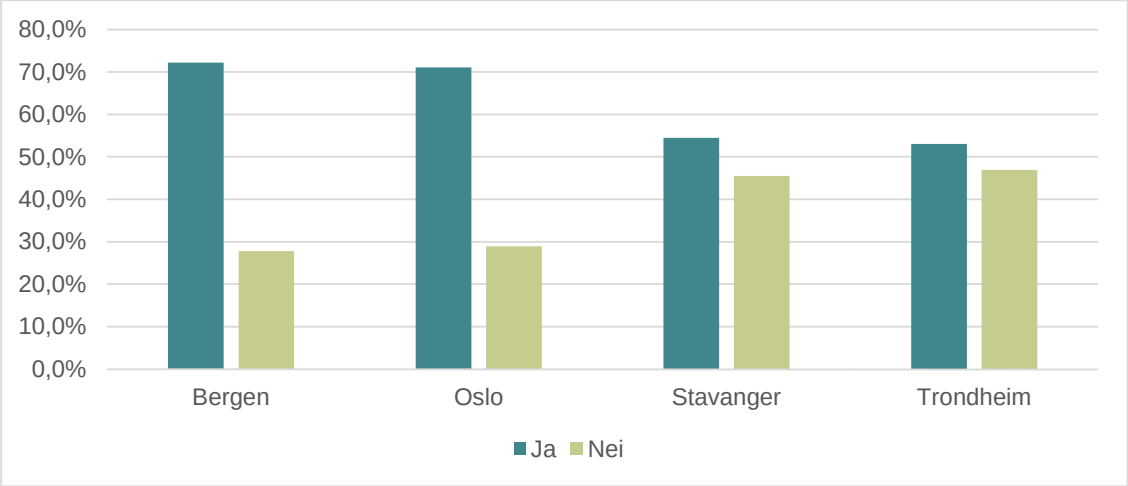


Figure 8.5: "Do you know of any problematic areas to cycle?"[29]. Bicycle Survey 2017.

Of the people indicating a problematic area, respondents in Oslo, Bergen and Stavanger feel themselves most unsafe at these indicated places, while cyclists in Trondheim feel safest.

Table 8.1: Indicated feeling of unsafety at the indicated areas (marked by respondents)[29]. Bicycle Survey 2017.

		Bergen	Oslo	Stavanger	Trondheim
How safe do you feel cycling here?	Very safe 1	1 %	2 %	2 %	5 %
	2	5 %	3 %	3 %	5 %
	3	6 %	7 %	7 %	7 %
	4	19 %	15 %	21 %	18 %
	5	28 %	27 %	23 %	28 %
	6	25 %	27 %	25 %	27 %
	Very unsafe 7	17 %	18 %	20 %	10 %
Total		**100 %**	**100 %**	**100 %**	**100 %**

The respondents have also answered the reasons why they feel unsafe (Figure 8-6), and the most common comments are the bad infrastructure solution, number of cars, narrow space, and the speed of cars. The "other" option was also selected quite often. Here the respondents had the possibility to leave a comment. Tramlines, busses and bus stops, roadwork, asphalt conditions and winter maintenance were among the aspects pointed out here.

[29] N: Bergen=399, Oslo=1000, Stavanger=433, Trondheim=471.

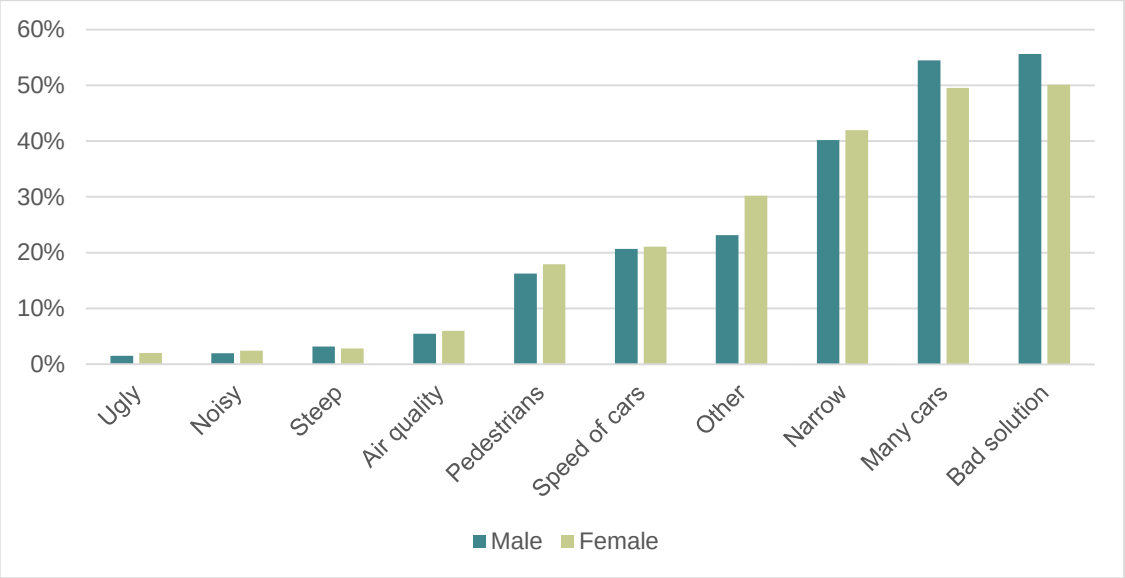


Figure 8.6: "What are the most important reasons for this place being problematic according to you?" (among all respondents). Bicycle Survey 2017.

9 Discussions and conclusions

This study has attempted to elaborate on cycling in the four biggest cities in Norway – Oslo, Bergen, Stavanger and Trondheim. Data from multiple sources have been used to this end. When combining these, it has been important to keep in mind the specific answers which could be derived from each dataset. We observe that there are differences in the modal share of cycling in the cities, with Trondheim having the highest and Bergen the lowest share of cycling. In both these cities, our study area includes most of the major suburbs. The topography could be an explanation. However, both Bergen and Trondheim are quite hilly, with large variations in cycling share.

