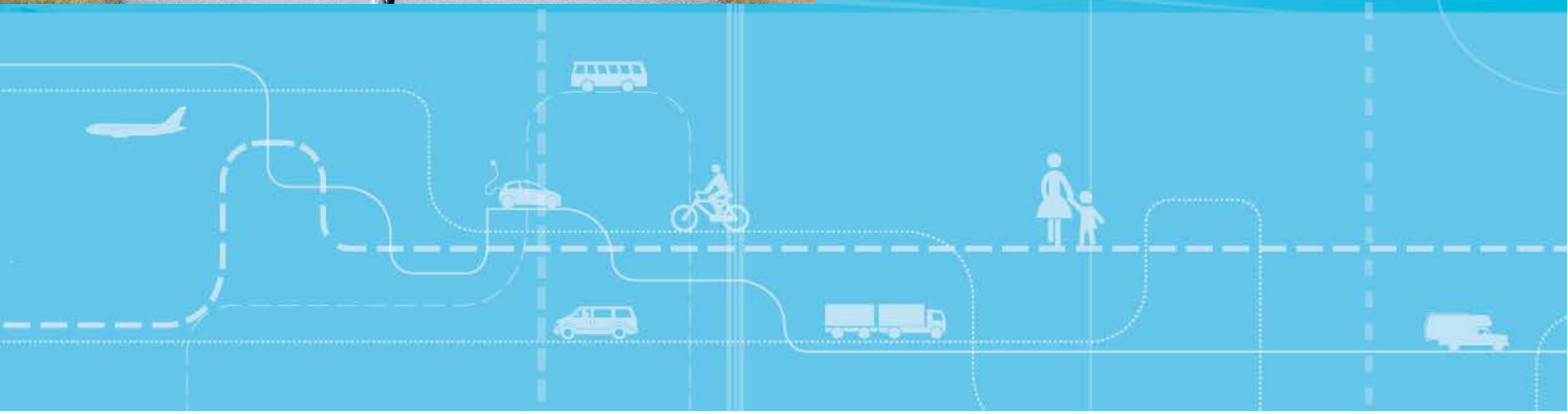


Perceptions of weather and travel mode choice – results from focus groups and surveys in Oslo and Stavanger



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Randi Hjorthol

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Summary:

About one third of the respondents both in Oslo and Stavanger say that the weather is important for choice of transport mode on their journey to work, not so many claims that weather influence the mode choice on shopping trips. Precipitation, rain and snow, influences more than temperature and wind. However, wind has stronger effect in Stavanger than in Oslo. Both for walking and cycling precipitation is more important than temperature, e.g while more than 60 percent accept to walk (2-3 km) in cold weather (<-10 oC) with no precipitation, this percentage is halved with showers at the same temperature. This is some of the results from a survey carried out in Oslo and Stavanger in October and November 2015 with about 1000 respondents from each city.

Sammendrag:

Rundt en tredjedel av befolkningen i Oslo og Stavanger sier at været er viktig for reisemåte til jobben. Når folk skal handle dagligvarer spiller ikke været fullt så stor rolle. Nedbør, i form av regn og snø, har større betydning for hvordan man reiser enn temperatur og vind. Vind har imidlertid større betydning i Stavanger (som har mer vind) enn i Oslo. Når det gjelder sykling og gåing er nedbør viktigere enn vind og temperatur. For eksempel er det slik at mer enn 60 prosent synes det er akseptabelt å gå 2-3 km ved lave temperaturer (<-10oC) når det ikke er nedbør, mens bare halvparten av disse synes det er greit å gå ved samme temperatur i bygevær. Dette er noen av resultatene fra en spørreundersøkelse som ble gjort i Oslo og Stavanger høsten 2015.

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*Institute of Transport Economics
Gaustadalleen 21, 0349 Oslo, Norway
Telefon 22 57 38 00 - www.toi.no*

*Transportøkonomisk Institutt
Gaustadalleen 21, 0349 Oslo
Telefon 22 57 38 00 - www.toi.no*

Preface

This report is part of work package two (WP 2) in the project ClimaMob: Climate change and everyday mobility – social impacts, adaptation and mitigation strategies funded by the Research Council of Norway in a large-scale programme on climate research (KLIMAFORSK). ClimaMob is a collaboration project between Institute of Transport Economics (TØI), the Norwegian Meteorological Institute, Transport Studies at Oxford University; Department of Human Geography and Planning at the University of Utrecht, and Human Geography at the University of Tartu, Estonia. Institute of Transport Economics is project manager.

This report is written by Randi Hjorthol. Susanne Nordbakke and Tanu P. Uteng, both at TØI, have contributed to the preparation of the guidelines for the focus groups and the survey questionnaire.

Research director Frode Longva has been quality manager, and Trude Rømming has finalized the layout of the manuscript.

Oslo, February 2016
Transportøkonomisk institutt

Gunnar Lindberg
Managing director

Frode Longva
Research director

Content

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Summary:

Perception of weather and travel mode choice – results from focus groups and surveys in Oslo and Stavanger

TØI Report 1473/2016

Author: Randi Hjorthol

Oslo 2016, 60 pages English

About 1/3 of the respondents both in Oslo and Stavanger say that the weather is important for choice of transport mode on their journey to work, not so many claims that weather influence the mode choice on shopping trips. Precipitation, rain and snow, influences more than temperature and wind. However, wind has stronger effect in Stavanger than in Oslo. Both for walking and cycling precipitation is more important than temperature, e.g while more than 60 percent accept to walk (2-3 km) in cold weather (<-10 °C) with no precipitation, this percentage is halved with showers at the same temperature. The respondents in Stavanger have a stronger “car identity” than those in Oslo. “Car-identity” has a very strong relationship with car use on shopping trips, and more significant than weather indicators and other background variables.

This is results from a survey carried out in Oslo and Stavanger in October and November 2015 with about 1000 respondents from each city. Before the survey focus group interviews were done in both cities.

The aim of the study has been to analyse perceptions of different aspects of weather (preliminary precipitation, temperature and wind) and to find relationships in everyday travel. Different aspects of actual and perceived weather and the connection with everyday mobility have received little study to date.

Weather, however, is only one aspect, and in most cases not the most important one in travel mode choice or regarding other aspects of daily mobility. In studying the effect of weather, characteristics of where people live, their household, the individual variables as age and gender, transport resources, attitudes, norms and habits have to be examined. The spatial context is represented by the two cities chosen, namely Oslo and Stavanger.

Figure 1 illustrates the conceptual model with relationships between the variables.

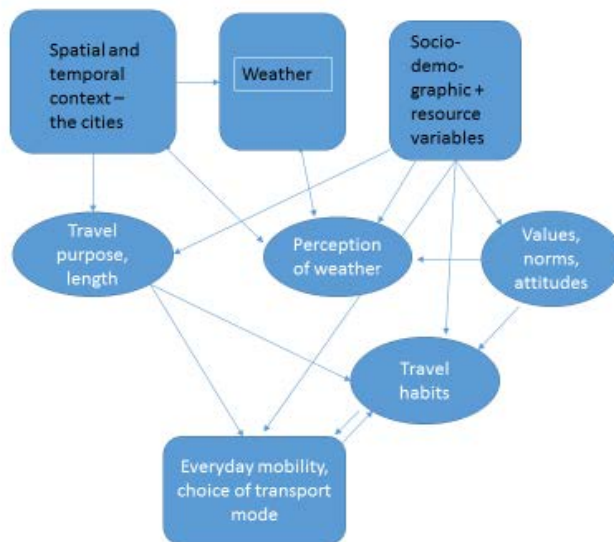


Figure 1 The relation between variables explaining choice of transport mode

The two cities – Oslo and Stavanger

Oslo and Stavanger were selected as cases because they are cities different in both size and prevailing weather conditions.

Oslo, the capital of Norway, has a population of approx. 650 000 and this doubles when the greater urban area is included. Stavanger has about 130 000 inhabitants and 250 000 when the adjacent municipalities are included. The average temperatures of the two cities differ throughout the year – in Oslo the winter temperature is lower and the summer temperature higher than in Stavanger. In the winter months (December to March) the precipitation (mostly rain) in Stavanger is double that (more snow than rain) in Oslo.

The choice of transport mode in everyday mobility is different between the two cities. In Oslo, people walk and avail themselves of public transport much more than in Stavanger, where the car is the most used mode of transport. The quality of public transport is much better in Oslo than in Stavanger.

What people think others do in different weather situations

The relationship between weather and cycling is perceived different between the two cities. In Stavanger, more so than in Oslo, the respondents more often disagree on the statement that people in their city cycle regardless of the weather. They also disagree more than people in Oslo that it is rarely so windy that they are prevented from cycling. Both these statements involve concepts about weather/wind with the possibility of a large degree of variation. The differences can be a result of how weather/wind is perceived (and actually is) in the two cities. There is more wind and “weather” in Stavanger than in Oslo, so respondents think about the weather as

more severe in Stavanger than in Oslo, and therefore mean that people are less likely to cycle. Or, it could be that people in Oslo are “hardier”, that they more often cycle in poor weather.