One difference, however, could be that Trondheim has focused more on cycling strategies, while in Bergen, planners have worked more with public transport. Trondheim has a recent Strategy for cycling (Miljøpakken Trondheim 2014), with a goal to develop a continuous network of cycling paths in the city. Bergen, on the other hand, has a major focus on developing light rail lines connecting the suburbs to the city centre (Skyss 2018).

This assumption is supported by the response on safety and rating of the cycling friendliness of the city in our survey. Cyclists in Trondheim are slightly more satisfied with their cycling infrastructure and feel less unsafe than cyclists in the other cities. In addition, cyclists in Bergen and Oslo feel more unsafe on streets in the inner city, where most of the cycling takes place, compared to cyclists in Trondheim and Stavanger.

We have also asked questions on the purpose of cycling trips. By far, most cycling trips are taken as commute trips to and from work or school. This observation has implications on prioritizing areas when planning and designing cycling infrastructure. Also, training or exercise is an important purpose, especially in Bergen and Trondheim.

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Appendices

Appendix 1: Bicycle Survey 2017 questionnaire

ID:tidspunkt

startdato	Dato for oppstart av intervjuet
◆ **range:***	
◆ **afilla:**sys_date c Fylles inn automatisk	☐☐☐☐☐☐☐☐ 1

starttid	Tid for oppstart av intervjuet
◆ **range:***	
◆ **afilla:**sys_timenowf c Fylles inn automatisk	☐☐☐☐☐☐ 1

koblingsnokkel	**Identifikasjon** **sms_Id c** **denne skal være sjult**
◆ **range:***	
	Open

sms_sted	**Område utvalg - lages ut fra Falck.** **sms_sted c** **denne skal være skjult, poeng hvis rekruttering til lotteri skal være kun fra Oslo. Eventuelt basere på postnummer som de selv oppgir. Bruke denne for filtering for hvem som skal få spørsmål om å være med. Med mindre man vil sjekke interessen over hele landet.**
◆ **range:***	
sms_sted c	Open

ID:rekruttering

Say
Helt først,

app_rekrut	**TØI skal i mai og juni samle inn reisedata fra et utvalg mennesker i Norge ved bruk av mobilapplikasjonen Sense.DAT, en app som automatisk registerer reisene dine. (lenke åpnes i ny fane) Du vil motta innloggingsinformasjon fra oss, og kan selv følge med på reisene dine. Dataene vil kun bli brukt til forskningsformål, uten kommersiell utnyttelse. Er dette noe du kan tenke deg å være med på?**
◆ **range:***	
Ja	○ 1
Nei, jeg ønsker kun å svare på spørsmålene	○ 2

ID:bakgrunn

postnr	**Fyll inn ditt postnummer**
◆ **range:***	
Skriv inn her	Open

jobb	**Hva er din hovedaktivitet?**
◆ **range:***	
Yrkesaktiv, inntektsgivende arbeid	○ 1
Går på skole, studerer	○ 2
Pensjonist, AFP el.l.	○ 3
Langvarig sykmeldt eller ufør	○ 4
Arbeidsledig, uten inntektsgivende arbeid	○ 5
Annet	○ 6
Ønsker ikke svare	○ 7

ID:tilgang_reisem

Tilgang	**Eier du eller har du tilgang til ...**				
◆ **range:***					
	Eier ikke	Eier ikke, men har tilgang	Eier, men sjelden tilgang	Eier, og har god tilgang	
	1	2	3	4	
Bil	○	○	○	○	1
MC/Moped	○	○	○	○	2
Elsykkel	○	○	○	○	3
Vanlig sykkel	○	○	○	○	4

ID:sykkelbruk_sisteaar

SykUka	**Hvor ofte sykler du på denne tiden av året?**						
◆ **range:***							
	Mer enn 4 dager i uka	2 til 4 dager i uka	1 dag i uka	1 til 3 dager i måneden	Sjeldnere	Aldri	
	1	2	3	4	5	6	
Sykling for transport	○	○	○	○	○	○	1
Sykling som trening	○	○	○	○	○	○	2
Sykling som rekreasjon	○	○	○	○	○	○	3

sykl_aaret	**Sykler du hele året?**	
◆ **filter:**\SykUka.a.1=1;2;3;4|\SykUka.a.2=1;2;3;4|\SykUka.a.3=1;2;3;4 ◆ **range:***		
Ja	○	1
Nei	○	2

ID:ikke_syklet_hvorfor
filter:\SykUka.a.1=5;6&\SykUka.a.2=5;6&\SykUka.a.3=5;6

ikke_syklet	**Et av formålene med denne undersøkelsen er å lære mer om hvorfor noen velger å sykle, og andre ikke. Er noen av følgende faktorer av betydning for at du ikke sykler?**

- **range:***

	1:Ingen betydning	2	3	4	5:Svært stor betydning	
	1	2	3	4	5	
Jeg har ikke sykkel/sykkelen min er i ustand	○	○	○	○	○	1
Trafikkforholdene i området hvor jeg bor/reiser	○	○	○	○	○	2
Været	○	○	○	○	○	3
Helseproblemer hindrer meg fra å sykle	○	○	○	○	○	4
Jeg føler meg utrygg når jeg sykler	○	○	○	○	○	5
Jeg orker ikke	○	○	○	○	○	6
Jeg liker ikke å sykle	○	○	○	○	○	7
Jeg har ikke tid	○	○	○	○	○	8

ID:arbeidsreise_alle

AntKm	**Omtrent hvor lang er reiseveien din hjemmefra og til arbeid/skole**	
◆ **filter:**\jobb.a=1;2 ◆ **range:*** 1-3 km	○	1
3-5 km	○	2
5-7 km	○	3
7-9 km	○	4
10-15 km	○	5
15-20 km	○	6
Over 20 km	○	7

VanligJobb	**Hvordan reiser du vanligvis til arbeid/skole på denne tiden av året?** Velg det transportmiddelet du reiser lengst med	
◆ **filter:**\jobb.a=1;2 ◆ **range:*** Bil	○	1
MC/moped	○	2
Sykkel	○	3
Elsykkel	○	4
Gange	○	5
Offentlig transport	○	6
Jeg jobber hjemmefra	○	7
Annet		Open

ID:Sykkel_bakgrunn
filter:\SykUka.a.1=1;2;3;4|\SykUka.a.2=1;2;3;4|\SykUka.a.3=1;2;3;4

type_sykkel.A	**Hva slags sykkel bruker du?** Hvis du bruker flere sykler, merk av for flere:	
◆ **range:***		
Terrengsykkel (off-road)	☐	1
Hybrid	☐	2
Klassisk	☐	3
Leid bysykkel	☐	4
Racer	☐	5
Elsykkel	☐	6
Annen type sykkel	☐	7

type_sykkel.B	**Hvilken av disse typene bruker du mest?** Velg blant syklene du oppgav i forrige spørsmål	
◆ **filter:**\.a=#2:8 ◆ **range:**\.a		
Terrengsykkel (off-road)	○	1
Hybrid	○	2
Klassisk	○	3
Leid bysykkel	○	4
Racer	○	5
Elsykkel	○	6
Annen type sykkel	○	7

sykkel_utstyr_transport	**Merk av for det utstyret du syklet med forrige gang du syklet for transport**	
◆ **filter:**\SykUka.a.1=1;2;3;4;5 ◆ **range:***		
Hjelm	☐	1
Sykkeljakke	☐	2
Sykkelsko	☐	3
Sykkelbukse	☐	4

sykkel_utstyr_transport	Merk av for det utstyret du syklet med forrige gang du syklet for transport	
Annet		☐ 5
◆ **exclusive:**yes Ingen av disse		○ 6

ID:Sykkel_mengde
filter:\SykUka.a.1=1;2;3;4|\SykUka.a.2=1;2;3;4|\SykUka.a.3=1;2;3;4

syklet_sist_uke	Har du syklet i løpet av den siste uka (de 7 siste dagene)?	
◆ **range:***		
Ja		○ 1
Nei		○ 2

km_totaluka	Omtrent hvor langt (i kilometer) syklet du i løpet av de 7 siste dagene for ...	
◆ **filter:**\syklet_sist_uke.a=1 ◆ **range:***		
transport		☐☐☐ 1
trening/rekreasjon		☐☐☐ 2

ID:Dagbok

Say
Vi ønsker å vite hvordan du beveget deg utenfor boligen din i går.

ReiseDagen	Tenk på alle slags reiser du tok, uavhengig av lengde, varighet eller formål. Ikke glem å ta med korte gang- eller sykkelturer Legg merke til at en reise kan bestå av flere TURER. Hver gang du stopper for å utføre et gjøremål, regner vi en tur for avsluttet. Som et eksempel, en reise hjemmefra via barnehage til jobb er to turer. Tur 1 har reiseformål "Hente-/bringe-/følgereise". Tur 2 har reiseformål "Reise til/fra arbeid". **Hadde du noen reiser utenfor hjemmet i går?**	
◆ **range:***		
Ja		○ 1
Nei		○ 2

Dato_reise	**Hvilken dato var dette?**
◆ **filter:**\ReiseDagen.a=1	
Dato reise	Open

ID:Dagbok1
filter:\ReiseDagen.a=1

Dagbok_2.A

Nå vil vi at du skal gjøre rede for alle turene dine i går
(Formål, reisemiddel, antall kilometer (km) og antall minutter (min))

Husk at hver gang du stopper for å utføre et gjøremål, regner vi en tur for avsluttet.

Turens formål

	Reise til/fra arbeid	Reise til/fra skole	Reise i arbeid	Innkjøp – dagligvarer o.l.	Div ærend - bank/post,	Lege/sykehus, tannlege	Hente-/bringe-/følgereise	Besøk - privat	Fritidsreise - kino, teater, pub	Organiserte fritidsaktiviteter	Trening / mosjon	Luftehund som hovedformål	Lengre reise – hyttetur, ferie	Annet formål	HJEM	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Tur 1	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	1
Tur 2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	2
Tur 3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	3
Tur 4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	4
Tur 5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	5
Tur 6	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	6

Dagbok_2.B

Nå vil vi at du skal gjøre rede for alle turene dine i går
(Formål, reisemiddel, antall kilometer (km) og antall minutter (min))

Husk at hver gang du stopper for å utføre et gjøremål, regner vi en tur for avsluttet.

Transportmiddel

	Til fots hele veien	Sykkel	El-sykkel	Moped	Bil, sjåfør	Bil, passasjer	Kollektivtransport	
	1	2	3	4	5	6	7	
Tur 1	○	○	○	○	○	○	○	1
Tur 2	○	○	○	○	○	○	○	2
Tur 3	○	○	○	○	○	○	○	3
Tur 4	○	○	○	○	○	○	○	4
Tur 5	○	○	○	○	○	○	○	5
Tur 6	○	○	○	○	○	○	○	6

Dagbok_2.C	Nå vil vi at du skal gjøre rede for alle turene dine i går (Formål, reisemiddel, antall kilometer (km) og antall minutter (min)) Husk at hver gang du stopper for å utføre et gjøremål, regner vi en tur for avsluttet. **km**	
Tur 1		☐☐☐ 1
Tur 2		☐☐☐ 2
Tur 3		☐☐☐ 3
Tur 4		☐☐☐ 4
Tur 5		☐☐☐ 5
Tur 6		☐☐☐ 6

Dagbok_2.D	Nå vil vi at du skal gjøre rede for alle turene dine i går (Formål, reisemiddel, antall kilometer (km) og antall minutter (min)) Husk at hver gang du stopper for å utføre et gjøremål, regner vi en tur for avsluttet. **min**	
Tur 1		☐☐☐ 1
Tur 2		☐☐☐ 2
Tur 3		☐☐☐ 3
Tur 4		☐☐☐ 4
Tur 5		☐☐☐ 5
Tur 6		☐☐☐ 6

FlereTurer	**Hadde du flere enn seks turer i går?**	
◆ **filter:**\Dagbok_2.a.6=* ◆ **range:*** Ja		○ 1
Nei		○ 2