The statements about car-driving and use of public transport related to weather reflect even greater differences between the cities. People in Stavanger agree to a greater degree than in Oslo that people in the city take the car on most errands regardless of the weather, while, correspondingly, respondents in Oslo think that people in their city use public transport to a greater degree than the respondents from Stavanger.

Identity and habits are important for mode choice

The respondents in Stavanger have a stronger “car identity” than those in Oslo. They like car-driving; they say that driving a car is “typical of me” and that some activities would otherwise be excluded if they were not to use the car more often than the people from Oslo. The respondents from Oslo identify themselves more as public transport users and walkers than those from Stavanger.

A multivariate analysis shows that transport identity (e.g. “It is typical me to drive a car”) has very strong relationship with car use on shopping trips, and more significant than weather indicators and other background variables.

When it comes to cycling there is no difference regarding how much they like it, but a higher percentage of the respondents from Stavanger strongly agree with the statement that *–cycling is typically me*. From the National Travel Survey from 2013/14 we know that people in Stavanger cycle on everyday travel more than people in Oslo.

Travel habits in the two cities seem very different, and correspond to the differences in transport identity. While the respondents in Stavanger are typical car-users, Oslo respondents are used to public transport to a much greater degree. This difference is probably a consequence of the difference in the quality of public transport, which is much better in Oslo than in Stavanger. It may also be a consequence of cultural mores in relation to use of modes of transport – but these are more anecdotal – in Stavanger as a city affected by American culture (as an international “oil-city”), and that only “losers” use public transport (cf. George W Bush, US President, campaign speech *What will I do for public transport? I will improve the economy so you can find good enough work to be able to afford a car*, and Margaret Thatcher, former British PM – *Any man who takes a bus to work after the age of 30 can count himself a failure in life*). Neither the focus groups nor the survey can support whether these “stories” also count for Stavanger.

Combination of weather indicators for accepting walking and cycling

A majority of the respondents in both cities will cycle at any temperature so long as there is no precipitation, and the percentage varies little between the temperature intervals. When there is light rain/snow the percentages cycling are less, and more at lower than higher temperatures. Still, there are no differences between the cities. When the weather is characterized by showers, the respondents in Stavanger more often than in Oslo say that they will cycle at temperatures below 20°C. Even with persistent rain the Stavanger respondent will cycle more than his/her counterpart

from Oslo at most temperatures, but the percentage is lower than for the other combinations.

While there are hardly any differences between the respondents regarding walking when there is no precipitation, the result shows that people in Oslo walk more when there is light rain/snow or persistent precipitation than those in Stavanger. When it is showery they also walk more at all temperatures than respondents in Stavanger. These results might be indications of differences in how precipitation in the two cities is experienced. It could be that rain in Stavanger is more combined with wind than in Oslo and that the weather then seems worse. It could also be that accessibility and habitual use of a car among the respondents in Stavanger makes it easier to decide on the car when it rains than it is for the Oslo respondents, who take the car to a much lesser extent.

Concluding remarks

The results show that even though the weather (of course) is embedded in people's daily lives, it is not so clear how everyday travel is influenced by it. People cycle less when it rains, and temperature and precipitation have an impact on mode choice, but there is also a range of other factors that influence choice. As this report indicates, access to alternative modes, the family situation, environmental consciousness and self-identity are all examples of variables that have a greater impact on transport mode than weather conditions in itself. However, this doesn't mean that weather will not influence daily mobility. This report shows that precipitation and wind – indicators that have a significant impact – will be more important for mode choice in the future, because the weather in most of the country will be wetter and wilder.

Sammendrag:

Opplevelse av vær og reisemåte – resultater fra fokusgrupper og spørreundersøkelser i Oslo og Stavanger

TØI rapport 1473/2016

Forfatter: Randi Hjortbol

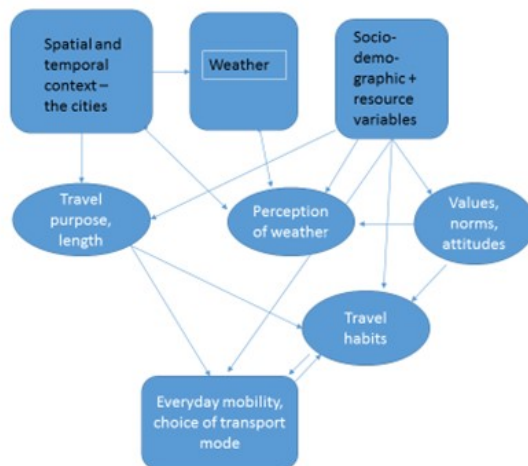
Oslo 2016 60 sider

Omtrent en tredjedel av innbyggerne i både Oslo og Stavanger sier at været er viktig for valg av reisemåte til og fra jobben. Det er ikke fullt så viktig når de skal handle dagligvarer. Nedbør, i form av regn eller snø, har større påvirkning enn temperatur eller vind. Vind har imidlertid større betydning i Stavanger enn i Oslo. Både når det gjelder gåing og sykling er nedbør viktigere enn temperatur. For eksempel synes 60 prosent det er greit å gå en tur på to-tre km når det er kaldt (<10 °C) uten nedbør, men hvis det er nedbør halveres prosentandelen som synes det er akseptabelt å gå ved samme temperatur. Respondentene fra Stavanger uttrykker en klarere «bilidentitet» enn respondentene fra Oslo. «Bilidentitet» har klar sammenheng med om man bruker bil på handlereisene, og en sterkere sammenheng enn de forskjellige værindikatorerne har.

Dette er noen av resultatene fra en spørreundersøkelse som ble gjennomført i Oslo og Stavanger i oktober og november 2015 med omtrent 1000 personer i hver by. Forut for spørreundersøkelsen ble det gjennomført fokusgrupper i begge byene.

Hensikten med denne undersøkelsen har vært å undersøke hvordan oppfatningen av forskjellige aspekter ved vær (nedbør, temperatur og vind) henger sammen med daglig reiseaktivitet. Dette er et felt som har fått relativt liten forskningsmessig oppmerksomhet.

Vær er imidlertid bare en faktor som er med på å bestemme valg av transportmiddel på de forskjellige daglige reisene. For å undersøke hva været betyr må man også se på effekten av hvor folk bor, hva slags hushold vedkommende bor i, kjønn, alder, normer og holdninger osv. I denne undersøkelsen er bosted representert ved byene Oslo og Stavanger. Figuren under viser forholdet mellom de forskjellige faktorene som er med på å forklare den daglige mobiliteten og valg av reisemåte.



Figur 1 forholdet mellom variabler som er med på å forklare valg av transportmiddel

Oslo og Stavanger – byene som undersøkes

Oslo og Stavanger ble valgt som undersøkelsesområder i dette prosjektet fordi de varierer både i størrelse og når det gjelder vær.

Oslo har en befolkning på ca 650 000 innbyggere, som fordobles når byregionen regnes med. Stavanger har omtrent 130 000 innbyggere og 250 000 når nabokommunene regnes med. Gjennomsnittstemperaturene i de to byene er forskjellige gjennom året. I Oslo er vintrene kaldere og somrene varmere enn hva de er i Stavanger. I vintermånedene (desember til mars) er det dobbelt så mye nedbør i Stavanger som i Oslo.

Den nasjonale reisevaneundersøkelsen viser at også reisevanene er forskjellige i de to byene. Mens Oslofolk bruker kollektive transportmidler og går mer enn i Stavanger, er bilen det mest brukte transportmidlet i Stavanger (Hjorthol m fl. 2014). Kvaliteten på det kollektive tilbudet er mye bedre i Oslo enn i Stavanger.

Hva man tror andre gjør under forskjellig værforhold

I spørreundersøkelsen ble det blant annet spurt om hva man trodde beboerne i sin egen by gjorde i forskjellige værsituasjoner.

Når det gjaldt sykling og vær, mente folk i Oslo oftere enn beboerne i Stavanger at de syklet uansett vær, og at det var sjelden at det blåste så mye at det forhindret folk å sykle. Dette kan være et uttrykk for at det er «mer vær» i Stavanger enn det er i Oslo. Samtidig er det slik at andelen som sykler på de daglige reisene er høyere i Stavanger enn i Oslo (Hjorthol m fl. 2014).

Når det gjelder vær og bruk av bil er forskjellene enda større. I Stavanger var det en mye større andel enn i Oslo som sa at i deres by bruker folk bil til alle ærend uansett vær. Oslofolk på sin side mente at innbyggerne bruker kollektivtilbudet uansett vær.