D:psykologens_hjorne

intensjon	**Ta stilling til følgende påstander**							
◆ **range:***								
	1: Helt uenig	2	3	4	5	6	7:Helt enig	
	1	2	3	4	5	6	7	
Jeg ønsker å sykle mer (flere km per uke) det neste halve året enn jeg gjør nå	○	○	○	○	○	○	○	1
Jeg ønsker å være mer fysisk aktiv (flere minutter per uke) det neste halve året enn jeg er nå	○	○	○	○	○	○	○	2
Jeg ønsker å kjøre mindre bil det neste halve året enn jeg gjør nå	○	○	○	○	○	○	○	3
Jeg ønsker å gå mer det neste halve året enn jeg gjør nå	○	○	○	○	○	○	○	4

pbc	**Ta stilling til følgende påstander**							
◆ **range:***								
	1: Helt uenig	2	3	4	5	6	7:helt enig	
	1	2	3	4	5	6	7	
◆ **filter:**\intensjon.a.1 =2:7								
Jeg er sikker på at jeg vil klare å sykle mer det neste halve året enn jeg gjør nå	○	○	○	○	○	○	○	1
◆ **filter:**\intensjon.a.2 =2:7								
Jeg er sikker på at jeg vil klare å være mer fysisk aktiv det neste halve året enn jeg er nå	○	○	○	○	○	○	○	2

pbc	**Ta stilling til følgende påstander**							
◆ **filter:**\intensjon.a.3 =2:7 Jeg er sikker på at jeg vil klare å kjøre mindre bil det neste halve året enn jeg gjør nå	○	○	○	○	○	○	○	3
◆ **filter:**\intensjon.a.4 =2:7 Jeg er sikker på at jeg vil klare å gå mer det neste halve året enn jeg gjør nå	○	○	○	○	○	○	○	4

annet	**I hvilken grad er du enig i følgende påstander?**							
◆ **range:***								
	1: Helt uenig	2	3	4	5	6	7: Helt enig	
	1	2	3	4	5	6	7	
Aktivitetsnivået mitt er lavere om vinteren enn om sommeren	○	○	○	○	○	○	○	1
Hvis jeg syklet mer, ville jeg trent mindre på andre måter	○	○	○	○	○	○	○	2
◆ **filter:**\SykUka.a.1= 1;2;3;4 Sykkelreisene mine erstatter andre former for fysisk aktivitet	○	○	○	○	○	○	○	3

Say
Her følger tre påstander som passer mer eller mindre godt for ulike mennesker.

personlighet	**Marker på skalaen hvor godt hver enkelt påstand passer for deg.**							
◆ **range:***								
	1 Passer ikke	2	3	4	5	6	7 Passer godt	
	1	2	3	4	5	6	7	
Jeg liker å jobbe i situasjoner som innebærer konkurranse med andre	○	○	○	○	○	○	○	1
Det er viktig for meg å prestere bedre enn andre	○	○	○	○	○	○	○	2
Jeg prøver hardere når jeg er i konkurranse med andre mennesker	○	○	○	○	○	○	○	3

ID:Bikeabillity2

Information

Vi ønsker å vite litt om hvordan du opplever å sykle i din by. Vi er også interessert i svar fra deg som ikke sykler/sykler lite

Say

Byen din, slik du kjenner den

telledugnad | **I hvilken grad er du fornøyd med...**

- **range:***

	1: svært misfornøyd	2	3	4	5	6	7: svært fornøyd	Vet ikke	
	1	2	3	4	5	6	7	8	
byen din som sykkelby?	○	○	○	○	○	○	○	○	1
omfanget av sykkelveier/-ruter?	○	○	○	○	○	○	○	○	2
kvaliteten på sykkelveier/ruter?	○	○	○	○	○	○	○	○	3

trafikkuhell | **Har du hatt noen trafikkuhell med sykkel i løpet av de siste årene?**

Med trafikkuhell mener vi kollisjon, utforkjøring eller velt som førte til at du selv eller sykkelen ble skadet.

- **range:***

Ja, i 2017	☐	1
Ja, i 2016	☐	2
Ja, i 2015	☐	3
- **exclusive:**yes Nei	○	4

random_kart | **tilfeldig tall mellom 1 og 999**

- **range:***
- **afilla:**sys_random c

Fylles inn automatisk ☐☐☐☐☐☐☐ 1

Goto

- **if:**\random_kart.a.1=0:200

Goto
◆ **idref:**cycle2zero_bikeability2

ID:Kart_barrierer
filter:\SykUka.a.1=1;2;3;4

andre_1	**Er det noen gater, veier eller kryss i din by du har erfaring med og som du opplever at det er ubehagelig eller vanskelig å sykle?**
◆ **range:***	
Ja	○ 1
◆ **skip:**rute_helhet Nei	○ 2

Information
Du får nå opp et interaktivt kart Kartet skal være sentrert på ditt nærområde. Bruk adressefeltet for å justere. Du kan nå markere problemstrekningen eller -punktet, ved hjelp av knappene.

geo	**Indiker stedet som er problematisk** Hold musepekeren over knappene for instruks Du kan zoome og panorere kartet, eller søke på steder og addresser.
Data	Open

utrygg_grad	**Hvor utrygg føler du deg når du sykler her?**
◆ **range:***	

	Svært trygg						Svært utrygg	
	1	2	3	4	5	6	7	
	○	○	○	○	○	○	○	1

unngaar_grad	**I hvilken grad forsøker du å unngå dette stedet?**
◆ **range:***	

	Ikke i det hele tatt						I svært stor grad	
	1	2	3	4	5	6	7	
	○	○	○	○	○	○	○	1

faktorer.A	**Hva er de viktigste grunnene til at du mener stedet er problematisk?** Du kan velge inntil tre alternativer	
◆ **range:**#0:3		
Støy	☐	1
Forurenset	☐	2
Mange biler	☐	3
Bilenes fart	☐	4
Fotgjengere	☐	5
Trangt	☐	6
Stygt	☐	7
Bratt	☐	8
Dårlig løsning	☐	9
Annet	Open	

faktorer.B	**I hvor stor grad bidrar disse faktorene til at stedet er problematisk?**								
◆ **filter:**\faktorer.a=% ◆ **range:***									
	1 1	2 2	3 3	4 4	5 5	6 6	7 7	Vet ikke 8	
Støy	○	○	○	○	○	○	○	○	1
Forurenset	○	○	○	○	○	○	○	○	2
Mange biler	○	○	○	○	○	○	○	○	3
Bilenes fart	○	○	○	○	○	○	○	○	4
Fotgjengere	○	○	○	○	○	○	○	○	5
Trangt	○	○	○	○	○	○	○	○	6
Stygt	○	○	○	○	○	○	○	○	7
Bratt	○	○	○	○	○	○	○	○	8
Dårlig løsning	○	○	○	○	○	○	○	○	9
Annet								Open	

andre_2	**Er det flere gater, veier eller kryss i din by du har erfaring med og som du opplever at det er ubehagelig eller vanskelig å sykle?**
◆ **range:***	

andre_2	**Er det flere gater, veier eller kryss i din by du har erfaring med og som du opplever at det er ubehagelig eller vanskelig å sykle?**	
Ja		○ 1
◆ **skip:**Arstall Nei		○ 2

ID:Kart_barrierer2
filter:\SykUka.a.1=1;2;3;4

geo2	**Indiker stedet som er problematisk** Hold musepekeren over knappene for instruks Du kan zoome og panorere kartet, eller søke på steder og addresser.
Data	Open

utrygg_grad2	**Hvor utrygg føler du deg når du sykler her?**							
◆ **range:***								
	Svært trygg						Svært utrygg	
	1	2	3	4	5	6	7	
	○	○	○	○	○	○	○	1

unngaar_grad2	**I hvilken grad forsøker du å unngå dette stedet?**							
◆ **range:***								
	Ikke i det hele tatt						I svært stor grad	
	1	2	3	4	5	6	7	
	○	○	○	○	○	○	○	1

faktorer2.A	**Hva er de viktigste grunnene til at du mener stedet er problematisk?** Du kan velge inntil tre alternativer	
◆ **range:**#0:3		
Støy		☐ 1
Forurenset		☐ 2
Mange biler		☐ 3
Bilenes fart		☐ 4
Fotgjengere		☐ 5

faktorer2.A	**Hva er de viktigste grunnene til at du mener stedet er problematisk?** Du kan velge inntil tre alternativer	
Trangt	☐	6
Stygt	☐	7
Bratt	☐	8
Dårlig løsning	☐	9
Annet	Open	

faktorer2.B

I hvor stor grad bidrar disse faktorene til at stedet er problematisk?

- **filter:**\faktorer2.a=%
- **range:***

	1 1	2 2	3 3	4 4	5 5	6 6	7 7	Vet ikke 8	
Støy	○	○	○	○	○	○	○	○	1
Forurenset	○	○	○	○	○	○	○	○	2
Mange biler	○	○	○	○	○	○	○	○	3
Bilenes fart	○	○	○	○	○	○	○	○	4
Fotgjengere	○	○	○	○	○	○	○	○	5
Trangt	○	○	○	○	○	○	○	○	6
Stygt	○	○	○	○	○	○	○	○	7
Bratt	○	○	○	○	○	○	○	○	8
Dårlig løsning	○	○	○	○	○	○	○	○	9
Annet								Open	

Goto

- **idref:**bakgrunn2

ID:cycle2zero_bikeability2
filter:\SykUka.a.1=1;2;3;4

Say
Tenk tilbake på forrige gang du syklet i din by

rute_helhet	**Hvordan oppfattet du**							
◆ **range:***								
	1: veldig dårlig	2	3	4	5	6	7: Veldig bra	
	1	2	3	4	5	6	7	
sykkelruten som helhet?	○	○	○	○	○	○	○	1

rute_opplevelse	**Sist gang du syklet, Alt i alt, hvordan oppfattet du**							
◆ **range:***								
	1: Helt uproblematisk	2	3	4	5	6	7: Veldig problematisk	
	1	2	3	4	5	6	7	
støyforholdene?	○	○	○	○	○	○	○	1
luftforurensningen?	○	○	○	○	○	○	○	2
antall biler?	○	○	○	○	○	○	○	3
farten til motorkjøretøy?	○	○	○	○	○	○	○	4
samspillet med andre trafikantgrupper (inkludert fotgjengere)?	○	○	○	○	○	○	○	5
tilretteleggingen for deg som syklist?	○	○	○	○	○	○	○	6

rute_trygg	**Sist gang du syklet,**							
◆ **range:***								
	1: veldig utrygg	2	3	4	5	6	7: Veldig trygg	
	1	2	3	4	5	6	7	
hvor trygg følte du deg som syklist?	○	○	○	○	○	○	○	1

ID:bakgrunn2

Say
Vi trenger litt mer bakgrunnsinformasjon,

Arstall	**Hvilket år er du født?**	
◆ **range:***		
Skriv inn årstall	☐☐☐☐	1

Kjonn	**Er du mann eller kvinne?**	
◆ **range:***		
Mann	○	1
Kvinne	○	2

barn_husstand	**Hvor mange barn (under 18 år) er det i din husstand?**	
◆ **range:***		
Ingen	○	1
1	○	2
2	○	3
3	○	4
4	○	5
5 eller mer	○	6

brutto	**Omtrent, hva var din bruttoinntekt siste år?**	
◆ **range:***		
Under 100 000	○	1
100 000 til 299 000	○	2
300 000 til 499 000	○	3
500 000 til 699 000	○	4
700 000 eller mer	○	5
Vil ikke svare	○	6

utdanning	Hva er din høyeste utdanning?	
◆ **range:***		
Grunnskole	○	1
Videregående	○	2
Høgskole - lavere grad (t.o.m 4 år)	○	3
Høgskole - høyere grad (5 år eller mer)	○	4

andre_apper	● Bruker du noen av disse aktivitetsappene når du sykler?	
◆ **range:***		
Strava	☐	1
FitBit	☐	2
Endomondo	☐	3
Sykle til VM	☐	4
Annet	☐	5
◆ **exclusive:**yes Ingen av disse	○	6

rekrut_1	Vi ønsker å følge opp denne spørreundersøkelsen. Et utvalg av deltagerne vil i løpet av noen uker få tilbud om å svare på noen korte oppfølgingsspørsmål. I tillegg kan de være med på et spennende forsøk rettet mot økt aktivitet i hverdagen. ● **Er dette noe du kan tenke deg å være med på?**	
◆ **range:***		
Ja	○	1
Nei	○	2