Identitet og vaner er viktig for valg av transportmiddel

Befolkningen i Stavanger har en sterkere «bilidentitet» enn hva folk i Oslo har. En stor andel (80 prosent) av Stavangerfolk sier at de liker å kjøre bil, og at det å kjøre bil er «typisk meg». Videre er det flere fra Stavanger enn fra Oslo som mener at hvis de ikke kan bruke bil er det en del aktiviteter de ikke gjør.

En multivariat analyse viser at «bilidentitet» har klar sammenheng med om man bruker bil på handlereisene, og viser en sterkere sammenheng enn de forskjellige værindikatorer.

Når det gjelder det å *like sykling*, er det ikke noen forskjell mellom representantene for de to byene, men respondentene fra Stavanger sier oftere enn folk fra Oslo at det å sykle er «typisk meg».

Vaner knyttet til de daglige reisene er forskjellige i de to byene, og er nær knyttet til ulikhetene i identitet. Mens respondentene i Stavanger er typiske bilkjørere, bruker Oslo-folk kollektivtransporten i mye større grad. Forskjellen er antakelig først og fremst et resultat av at kollektivtilbudet i Oslo er mye bedre enn i Stavanger. Det kan også ha sammenheng med kulturelle forskjeller som er knyttet til oppfatning av kollektivtransport som noe lite attraktivt, men dette er mer anekdotisk enn basert på resultater av våre undersøkelser. Stavanger er en internasjonal oljeby med koplinger til «det amerikanske».

Gåing og sykling ved ulike værforhold

De fleste i begge byene vil gå eller sykle ved ulike temperaturer så lenge det ikke er nedbør. Med lett nedbør og bygevær halveres andelen som vil sykle (3-5 km) på temperaturer over null grader, og enda mer hvis temperaturen blir lavere. Er nedbøren vedvarende reduseres andelen ytterligere, men respondentene i Stavanger sier at de sykler under disse værforholdene oftere enn respondentene i Oslo. Det kan tyde på at Stavangerfolk antakelig er mer vant til slike værforhold og aksepterer å sykle selv om det regner.

Det er heller ikke her noen forskjeller mellom de to byene når det gjelder å gå under forskjellige temperaturer når det ikke er nedbør. På samme måte som for sykling avtar andelen som sier de vil gå (2-3 km) når det regner eller snør, men reduksjonen er mindre enn hva den er for sykling. I motsetning til sykling under ulike værforhold sier respondentene fra Oslo oftere enn de fra Stavanger at de kan akseptere å gå når det regner eller snør. Det kan ha sammenheng med at Oslofolk i større grad enn folk i Stavanger går på sine daglige reiser, mens de som bor i Stavanger har lettere tilgang til bil (Hjorthol m fl. 2014).

Avsluttende kommentarer

Resultatene i denne rapporten viser at selv om været er en del av dagliglivet, er det ikke helt entydig hvordan det påvirker de daglige reisene. Folk sykler mindre når det regner, og temperatur, vind og nedbør påvirker valg av reisemåte, men det er også mange andre faktorer som har betydning for hva som velges. Analysene i denne rapporten tyder på at tilgang til transportmidler, familiesituasjon, miljøbevissthet og «transportidentitet» er eksempler på variabler som har (større) betydning for valg av reisemåte på enkelte reisemål enn det vær har. Det betyr imidlertid ikke at vær ikke har betydning. Denne rapporten viser at både nedbør og vind er indikatorer som har

betydning, og som vil bli enda mer betydningsfulle i tiden framover, fordi været vil bli våtere og villere i størstedelen av landet

Denne rapporten er en del av arbeidspakke 2 i prosjektet – Klimaendring og daglig mobilitet – sosiale virkninger, tilpasning og virkemidler. Prosjektet er finansiert av Norges forskningsråd innenfor forskningsprogrammet KLIMAFORSK.

1 Introduction

1.1 Objectives and some previous research

This is an analysis of how weather conditions are perceived in relation to everyday travel in two urban contexts where the weather differences are significant, namely the cities of Oslo and Stavanger in Norway. The intention is to map people's subjective weather perceptions and tolerances in different geographical contexts and social groups, and to investigate the likely impact on travel behaviour and travel mode choice. The main question is: What influence do weather conditions have on everyday travel compared to other factors that have an impact on travel mode choice?

This report is part of work package two (WP 2) in the project *Climate change and everyday mobility – social impacts, adaptation and mitigation strategies* funded by the Research Council of Norway in a large-scale programme on climate research (KLIMAFORSK).

Up until now, both research and the political/public opinion debate on climate change and the transport sector have been preoccupied with impacts on transport infrastructure and buildings (Meld. St. 33, 2012–2013; Böcker et al., 2013a; Aaheim and Hauge, 2007; Koetse and Rietveld, 2009). However, climate change and related direct weather impacts have further far-reaching consequences for the sector which need to be considered, above all how we arrange activities, travel behaviour and destinations in relation to prevalent and anticipated weather conditions. Existing knowledge on the relationship between weather conditions and daily mobility is sparse, and has been concentrated primarily on the effects of precipitation, temperature or seasonal variations on travel behaviour. In Canada and northern USA, car traffic is reduced with snowfall (Datla and Sharma, 2010; Knapp and Smithson, 2000) and in Scotland and Australia with rain (Hassan and Barker, 1999; Keay and Simmonds, 2005). Other studies, mainly European, reflect a positive relationship between precipitation and choice of motorized mode of travel, primarily the car, and often at the expense of cycling and walking (Böcker et al., 2013b; Aaheim and Hauge, 2007; Bergström and Magnussen, 2003). In general, precipitation has a greater effect on leisure trips than on mandatory trips such as commuting to work or shopping (Böcker et al., 2013b).

Several studies on the effect temperature has on travel behaviour report significant less cycling in winter (Fyhri and Hjorthol, 2006; Müller et al., 2006; Bergström and Magnussen, 2003). Along the same lines, Hjorthol (2013) reports that in Norway older people travel less frequently in winter than in summer. Silm and Ahas (2010), too, find significant seasonal differences in population mobility. Other studies show that temperature has less of an impact on travel mode choice than precipitation (Böcker et al., 2013b). The impact of wind has received less attention, some studies finding that wind has a negative effect on cycling (Heinen et al., 2011; Aaheim and Hauge, 2005). Most of the existing research is based on data from countries with

climatic conditions different from those in Norway, but no comprehensive framework of the relationship between weather conditions and travel behaviour and mobility. This research area has only recently emerged in the context of climate change mitigation and adaptation.

Perceptions of 'good', 'poor' and 'acceptable' weather are subjective and context-dependent (e.g., Denstadli et al., 2011; Meze-Hausken, 2008; Smith, 1993). Correspondingly, feelings of comfort, discomfort, pleasure and safety may be perceived subjectively and differently by different individuals, e.g., by people living in a coastal climate as opposed to those living inland. Moreover, adaptation behaviour may vary and different 'cultures' for coping with adverse weather conditions can develop. Little is known about these issues in the context of everyday mobility. In addition, if relevant variables for climate projections are to be defined, it is imperative that elements of the weather perceived as the most important determinants for travel behaviour are identified. Based on social psychological theories, this report investigates the relationship between weather conditions and concepts such as habits, norms, attitudes, perceptions, intentions, etc., in the context of everyday travel.

1.2 Literature and concepts – attitudes and behaviour

When the main question in this study concerns the impact of weather on travel behaviour, it is important to examine the influence of factors such as values, attitudes, habits in addition to contextual and individual variables.

In the literature on the relation between attitudes and behaviour, many researchers are inspired by the Theory of Planned Behaviour (Ajzen, 1991). There have been two field studies on the relation between norms and use of public transport that have been useful in our establishment of a conceptual framework in this study (Bamberg et al., 2007), both inspired by the theory of planned behaviour (TPB, Ajzen 1991) and the norm-activation model (NAM, Schwartz 1977).

Those who view environmental behaviour as pro-social often use the norm-activation model, and if seen as based on rational choice the theory of planned behaviour is preferred. Bamberg et al. (2007) combine these two theories.

Norms can be defined as inter-subjective, commonly shared and often implicit rules and expectations about behaviour in a social context. They vary according to the degree internalized (Thøgersen, 2006), often separated into social and personal. Social norms are based on expectations from groups of importance for the individual; they include reward and punishment related to following or breaking the norm (Thøgersen, 2006). Guilt, which is related to norms, is defined by Thøgersen (2006: 249) as an introjected norm, i.e. one that is only superficially internalized.

Attitudes can reflect different degrees of stability; for example, values more stable than meanings (Rokeach, 1973). Several dimensions are important in any discussion about the relation between attitudes and behaviour. The attitude and the act must be at the same level. Ajzen and Fishbein (1980) point to the fact that attitudes often have several dimensions and behaviour cannot be predicted on the basis of one of the dimensions alone. Attitudes are not static, they can change over time and bring about inconsistency between attitude and behaviour. According to the theory of cognitive dissonance, either the attitude or the act has to change if the two are to be in accordance (Festinger, 1957). Anabel (2005) points to the fact that different attitudes can result in the same behaviour.

Attitudes must also be accessible (in the memory/mind) (Fazio, 1986) if they are to have an impact on behaviour. This is the strength of the association between the object/phenomenon and assessment of it. Surveys will often “demand” that respondents answer questions about which they have no opinion or about which they have made up attitudes. Awareness of the problem/phenomenon will be a basis for the attitude. The concept of attitude is used about both values and “short-dated” meanings. It is obvious that the latter is less “binding” for the behaviour than stable values.

Finally, alternative acts will sometimes not be assessed because the behavioural pattern is more or less fixed in habits and routines (Verplanken et al., 1997). Garwill et al. (1994) point to the fact that there might not be a relation between values, attitudes and behaviour because of habits.

This short presentation and discussion forms the basis of our conceptual framework and guidelines for focus groups and construction of the questionnaire, in addition to what is known from previous research on weather and travel behaviour (in 1.1). The main concepts are awareness of the problem, habits (travel mode choice), attitudes towards modes of transport, norms and intentions of behaviour.

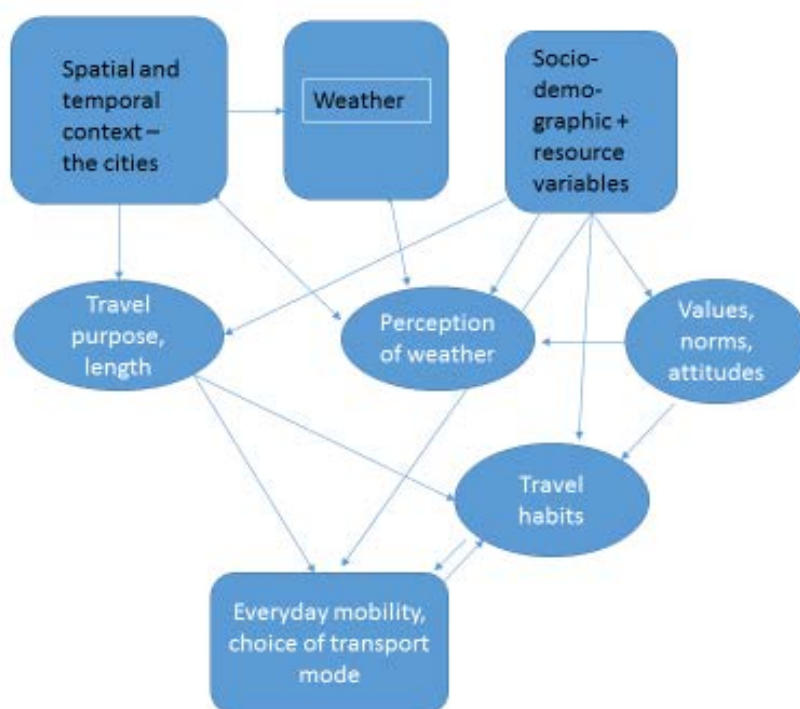


Figure 1 A model of perceptions of weather and everyday travel

Figure 1 illustrates the relationships between the variables in the conceptual model – a model that has been the basis for the discussion in focus groups and construction of the questionnaire in the surveys in the two cities.

2 Method and data

2.1 The two cities – Oslo and Stavanger

Oslo and Stavanger were selected as cases in Norway because they are cities different in both size and prevailing weather conditions.

Oslo, the capital of Norway, has a population of approx. 650 000 and this doubles when the greater urban area is included. Stavanger has about 130 000 inhabitants and 250 000 when the adjacent municipalities are included. The average temperatures of the two cities differ throughout the year – in Oslo the winter temperature lower and the summer temperature higher than in Stavanger. In the winter months (December to March) the precipitation (mostly rain) in Stavanger is double that (more snow than rain) in Oslo.

Table 2.1 Travel mode choice in the two cities and quality of public transport. National travel survey (NTS) 2013/14, own withdrawing of data from NTS.

Transport mode everyday travel and quality of public transport	Oslo	Stavanger
By foot	32	24
Cycle	5	8
Car	37	58
Public transport	26	10
Have very good public transport in the neighbourhood*	83	64

*Less than 1 km from home to bus stop/terminal and at least four departures per hour.

The choice of transport mode in everyday mobility is different between the two cities (Table 2.1) – in Oslo, people walk and avail themselves of public transport much more than in Stavanger, where the car is the most used mode of transport. The quality of public transport is much better in Oslo than in Stavanger.

2.2 Focus groups in Oslo and Stavanger

The literature on the relationship between the perception of weather indicators and travel behaviour – how people experience weather and the consequences for their everyday mobility – is not great. Previous research has focused mainly on the relationship between travel behaviour data and weather indicators; people's attitudes, values and habits are rarely part of this (cf. 1.1). It was therefore decided to have focus groups in the two cities preparing for the survey, their purpose to discuss the phenomenon with a view to coming up with the most relevant formulations and content of the questions in the survey.

Two focus group interviews were carried out in each city, and moderated by TNS Gallup. In Oslo, there were five men and three women in the oldest group (50–61 years) and three men and four women in the youngest group (18–35 years). In Stavanger, there were five men and four women in the 18–35 years group and five

women and three men in the 50–72 years group. The interviews were followed up using a guide compiled by the authors/researchers. It started with an open discussion of the prevailing weather in the two cities, later the seasons, a discussion of the perception of rain/snow, wind, sun and the relationships between weather and daily mobility. The groups ended with reflections on climate and experience of any changes in recent past years. The focus group discussions were carried out in the middle of October 2015 in both cities.

The results indicated some differences between the two cities and between the age groups. Briefly, wind was a typical topic of participants in Stavanger, but not in Oslo. The participants from Oslo experienced more instability in the weather conditions in the later years, while instability is always relatively normal in Stavanger. The older groups are more likely to select mode of transport by weather conditions.

2.3 Survey in two cities

The survey was carried out in the period 26.11.2015 – 11.12.2015, when a total of 2,097 responded, 1,060 in Oslo and 1,037 in Stavanger/Sandnes. The target group was inhabitants 18 years or older in these two urban areas.

The survey was submitted via TNS Gallup's Internet panel – GallupPanellet. All respondents/interviewees in Oslo were panel members. In Stavanger/Sandnes it was necessary to supplement with an additional sample from the population database of TNS Gallup. This part of the sample was recruited via SMS. Of the total sample in this urban area, 469 came from the Panel and 568 responded via SMS.

The response rates from the two methods were very different: 57.3% from the panel and only 4.5% of those who received the survey via SMS. The data were weighted by gender, age and education according to public statistics from Statistics Norway.

The questions can be grouped within the following: perceptions of weather and seasons, values and attitudes related to transport and weather, habits, commuting and shopping trips and climate; in addition, information about socio-demographic characteristics and transport resources.

The questionnaire is replicated here in Appendix 1 (in Norwegian).

2.4 Description of the sample

The sample comprises panel respondents from both cities and an extra sample from Stavanger recruited by SMS to a base of inhabitants in Stavanger (Bisnode Match) (Table 2.2).

Table 2.2 Sample in Oslo and Stavanger. Unweighted data

	N	Percent
Oslo, panel	1060	50.5
Stavanger, panel	469	22.4
Stavanger, SMS	568	27.1
Total	2097	100.0

Table 2.3 Background variables. Percent and number. Unweighted data

Background variables	Percent	Number
<i>Gender</i>		
Female	54	1137
Male	46	959
<i>Family</i>		
Living with partner	38	800
Living with partner and children	23	475
Living with children	5	96
Living with parents	4	79
Living alone	24	512
Shared housing	5	111
Other	1	23
<i>Car in the household</i>		
Yes, one	53	1118
Yes, several	26	538
No	21	441
<i>Driving licence for car</i>		
Yes	88	1849
No	12	247
<i>Main occupation</i>		
Working full time	57	1204
Working part time	8	164
Self-employed	3	61
Retired pensioner	16	335
Unemployed	2	45
On social security	3	72
Student	9	180
Other	2	36
<i>Education</i>		
Compulsory school	4	82
Upper secondary school	32	660
University, lower degree	34	713
University, higher degree	30	637
<i>Political preference</i>		
The Labour party	26	550
The Conservative party	21	432
The Progress party	12	242
The Centre party	2	36
The Christian Democratic party	3	67
The Liberals	7	140
The Socialist Left party	5	114
The Norwegian Green party	6	120
The Red party	4	80
Other parties	1	18
Don't know	14	291

Table 2.3 lists some background variables of the sample. In the further analyses the weighted data will be used.