ID:rekrutt_lotteri
filter:\app_rekrut.a=1

type_telefon	Du svarte innledningsvis at du ønsket å være med å bruke Sense.DAT-appen **For at appen skal fungere er den avhengig av tillatelse fra operativsystemet til å kjøre i bakgrunnen. Enkelte telefoner vil av batterihensyn ikke tillate dette.** **Vi trenger derfor å vite hva slags telefon du har.**

- **filter:**\app_rekrut.a=1
- **range:***

iPhone	○	1
Samsung	○	2
Huawei / Honor	○	3
Windows	○	4
Sony	○	5
Annen android	○	6

Say

- **filter:**\type_telefon.a=4

Du har desverre ikke en kompatibel telefon, så vi vil ikke kontakte deg med påloggingsinformasjon denne gang.

aktuell_lotteri	**automatisk fyll inn om aktuell for lotteri**

- **filter:**\type_telefon.a=1;2;3;5;6 & \jobb.a=1;2
- **range:***

aktuell for lotteri	○	1

Say

- **filter:**\aktuell_lotteri.a=1

For deg som laster ned appen er det også mulig å være med i et lite eksperiment utover kun registrering av reiser. I eksperimentet er det mulig i en avgrenset periode å
tjene penger på å sykle
. Vi trekker ut blant dem som melder sin interesse.

lotteri_rekrut	Er dette noe du kan tenke deg å være med på?

- **filter:**\aktuell_lotteri.a=1
- **range:***

Ja	○ 1
Nei	○ 2

random	tilfeldig tall mellom 1 og 999

- **range:***
- **afilla:**sys_random c

Fylles inn automatisk

☐☐☐☐☐☐ 1

ID:IPAQ_alt
filter:\random.a.1=0:500

Information

Vi er interessert i informasjon om ulike former for fysisk aktivitet som folk driver med i dagliglivet. Spørsmålene gjelder tiden du har brukt på fysisk aktivitet de siste
7 dagene
. Vennligst svar på alle spørsmålene uansett hvor fysisk aktiv du selv synes du er. Tenk på aktiviteter du gjør på jobb, som en del av hus- og hagearbeid, for å komme deg fra et sted til et annet, og aktiviteter på fritiden (rekreasjon, mosjon og sport).

Say

Tenk på all
meget anstrengende
aktivitet du har drevet med de siste 7 dagene. Meget anstrengende aktivitet er aktivitet som krever hard innsats og får deg til å puste mye mer enn vanlig. Ta bare med aktiviteter som varer minst 10 minutter i strekk.

meget_IPAQ.A	**Hvilke dager i løpet av de siste 7 dagene har du drevet med meget anstrengende fysisk aktivitet som tunge løft, gravearbeid, aerobics, løp eller rask sykling?** Merk av for alle aktuelle dagene	
◆ **range:***		
Mandag		☐ 1
Tirsdag		☐ 2
Onsdag		☐ 3
Torsdag		☐ 4
Fredag		☐ 5
Lørdag		☐ 6
Søndag		☐ 7
◆ **skip:**nextques ◆ **exclusive:**yes Ingen dager		○ 8

meget_IPAQ.B	**Hvor lang tid (antall minutter) brukte du på meget anstrengende fysisk aktivitet på hver av disse dagene?**	
◆ **filter:**\.a=% ◆ **range:**10:450		
Mandag		1
Tirsdag		2
Onsdag		3
Torsdag		4
Fredag		5
Lørdag		6
Søndag		7
◆ **skip:**nextques ◆ **exclusive:**yes Ingen dager		8

meget_IPAQ.C	**Hvor stor del (antall minutter) av denne tiden var sykling i raskt tempo?**	
◆ **filter:**\.a=% & \syklet_sist_uke.a=1 ◆ **range:**0:450		
Mandag		1
Tirsdag		2
Onsdag		3
Torsdag		4
Fredag		5
Lørdag		6
Søndag		7
◆ **skip:**nextques ◆ **exclusive:**yes Ingen dager		8

Say
Tenk på all middels anstrengende aktivitet du har drevet med de siste 7 dagene. Middels anstrengende aktivitet er aktivitet som krever moderat innsats og får deg til å puste litt mer enn vanlig. Ta bare med aktiviteter som varer minst 10 minutter i strekk.

middels_IPAQ.A	**Hvor mange dager i løpet av de siste 7 dagene har du drevet med middels anstrengende fysisk aktivitet som å bære lette ting, jogge eller sykle i moderat tempo?** **Ikke ta med gange** Merk av for alle aktuelle dagene	
◆ **range:***		
Mandag		☐ 1
Tirsdag		☐ 2
Onsdag		☐ 3
Torsdag		☐ 4
Fredag		☐ 5
Lørdag		☐ 6
Søndag		☐ 7
◆ **skip:**nextques ◆ **exclusive:**yes Ingen dager		○ 8

middels_IPAQ.B	**Hvor lang tid (antall minutter) brukte du på middels anstrengende fysisk aktivitet på hver av disse dagene?**	
◆ **filter:**\.a=% ◆ **range:**10:600		
Mandag		☐☐☐ 1
Tirsdag		☐☐☐ 2
Onsdag		☐☐☐ 3
Torsdag		☐☐☐ 4
Fredag		☐☐☐ 5
Lørdag		☐☐☐ 6
Søndag		☐☐☐ 7
◆ **skip:**nextques ◆ **exclusive:**yes Ingen dager		☐☐☐ 8

middels_IPAQ.C	**Hvor stor del (antall minutter) av denne tiden var sykling i moderat tempo ?**

- **filter:**\.a=% &\syklet_sist_uke.a=1
- **range:**0:600

Mandag	☐☐☐ 1
Tirsdag	☐☐☐ 2
Onsdag	☐☐☐ 3
Torsdag	☐☐☐ 4
Fredag	☐☐☐ 5
Lørdag	☐☐☐ 6
Søndag	☐☐☐ 7

- **skip:**nextques
- **exclusive:**yes

Ingen dager	☐☐☐ 8

Say

Tenk på tiden du har brukt på
å gå
de siste 7 dagene. Dette inkluderer gange på jobb og hjemme, gange fra et sted til et annet eller gange som du gjør på tur eller som trening på fritiden.

gange_IPAQ_1.A	**Hvilke dager i løpet av de siste 7 dagene gikk du i minst 10 minutter i strekk?** Merk av for alle aktuelle dagene

- **range:***

Mandag	☐ 1
Tirsdag	☐ 2
Onsdag	☐ 3
Torsdag	☐ 4
Fredag	☐ 5
Lørdag	☐ 6
Søndag	☐ 7

- **skip:**nextques
- **exclusive:**yes

Ingen dager	○ 8

gange_IPAQ_1.B	Hvor lang tid (antall minutter) brukte du på å gå på disse dagene?	
◆ **filter:**\.a=% ◆ **range:**10:300		
Mandag		☐☐☐ 1
Tirsdag		☐☐☐ 2
Onsdag		☐☐☐ 3
Torsdag		☐☐☐ 4
Fredag		☐☐☐ 5
Lørdag		☐☐☐ 6
Søndag		☐☐☐ 7
◆ **skip:**nextques ◆ **exclusive:**yes Ingen dager		☐☐☐ 8

Say
Det neste spørsmålet omfatter all tid du tilbrakte sittende på ukedagene i løpet av de siste 7 dagene. Inkluder tid du har brukt på å sitte på jobb, hjemme, på kurs og på fritiden. Dette kan tilsvare tiden du sitter ved et arbeidsbord, hos venner, på bussen, mens du leser, eller sitter eller ligger for å se på TV.

tid_sitte_IPAQ	Hvor lang tid (timer og minutter) brukte du på å sitte på en vanlig hverdag i løpet av de siste 7 dagene?	
◆ **range:***		
timer/min		☐☐ / ☐☐ 1

helse	Hvordan vurderer du din egen helse?	
◆ **range:***		
Meget god		○ 1
God		○ 2
Verken god eller dårlig		○ 3
Dårlig		○ 4
Meget dårlig		○ 5

kommentarer	Har du noen kommentarer til undersøkelsen?	
Skriv her		Open
Nei		☐ 1

sluttdato	Dato for slutt av intervjuet

- **range:***
- **afilla:**sys_date c

Fylles inn automatisk

☐☐☐☐☐☐☐☐ 1

sluttid	Tid for avslutning av intervjuet

- **range:***
- **afilla:**sys_timenowf c

Fylles inn automatisk

☐☐☐☐☐☐ 1

brukttid	Tid brukt på intervjuet

- **range:***
- **afilla:**sys_elapsedtime c

Fylles inn automatisk

☐☐☐☐☐☐ 1

Information

- **exit:**yes
- **redirect:**https://www.toi.no/?lang=no_NO
- **status:**COMPLETE

- **filter:**\type_telefon.a=4|\app_rekrut.a=2

Takk for at du tok deg tid til å svare på spørsmålene

- **filter:**\type_telefon.a=1;2;3;5;6

Takk for at du tok deg tid til å svare på spørsmålene
Vi kontakter deg i løpet av de nærmeste dagene med påloggingsinformasjon til Sense.DAT.

Appendix 2: Backround variables

	Oslo			Bergen			Trondheim			Stavanger		
	NTS*	C2Z Survey	C2Z App	NTS	C2Z Survey	C2Z App	NTS	C2Z Survey	C2Z App	NTS	C2Z Survey	C2Z App
Share men	48.8	52.3	55.6	48.1	58.6	63.7	50.5	53.5	57.7	51.4	54.5	57.4
13-17 years	5.3	0.1	0.1	7.1	0.0	0.3	7.0	0.2	0.0	8.1	0.2	0.4
18-24 years	10.9	1.6	1.0	11.7	2.3	1.3	12.9	6.0	4.2	10.2	1.7	0.8
25-34 years	25.9	19.1	24.0	19.4	15.0	25.7	19.5	22.5	24.6	21.1	12.2	14.8
35-44 years	21.1	29.8	35.0	19.0	27.3	29.9	18.9	24.2	28.6	19.8	25.1	33.6
45-54 years	14.6	24.0	24.7	16.8	26.1	23.8	16.8	21.1	26.1	16.7	27.4	29.5
55-66 years	12.8	17.3	12.7	13.6	22.9	15.8	13.2	19.1	13.7	13.2	25.2	17.2
67-74 years	4.9	5.6	2.2	6.2	5.0	2.6	6.4	4.8	1.1	5.7	6.6	2.5
75+ years	4.6	1.3	0.1	6.3	0.3	0.3	5.2	0.7	0.3	5.3	0.9	0.8
Share employed	63.7	86.6	92.8	59.5	85.1	88.7	58.6	78.0	83.8	64.5	84.4	89.8
Access to car	58.0	79.4	77.0	67.5	86.5	91.0	71.6	84.8	87.7	78.6	92.2	91.0
Access to bike	70.9	98.1	98.5	63.4	98.2	99.0	79.1	99.4	99.7	79.2	99.1	99.2
N	7 532	2 087	734	3 248	979	311	2 364	963	357	2 754	861	244

**Unweighted NTS-figures.*

Appendix 3: Regression analysis

Survey, km cycled previous day

Dependent variable: Number of km cycled previous day

Reference group: Woman, 45-54 years, city of Moss

	Model I		Model II	
	B	Sig.	B	Sig.
(Constant)	2.112	0.000	-0.217	0.709
Equipment_all	3.546	0.000	3.422	0.000
Helmet	3.242	0.000	3.157	0.000
D_gender	0.839	0.000	0.869	0.000
D_age_13_17	-0.368	0.874	-0.022	0.992
D_age_18_24	-1.546	0.052	-1.716	0.031
D_age_25_34	-1.306	0.000	-1.544	0.000
D_age_35_44	-0.472	0.143	-0.622	0.053
D_age_55_66	-0.726	0.029	-0.703	0.034
D_age_67_74	-1.628	0.002	-1.618	0.002
D_age_75	-1.775	0.120	-1.867	0.101
D_Bodø			2.375	0.001
D_Buskerudbyen			1.253	0.048
D_Glomma			1.764	0.012
D_Tromsø			1.592	0.019
D_Trondheim			2.766	0.000
D_Oslo			3.249	0.000
D_Bergen			3.118	0.000
D_Stavanger			2.628	0.000
R2	0.058		0.067	