3 Perceptions of weather and daily travel in the two cities

3.1 Is summer always best?

“All the leaves are brown and the sky is grey” sang the Mamas and Papas in 1965, and “California dreaming”, from which this quotation is taken, is at the top of “Winter songs” (the Guardian top list). The rest of this song is on the pessimistic side. The lyrics of some of the most popular “Summer songs” reflect California, with many positive songs from the Beach Boys in the same period as “California dreaming”¹

There are more “summer songs”, mostly with a positive content, than winter songs, which are often more melancholic. Is this an illustration of a universal perception of summer as the preferred season – or so at least in the countries of the northern hemisphere? As Table 3.1 shows, opinions in the two cities do not differ as to which season is preferable. About half of the respondents prefer the summer to other seasons. Spring is the second most preferred, and winter least.

Table 3.1 The respondents personal perception of favourite season in Oslo and Stavanger. Percent

Season	Oslo	Stavanger
Winter	5	5
Spring	23	25
Summer	51	52
Autumn	9	8
No favourite	12	10
Sum	100	100
N	1060	1034

Characteristics of summer and winter weather conditions differ between the two cities (see Tables 3.2 and 3.3).

¹ Two Norwegian variants are Jokke og Valentinerne «Her kommer vinteren» - (here comes the winter) which is a sarcastic reaction against the demand of being positive, optimistic and happy in the summer. The refrain - Her kommer vinteren (here comes the winter)
 Her kommer den kalde, fine tida (here comes the nice cold times)
 Her kommer vinteren (here comes the winter)
 Endelig fred å få (finally peace)
 The summer song is by DeLillos – “Neste sommer” (next summer) – with really nice lyrics about drinking wine, be together and take a swim.

Table 3.2 The respondents perception of summer weather in Oslo and Stavanger – a typical summer day.
Percent

Weather characteristics – summer	Oslo	Stavanger
<i>Sun and rain</i> ***		
Sunny	23	6
Partly cloudy	67	51
Cloudy	6	24
Light rain	2	15
Heavy rain	2	3
Don't know	1	1
Sum	100	100
<i>Temperature</i> ***		
<15°C	1	21
15–20°C	63	72
20–25°C	34	6
>25°C	1	0
Don't know	1	1
Sum	100	100
N	1058	1035

***p < 0.001.

Even though the majority of the population in each city say that on a typical summer day the weather can be characterized as partly cloudy, in Oslo more than 20 percent say that the summer is sunny, while in Stavanger only 6 percent perceive the summer this way. The differences are similar when it comes to temperature. The majority say that the typical summer temperature is between 15 and 20°C, but one-third of the respondents from Oslo say that the typical summer temperature is between 20 and 25°C, while in Stavanger only 6 percent say so. These characteristics are very near the objective weather descriptions.

The description of a typical winter day is also quite different in the two cities (Table 3.3), with more rain and cloudy weather in Stavanger than in Oslo, and much colder in Oslo.

Table 3.3 The respondents perception of winter weather in Oslo and Stavanger – a typical winter day.
Percent

Weather characteristics	Oslo	Stavanger
<i>Sun and rain</i> ***		
Sunny	6	0
Partly cloudy	26	5
Cloudy	27	15
Light rain	3	34
Light snow/slush	35	14
Heavy snow	2	0
Heavy rain	0	30
Don't know	2	2
Sum	100	100
<i>Temperature</i> ***		
<-5°C	15	1
-5–0°C	59	7
0–5°C	24	56
>5°C	1	35
Don't know	1	1
Sum	100	100
N	1058	1035

***p < 0.001.

These descriptions are in accordance with the official weather statistics, which show that precipitation is about double that in Stavanger compared to Oslo in the winter months, while in winter the temperature is significantly lower in Oslo.

In the focus groups that preceded the survey, one of the participants from Stavanger said that the only difference he could see between the seasons in his city was the colour of the leaves.

3.2 What people think the others do

The subjective perception of the weather and the weather statistics both indicate differences between the cities that can influence choice of transport mode. But it might also be that the different experiences of weather make people think differently about the relation between the weather conditions and the possibilities for carrying out different activities, including everyday travel.

For instance, if people are very used to “poor” weather, they might have a higher acceptance for carrying out certain activities. And it might also be that the weather influences one’s expectations of what a good winter or summer day might be. What people do, related to weather, can differ depending on both the measurable weather indicators like temperature, wind and precipitation, and the perception and experience of weather/season.

The weather is significantly different between Oslo and Stavanger. While the focus groups in Stavanger talked about the wind, the groups in Oslo hardly mentioned it. What are the differences in the characteristics of the weather? Are there major variations within any one indicator? This is important in any discussion of weather in general.

Table 3.4 gives the opinions of respondents in different weather situations in the two cities.

Table 3.4 Relation between weather and use of transport in the city. Percent

Statement	City	Strongly disagree	Disagree	Neither/nor	Agree	Strongly agree	Don't know
It seems that many cycle regardless of the weather***	Oslo	4	22	18	40	13	2
	Stavanger	10	25	16	38	8	3
It is rarely so windy that it prevents people from cycling if they want to***	Oslo	3	6	10	28	49	4
	Stavanger	19	30	13	23	13	2
People use their car for most purposes regardless of the weather***	Oslo	5	22	1	34	20	3
	Stavanger	3	11	8	38	38	2
It seems that people remain indoors when it rains	Oslo	9	24	20	36	8	2
	Stavanger	10	30	18	31	8	2
It seems that people use public transport regardless of the weather***	Oslo	1	5	9	35	49	1
	Stavanger	20	28	21	19	7	4

***p < 0.001.

The relationship between weather and cycling is different between the two cities. In Stavanger, more so than in Oslo, the respondents more often disagree on the statement that people cycle regardless of the weather. They also disagree more than people in Oslo that it is rarely so windy that they are prevented from cycling. Both these statements involve concepts about weather/wind with the possibility of a large degree of variation. The differences can be a result of how weather/wind is perceived (and actually is) in the two cities. There is more wind and “weather” in Stavanger than in Oslo, so respondents think about the weather as more severe in Stavanger than in Oslo, and therefore mean that people are less likely to cycle. Or, it could be that people in Oslo are “hardier”, that they more often cycle in poor weather.

The statements about car-driving and use of public transport related to weather reflect even greater differences between the cities. People in Stavanger agree to a greater degree than in Oslo that they take the car on most errands regardless of the weather, while, correspondingly, respondents in Oslo think that people in their city use public transport to a greater degree than the respondents from Stavanger.

These results correspond with the results from the Norwegian National Travel Survey from 2013/14. In Stavanger, about 50 percent of daily trips are by car as a driver, in Oslo the percentage is 30 (Hjorthol et al., 2014). The figures for public transport are 10 percent and 28 percent, respectively.

As shown in the model in Figure 1 it is more than weather conditions that influence daily travel. Understanding of the environmental problems related to travel, social and personal norms, including identity, habits in addition to socio-demographics are elements in the model of understanding of what weather conditions means compared to other factors.

4 Attitudes and norms related to environment and transport

4.1 Understanding the problems related to car-use

How do the respondents relate the environmental and climate problems to transport? The following three statements are presented in the survey: *Pollution from car traffic is not as serious as many say*, *It is necessary to do something with pollution from car traffic*, and *I think that climate problems are anthropogenic*, Table 4.1.

Respondents in Oslo express more worry about the environment/climate than those in Stavanger. They disagree more on the first statement and they agree more on the second and third statements. The analysis shows that the respondents from Stavanger answer “neither/nor” to a greater degree.

The differences between the respondents in the two cities can be explained by various factors, e.g. the actual pollution situation in the two cities, differences in education and political sympathy, which we take a closer look at later in this report.

Table 4.1 Statements about environment/climate and transport – understanding of the problem. Percent

Statement	City	Strongly disagree	Disagree	Neither/nor	Agree	Strongly agree
Pollution from car traffic is not as serious as many say***	Oslo	43	26	16	11	5
	Stavanger	33	25	21	12	9
It is necessary to do something about pollution from car traffic***	Oslo	4	4	14	31	47
	Stavanger	7	7	17	30	39
I think that climate problems are anthropogenic***	Oslo	4	5	12	27	52
	Stavanger	7	8	18	27	40

***p < 0.001.

4.2 Personal norms and values

Norms and values can influence daily travel and choice of transport. In this survey, there are indicators of both general values and norms directly related to the use of transport.

Political preference is an indicator of general values, giving a good indication of the understanding of the problem and personal norms. There are significant covariations between these two sets of variables (see Tables A1-A3 in Appendix 2). Those preferring the Progress party (a right-wing populist party) were most sceptical of the description of pollution and climate problems, while Green Party voters were at the other end.

Table 4.2 shows the difference in political preference in the two cities. The respondents were asked which party they would vote for if there was to be a parliamentary election the next day.

Table 4.2 Political preference – Which party would you vote for if there was an election for parliament tomorrow? (by city). Percent

Political preference***	Oslo	Stavanger
The Labour party	26	26
The Conservative party	21	18
The Progress party	8	18
The Centre party	1	2
The Christian democratic party	2	4
The Liberals	7	5
The Socialist left party	7	2
The Norwegian green party	8	5
The Red party	6	2
Other parties	1	1
Don't know	15	17

On comparing these figures with the parliamentary elections in 2013, we can see some deviations. In Oslo, the two largest parties (the Labour party and the Conservative party) got about 5 percent more of the votes, while the smaller ones got less. In Stavanger, the biggest deviation was in votes for the Conservative party, which got many more in the elections in 2013 than in the survey (33% vs 18%). The other differences are not so big. As Table 4.2 shows, 15 percent in Oslo and 17 percent in Stavanger had not made up their mind; they didn't know what they would have voted (this is not taken into consideration when the percentages are compared).

Table 4.3 Statements about environment/ climate and transport – personal norms in Oslo and Stavanger. Percent

Statement	City	Strongly disagree	Dis-agree	Neither/n or	Agree	Strongly agree
If I drive it has negative consequences for the environment***	Oslo	4	5	15	38	37
	Stavanger	8	9	19	35	30
Cycling on daily travel is good for the environment***	Oslo	3	2	12	29	54
	Stavanger	7	3	12	29	49
According to my values I feel an obligation to reduce car-use as much as possible***	Oslo	12	11	25	27	25
	Stavanger	20	15	21	25	18
I try to walk, cycle and use public transport to save the environment even if the weather is poor ***	Oslo	13	13	22	23	29
	Stavanger	33	19	17	15	16

***p < 0.001.

Statements relating to personal norms about the connection between own travel behaviour and the perception of environmental consequences are presented in Table 4.3. The majority of respondents, in both Oslo and Stavanger, agree that car-use has negative consequences for the environment, but a significantly bigger number in Oslo than in Stavanger. Other statements reflect the same tendency, especially in the case of the last one – *I try to walk, cycle and use public transport to save the environment even if the weather is poor*. One-third in Stavanger strongly disagree compared to only 13 percent in Oslo. Whether this is related to people’s values (political preferences), the conditions conducive to use of public transport, which are better in Oslo than in Stavanger², or other factors are all discussed later in this paper.

4.3 Social norms – important others

Part of someone’s norm set is the influence of opinions or values of “important others” – such as friends and family (see Table 4.4).

Table 4.4 Statements about environment/ climate and transport – social norms in Oslo and Stavanger. Percent

Statement	City	Strongly disagree	Disagree	Neither/nor	Agree	Strongly agree
My family and nearest friends think it is important to reduce car-use even if it rains/snows or is windy***	Oslo	17	20	37	18	8
	Stavanger	28	21	30	16	5
My family and nearest friends think it is important to cycle even if it rains/snows or is windy**	Oslo	25	23	37	11	3
	Stavanger	31	19	33	12	5

***p < 0.001, **p < 0.01.

Respondents in both cities generally disagree or do not have an opinion on what family and friends think about reduced car-use and cycling regardless of the weather conditions (Table 3.8). This illustrates that opinions/meanings are rarely expressed – it seems unusual for normative signals to be given on this topic.

4.4 Identity connected to transport

Research on identity in relation to transport has been concentrated to a large degree on different aspects of the car (e.g. Steg, 2005). In this survey, we also tried to relate cycling, walking and use of public transport to identity (Table 4.5).

As in the previous analysis on the normative statements, the two cities differ.

² In Oslo 83 percent of the population live less than 1 km from the nearest bus stop/terminal where the frequency of the bus/rail is at least four times an hour. In Stavanger (including Sandnes) the percentage is 54.

Table 4.5 Identity and relation to transport in Oslo and Stavanger. Percent

Statement	City	Strongly disagree	Dis-agree	Neither/nor	Agree	Strongly agree
I like car-driving***	Oslo	7	10	16	33	34
	Stavanger	3	6	11	29	51
Driving a car is typical me***	Oslo	23	18	18	23	18
	Stavanger	13	13	17	25	33
If I cannot drive I don't carry out the activity***	Oslo	58	22	11	7	2
	Stavanger	40	25	16	13	6
I like to cycle	Oslo	14	12	16	32	26
	Stavanger	17	14	15	29	25
Cycling is typical me***	Oslo	16	24	24	26	11
	Stavanger	23	20	19	20	18
Traveling by public transport is typical me***	Oslo	13	14	15	30	28
	Stavanger	51	18	9	12	10
I like to walk***	Oslo	2	4	9	34	51
	Stavanger	4	6	12	33	45
Walking is typical me***	Oslo	3	10	19	38	31
	Stavanger	10	14	21	32	23

***p < 0.001.

It is apparent that the respondents in Stavanger have a stronger “car identity” than those in Oslo. They like car-driving; they say that driving a car is “typical of me” and that some activities would otherwise be excluded if they were not to use the car more often than the people from Oslo. The respondents from Oslo identify themselves more as public transport users and walkers than those from Stavanger.

When it comes to cycling there is no difference regarding how much they like it, but a higher percentage of the respondents from Stavanger strongly agree with the statement that *–cycling is typically me*. From the National Travel Survey from 2013/14 we know that people in Stavanger cycle on everyday travel more than people in Oslo (Hjorthol et al., 2014).

5 Habits related to weather conditions and own travel behaviour

As discussed in the Introduction, habits can be important in daily mobility. Table 5.1 shows that people from Stavanger are more habitual car-users than people in Oslo. More than 60 percent of the respondents in Stavanger agree or strongly agree that car-driving is part of the daily routine. In Oslo the percentage is 47. About one-third of respondents strongly agree that they always use the car when it rains and on almost all tasks.

Table 5.1 Opinions of the relation between weather and own use of a car. Percent

Statement	City	Strongly disagree	Dis-agree	Neither/nor	Agree	Strongly agree
I always take the car when it rains***	Oslo	33	21	13	20	13
	Stavanger	21	15	12	19	34
Car driving is part of my daily routine***	Oslo	38	16	9	15	22
	Stavanger	21	10	8	18	43
I drive on almost all errands***	Oslo	40	20	9	16	15
	Stavanger	20	15	8	22	35

***p < 0.001.

There is a large majority in both cities that do not cycle, no matter the weather, and especially not in winter. However, the respondents in Stavanger seem to have more committed cycling habits than respondents in Oslo have (Table 5.2).

Table 5.2 Opinions of the relation between weather and own use of bicycle. Percent

Statement	City	Strongly disagree	Dis-agree	Neither/nor	Agree	Strongly agree
I cycle regardless of the weather in the summer season***	Oslo	33	27	12	19	10
	Stavanger	40	17	13	14	17
I cycle regardless of the weather in winter***	Oslo	78	12	4	4	2
	Stavanger	58	16	9	9	8
I cycle on nearly every errand in the summer season**	Oslo	35	21	16	19	9
	Stavanger	40	23	12	14	11

***p < 0.001.

In Oslo, people have strong habits of using the public transport system, while only a minority in Stavanger say that they use public transport regularly, in either summer or winter (Table 5.3).

Table 5.3 Opinions of the relation between weather and own use of public transport. Percent

Statement	City	Strongly disagree	Disagree	Neither/n or	Agree	Strongly agree
Travelling by public transport is part of my daily routine in the summer season***	Oslo	27	15	10	19	30
	Stavanger	66	10	5	8	11
Travelling by public transport is part of my daily routine in winter***	Oslo	23	10	10	16	41
	Stavanger	65	10	5	6	14
I use public transport to most tasks regardless of the weather***	Oslo	24	18	12	22	24
	Stavanger	65	13	8	6	9

***p < 0.001.

Travel habits in the two cities seem very different. While the respondents in Stavanger are typical car-users, Oslo respondents are used to public transport to a much greater degree. The transport habits correspond to the identities (cf. 4.5). This difference is probably a consequence of the difference in the quality of public transport, which is much better in Oslo than in Stavanger. It may also be a consequence of cultural mores in relation to use of modes of transport – but these are more anecdotal – in Stavanger as a city affected by American culture (as an international “oil-city”), and that only “losers” use public transport (cf. George W Bush, US President, campaign speech *What will I do for public transport? I will improve the economy so you can find good enough work to be able to afford a car* and Margaret Thatcher, former British PM – *Any man who takes a bus to work after the age of 30 can count himself a failure in life*). Neither the focus groups nor the survey can support these “stories”.