Survey, cycling share previous day

Dependent variable: Cycling share previous day

Reference group: Woman, 45-54 years, city of Moss

	Model I		Model II	
	B	Sig.	B	Sig.
(Constant)	0.192	0.000	0.069	0.028
Equipment_alt	-0.009	0.632	-0.009	0.640
Helmet	0.197	0.000	0.188	0.000
D_gender	0.019	0.122	0.022	0.077
D_age_13_17	0.081	0.483	0.099	0.389
D_age_18_24	-0.001	0.977	-0.016	0.685
D_age_25_34	-0.032	0.081	-0.044	0.018
D_age_35_44	-0.010	0.547	-0.014	0.390
D_age_55_66	0.019	0.267	0.023	0.178
D_age_67_74	-0.078	0.006	-0.073	0.010
D_age_75	0.029	0.661	0.023	0.725
D_Bodø			0.142	0.000
D_Buskerudbyen			0.055	0.103
D_Glomma			0.073	0.051
D_Tromsø			0.117	0.001
D_Trondheim			0.186	0.000
D_Oslo			0.170	0.000
D_Bergen			0.118	0.000
D_Stavanger			0.130	0.000
R2	0.047		0.060	

Cycling previous week

Dependent variable: Number of km cycled previous day

Reference group: Woman, 45-54 years, city of Moss

	Model I		Model II	
	B	Sig.	B	Sig.
(Constant)	21.118	0.000	10.984	0.000
Equipment_all	17.988	0.000	17.254	0.000
Helmet	13.953	0.000	13.399	0.000
D_gender	1.154	0.286	1.375	0.202
D_age_13_17	-22.502	0.010	-19.759	0.023
D_age_18_24	-12.963	0.000	-12.934	0.000
D_age_25_34	-6.957	0.000	-7.973	0.000
D_age_35_44	-2.305	0.109	-2.783	0.052
D_age_55_66	-2.116	0.149	-1.937	0.184
D_age_67_74	-16.265	0.000	-15.448	0.000
D_age_75	-20.295	0.000	-20.250	0.000
D_Bodø			9.400	0.007
D_Buskerudbyen			2.505	0.422
D_Glomma			8.186	0.017
D_Tromsø			10.991	0.001
D_Trondheim			10.614	0.000
D_Oslo			12.968	0.000
D_Bergen			17.107	0.000
D_Stavanger			11.241	0.000
R2	0.092		0.106	

Speed Oslo

Reference group: Women, regular bicycle, age 35-44 years.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.672	0.070		224.650	0.000
	tot_E_bike	1.792	0.102	0.110	17.605	0.000
	Kjonn	1.516	0.067	0.140	22.627	0.000
	U_25	-0.825	0.360	-0.014	-2.291	0.022
	A_O74	-0.624	2.358	-0.002	-0.264	0.791
	A_25_34	0.004	0.088	0.000	0.040	0.968
	A_45_54	0.492	0.084	0.040	5.858	0.000
	A_55_66	0.495	0.109	0.030	4.543	0.000
	A_67_74	0.222	0.275	0.005	0.807	0.420

a. Dependent Variable: av_Speed_kmh

Speed Bergen

Reference group: Women, regular bicycle, age 35-44 years.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	16.490	0.143		115.198	0.000
	tot_E_bike	0.798	0.232	0.039	3.445	0.001
	Kjonn	2.050	0.135	0.170	15.154	0.000
	U_25	-2.487	0.831	-0.033	-2.994	0.003
	A_O74	-2.981	1.014	-0.033	-2.940	0.003
	A_25_34	-0.478	0.170	-0.036	-2.808	0.005
	A_45_54	0.462	0.173	0.034	2.673	0.008
	A_55_66	0.787	0.205	0.048	3.848	0.000
	A_67_74	0.743	0.511	0.016	1.454	0.146

a. Dependent Variable: av_Speed_kmh

Speed Trondheim

Reference group: Women, regular bicycle, age 35-44 years.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	16.485	.115		143.024	0.000
	tot_E_bike	1.122	.162	.064	6.920	.000
	Gender	1.335	.105	.119	12.771	.000
	U_25	-.987	.291	-.032	-3.395	.001
	A_O74	.144	1.727	.001	.083	.934
	A_25_34	-.338	.136	-.026	-2.491	.013
	A_45_54	.412	.134	.033	3.078	.002
	A_55_66	-.040	.167	-.002	-.240	.810
	A_67_74	-1.520	.493	-.029	-3.083	.002

a. Dependent Variable: av_Speed_kmh

Speed Stavanger

Reference group: Women, regular bicycle, age 35-44 years.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	16.226	0.137		118.655	0.000
	tot_E_bike	0.575	0.188	0.036	3.053	0.002
	Kjonn	1.749	0.132	0.160	13.235	0.000
	U_25	-2.843	0.982	-0.034	-2.894	0.004
	A_O74	2.620	0.937	0.033	2.796	0.005
	A_25_34	1.038	0.208	0.064	4.982	0.000
	A_45_54	0.767	0.159	0.065	4.816	0.000
	A_55_66	0.616	0.186	0.043	3.302	0.001
	A_67_74	-3.250	0.626	-0.062	-5.191	0.000

a. Dependent Variable: av_Speed_kmh

Institute of Transport Economics (TØI)
Norwegian Centre for Transport Research

Established in 1964, the Institute of Transport Economics is an interdisciplinary, applied research centre with approximately 70 professionals. Its mission is to develop and disseminate transportation knowledge that has scientific quality and practical application.

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