6 Commuting and shopping trips over the year

Results from the Norwegian National Travel Surveys show that commuting (travel to and from work) and shopping trips (shopping for groceries) constitute most of everyday travel – on average about half of everyday trips (Hjorthol et al., 2014).

6.1 Commuting

Commuting is not a type of daily travel that varies much. Travel distance is the same, mode of transport is the same and errands are often carried out regularly on the way to and from the job. Commuting is usually at the same hour and over the same distance, and changing from one mode of transport to another is not so common, especially among car-users. The National Travel Survey indicates that many of those who cycle in the summer use public transport in winter (Hjorthol et al., 2014).

Table 6.1 Travel mode choice on journey to work by season in Oslo and Stavanger. Percent

Season	City	On foot	Cycle	Car driver	Car passenger	Public transport	Other
Winter (Dec.-Feb.) ***	Oslo	15	3	22	1	57	1
	Stavanger	11	11	53	3	18	4
Spring (March-May) ***	Oslo	18	11	21	1	47	3
	Stavanger	10	18	48	3	17	4
Summer (June-Aug.) ***	Oslo	18	17	20	1	41	4
	Stavanger	11	21	45	2	16	4
Autumn (Sept.-Nov) ***	Oslo	14	11	22	1	50	2
	Stavanger	11	16	50	3	17	3

***p < 0.001.

In Oslo, public transport is the typical mode of travel and is highest in winter, lowest in summer (Table 6.1). The percentage of car-driving is the same the year round. In the summer season, nearly one in five cycle, while the number walking is the same in all seasons.

In Stavanger, the typical transport mode of commuters is the car, which is highest in winter, lowest in summer. Use of public transport and walking is the same regardless of season. The percentage cycling is higher in Stavanger than in Oslo; and in Stavanger it is some of the car users who changes to cycling in the summer, while in Oslo it is some public transport users who change to cycling in the summer.

About half of the respondents say that the weather is not important in their choice of transport mode to work (Table 6.2). The respondents from Oslo and Stavanger are both of the same opinion about temperature and precipitation. When it comes to wind, many more respondents in Stavanger than in Oslo say that wind is of varying significance in their choice of transport mode (25 percent). This is in accordance with

the results from the focus groups, where wind was mentioned to a much greater degree in Stavanger than in Oslo.

Table 6.2 Importance of aspects of the weather in the choice of transport mode on commuting. Percent

Weather aspect	City	Not important at all	Not very important	Neither/nor	Some-what important	Very important
Temperature	Oslo	50	13	11	20	6
	Stavanger	53	11	13	16	7
Precipitation	Oslo	48	9	11	20	12
	Stavanger	50	9	11	18	13
Wind***	Oslo	58	15	13	11	3
	Stavanger	54	9	12	17	8

***p < 0.001.

Respondents in the two cities also agree that travel time, convenience and practicality are all important considerations in their getting to the workplace (Table 6.3). These three aspects are the most important ones, while costs (which people in Oslo regard as more important than the people in Stavanger do), health benefits and environmental aspects are of less importance. The respondents in Stavanger emphasise environmental aspects less importantly than those in Oslo.

Table 6.3 Importance of different aspects in the choice of transport mode on commuting. Percent

Different aspects	City	Not important at all	Not very important	Neither/nor	Some-what important	Very important
Travel time	Oslo	7	3	5	31	54
	Stavanger	8	3	7	25	57
Costs**	Oslo	11	8	15	39	28
	Stavanger	16	9	18	32	25
Practical	Oslo	5	1	4	28	61
	Stavanger	5	1	7	24	63
Easy	Oslo	6	3	5	30	57
	Stavanger	6	3	8	25	58
Gives health benefit	Oslo	18	13	25	31	13
	Stavanger	22	10	25	28	15
Good for the environment	Oslo	14	7	22	33	23
	Stavanger	24	11	23	29	13

***p < 0.001, **p < 0.01.

6.2 Shopping trips

On average, people in Norway shop for groceries nearly every second day (Hjorthol et al., 2014), and so mode of transport on shopping trips is an important consideration. The differences between the two cities in this survey are significant (Table 6.4). While the majority in Oslo walk to the shops, in Stavanger they drive.

Table 6.4 Transport mode on shopping trips by season in Oslo and Stavanger. Percent

Season	City	On foot	Cycle	Car driver	Car passenger	Public transport	Other
Winter (Dec.-Feb.) ***	Oslo	58	2	28	5	8	0
	Stavanger	21	3	65	8	2	1
Spring (March-May) ***	Oslo	61	4	25	4	6	1
	Stavanger	24	5	62	6	2	1
Summer (June-Aug.) ***	Oslo	61	5	24	3	6	1
	Stavanger	27	6	58	6	2	1
Autumn (Sept.-Nov.)	Oslo	59	4	25	4	7	1
	Stavanger	22	5	64	7	2	1

***p < 0.001.

Like for commuting, temperature, precipitation and wind are aspects perceived as not very important in the choice of transport mode on shopping trips (Table 6.5). Precipitation is the most important weather indicator, i.e. for about 30 percent of the respondents in both cities. People in Stavanger are significantly more likely than those in Oslo to emphasize the importance of the weather conditions, but the differences are small and are greatest for wind.

Table 6.5 Importance of weather aspects in choice of transport mode on shopping trips. Percent

Weather aspect	City	Not important at all	Not very important	Neither/nor	Some-what important	Very important
Temperature **	Oslo	56	12	17	12	3
	Stavanger	53	10	17	16	5
Precipitation ***	Oslo	51	11	15	17	6
	Stavanger	48	9	14	18	11
Wind ***	Oslo	60	13	17	8	2
	Stavanger	51	11	17	15	6

***p < 0.001.

Among other aspects of transport mode choice on shopping trips, convenience and ease of use are emphasised, more so in Stavanger than in Oslo (Table 6.6). Health benefits and environmental considerations are less important.

Table 6.6 Importance of different aspects in choice of transport mode on shopping trips. Percent

Different aspects	City	Not important at all	Not very important	Neither/nor	Some-what important	Very important
Travel time **	Oslo	16	5	14	33	33
	Stavanger	13	5	16	27	39
Costs	Oslo	22	12	22	26	18
	Stavanger	24	14	24	23	15
Practical ***	Oslo	10	2	9	30	49
	Stavanger	7	1	9	25	58
Easy **	Oslo	9	3	9	34	45
	Stavanger	8	2	11	28	51
Gives health benefit	Oslo	31	12	27	21	8
	Stavanger	33	13	29	18	7
Good for the environment ***	Oslo	24	11	29	22	14
	Stavanger	28	15	28	22	7

***p < 0.001, **p < 0.01.

7 Combinations of weather aspects for cycling and walking

Combinations of temperature and precipitation considered conducive to cycling are given in Table 7.1 (3–5 km or longer). A majority of the respondents in both cities will cycle at any temperature (we have not presented the very low winter temperature) so long as there is no precipitation, and the percentage varies little between the temperature intervals. When there is light rain/snow the percentages cycling are less, and more at lower than higher temperatures. Still, there are no differences between the cities. When the weather is characterized by showers, the respondents in Stavanger more often than in Oslo say that they will cycle at temperatures below 20°C. Even with persistent rain the Stavanger respondent will cycle more than his/her counterpart from Oslo at most temperatures, but the percentage is lower than for the other combinations.

Table 7.1 Combination of temperature and weather characteristics when one would cycle (3-5 km). Percent

Temperature	City	Weather characteristics			
		No precipitation	Light rain/snow	Showers	Persistent precipitation
< 0°C	Oslo	69	14	13***	8**
	Stavanger	71	17	21	11
	Both	70	16	17	9
0–9°C	Oslo	69	25	20***	7***
	Stavanger	69	25	32	14
	Both	69	25	26	11
10–19°C	Oslo	58**	37	40*	16**
	Stavanger	65	34	46	22
	Both	62	36	43	19
20–24°C	Oslo	58*	36	48	22**
	Stavanger	64	36	49	28
	Both	61	36	48	25
> 25°C	Oslo	60	40	47	27
	Stavanger	60	37	50	30
	Both	60	38	48	29

***p < 0.001, **p < 0.01.

It is the precipitation, not the temperature (within these intervals), that is important for cycling (see Table 7.1).

The corresponding question was asked about walking (Table 7.2). The acceptance of combinations of temperature and precipitation shows another picture. People walk to a large degree regardless of temperature. While there are hardly any differences

between the respondents regarding walking when there is no precipitation, the result shows that people in Oslo walk more when there is light rain/snow or persistent precipitation than those in Stavanger. When it is showery they also walk more at all temperatures than respondents in Stavanger. These results might be indications of differences in how precipitation in the two cities is experienced. It could be that rain in Stavanger is more combined with wind than in Oslo and that the weather then seems worse. It could also be that accessibility and habitual use of a car among the respondents in Stavanger (cf. Table 5.1) makes it easier to decide on the car when it rains than it is for the Oslo respondents, who take the car to a much lesser extent. People in Oslo walk more on everyday trips (cf. Table 6.4).

Table 7.2 Combination of temperature and weather characteristics when one would walk (2–3 km). Percent

Temperature	City	Weather characteristics			
		No precipitation	Light rain/snow	Showers	Persistent precipitation
< -10°C	Oslo	67*	42**	31**	32***
	Stavanger	62	35	26	26
	Both	65	39	29	29
-1 to -9°C	Oslo	68	49***	35***	37***
	Stavanger	66	38	28	27
	Both	67	43	31	32
0–9°C	Oslo	66	55***	43*	35***
	Stavanger	65	44	40	27
	Both	65	49	42	31
10–19°C	Oslo	65	54***	52	40***
	Stavanger	63	45	50	31
	Both	64	49	51	36
> 19°C	Oslo	66	53***	53	44***
	Stavanger	64	44	51	34
	Both	65	49	52	39

***p < 0.001, **p < 0.01.

8 Climate change and changes in travel

In the focus groups the participations from Stavanger said that they were used to instable and changing weather conditions, while those from Oslo claimed that there had been signs of more instability in recent years.

In the survey, the respondents were asked whether they had experienced changes in weather conditions. A majority (70–80 percent) said that they had experienced changes in most of these weather conditions (Table 8.1) – more rain, more wind and warmer weather than before. On the general question about changing weather, a few more of the respondents in Oslo said that they had experienced more changing weather than earlier. They thought it was warmer and that there was less snow. The respondents in Stavanger experienced more wind and rain than previously.

Table 8.1 Climate change and weather. Percent

Statements	City	Strongly disagree	Disagree	Neither/n or	Agree	Strongly agree	Don't know
More rain than previously***	Oslo	3	8	25	35	21	8
	Stavanger	6	6	27	30	26	5
Warmer than previously***	Oslo	4	10	22	35	23	6
	Stavanger	10	14	29	28	15	4
More snow than previously***	Oslo	34	39	18	4	2	5
	Stavanger	41	28	21	5	2	3
Less snow than previously***	Oslo	3	3	13	39	37	4
	Stavanger	7	10	30	29	20	5
More wind than previously***	Oslo	3	8	35	29	15	10
	Stavanger	7	10	30	30	20	5
More changing weather than previously***	Oslo	3	5	20	33	32	6
	Stavanger	7	5	26	28	29	5

***p < 0.001.

A large majority in both cities (about 75 percent) say that the changing weather conditions did not influence their mode of transport (Table 8.2). About half cycle more and the other half less, and there is no difference between the cities. About one-fifth in both cities say they walk more. In Oslo, more people say they drive less than before, and use public transport instead. In Stavanger, there is no difference between those who do it more and those who do it less.

Table 8.2 Climate change and changes in everyday travel. Percent

Transport mode	City	More than previously	Less than previously	No change
Cycle	Oslo	12	9	78
	Stavanger	12	11	77
Walk*	Oslo	21	5	73
	Stavanger	18	8	74
Car driving***	Oslo	5	19	76
	Stavanger	13	11	76
Use public transport***	Oslo	20	5	75
	Stavanger	12	10	78

***p < 0.001, **p < 0.01.

Even though a majority claim they have experienced changes in weather conditions, only to a minor degree has it influenced their choice of travel mode, as reported here.³

³ The question was: Have these changes influenced your mode choice in daily travel?

9 A multivariate analysis of choice of transport mode on shopping trips

In the previous sections bivariate analyses have been presented showing the varying attitudes, norms, identities, habits and modes of travel of the people of Oslo and Stavanger.

In this section, we go back to the model presented in the Introduction and examine how the different variables influence choice of transport mode in everyday travel, exemplified by shopping for provisions. The dependent variable is car-driving on shopping trips. Respondents with a driving licence and a car in the household are selected for the analysis. Shopping trips are chosen because most people have to buy groceries, and compared to commuting, this travel purpose gives more choices where, when and how to travel.

The model presented in Figure 1 contains sets of variables and it is necessary to reduce the number by doing a selection. The selection should secure that the “right” variables are taken into the further analysis. When several variables measure different aspects of the same phenomenon, factor analysis can be used in the selection process, often called data reduction.

Factor analysis includes questions related to identity, norms and understanding of the problem, i.e. variables presented in 3.2–3.5 (Appendix 3). Based on the results from this analysis, six variables loading highest on the corresponding (six) factors were selected. “*It is necessary to do something with car traffic*” representing factor 1 (environmentalists). “*Travelling by public transport in winter is part of my daily routine*” representing factor 2 (public transport users). “*Car-driving is typical me*” represents factor 3 (car-drivers). “*Cycling is typical me*” representing factor 4 (The cyclists). “*I like walking*” representing factor 5 (The walkers). “*My nearest friends and family think one should cycle even if it is raining or windy*” representing factor 6 (The norm-ridden).

Political preference also represents people’s values. The variable is recoded into left wing (the Labour party, the Socialist left party, The Red party and the Norwegian Green party) and right wing (The Conservative party, The Progress party, The Centre party, the Christian Democratic party, the Liberals and other parties).

Gender, family (with or without children), education (low vs high (university)), city, place of residence, all represent several aspects, e.g. differences in access to public transport, size of the urban area and weather conditions – precipitation, wind and temperature.

Assessments of the aspects of weather (temperature, precipitation and wind) related to commuting and shopping are used in a recoded version (important vs not important/neither nor) as an indicator of perception of weather.

Table 9.1 Logistic regression use of car on shopping trips in winter (December-February), spring (March-May), summer (June-August) and autumn (September-November). Respondents with driving licence and car in the household. (Full analysis in Appendix 4). Sign indicates relation between variables, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Variables in the model	Winter	Spring	Summer	Autumn
City ¹				
Oslo	—***	—***	—***	—***
Gender ²				
Female				
Age	+***	+**	+	+**
Type of family ³				
With children	+***	+***	+***	+***
Education ⁴				
Basic/high school				
Necessary to do something about pollution from cars ⁵ 20_2				
Strongly agree	—*	—*		
Agree		—**	—*	
Neither nor		—*		—*
Travelling by public transport is part of my daily routine ⁶ 15_9				
Strongly agree	—**	—*		—**
Agree	—**		—*	—*
Neither/nor	—*			—*
It is typical me to drive a car ⁷ 17_2				
Strongly agree	+***	+***	+***	+***
Agree	+***	+***	+***	+***
Neither/nor	+**			+
It is typical me to cycle ⁸ 17_5				
Strongly agree	—**	—*	—**	—**
Agree				
Neither/nor				
I like walking ⁹ 17_8				
Strongly agree	—**	—*	—**	—*
Agree	—*	—*	—**	
Neither/nor				
My family and friends think one should cycle even if it rains or is windy ¹⁰ 20_9				
Strongly agree				
Agree				
Neither/nor				
Importance of temperature in choice of transport mode on shopping trips ¹¹ 13_1				
Important	+		+	
Neutral				
Importance of precipitation in choice of transport mode on shopping trips ¹² 13_2				
Important		—**	—***	—*
Neutral				
Importance of wind in choice of transport mode on shopping trips ¹³ 13_3				
Important				
Neutral		+		+
Political preference ¹⁴				
Left-wing parties				

Reference categories: 1) Stavanger, 2) Male, 3) without children, 4) University, 5) Do not agree, 6) Do not agree, 7) Do not agree, 8) Do not agree, 9) Do not agree, 10) Do not agree, 11) Do not agree, 12) Do not agree, 13) Do not agree, 14) Right-wing parties.

It can be seen from Table 9.1 that the variables influencing car-use are similar throughout the four seasons. The cities representing the spatial context (with their characteristics) significantly influence the decision to drive. The respondents in

Stavanger drive a car on shopping trips to a much greater degree than those in Oslo. As indicated in the Introduction, the two cities differ regarding access to alternative transport (public transport), and also regarding weather. The differences shown in this analysis can therefore be the result of different characteristics of the cities. Even when controlled for “car identity”, respondents in Stavanger take the car significantly more than respondents in Oslo on trips to buy groceries.

Respondents in families with children more often take the car when shopping than those without. One explanation could be the volume of provisions bought – larger families need more than small families. Another could be that the children are taken on the shopping trip with the parents, when it is easier with the car than without.

Car-use also increases with age, which can be related to a greater need for help in transporting the purchased goods, or it might be that car-use habits develop over a period of years.

Attitudinal variables related to transport mode identity have the greatest influence, especially in connection with the car. Those who agree with the statement “It is typical me to drive a car” take the car when shopping to a greater degree than those who disagree. And this relation is stronger than the negative relation between car-use and the identity connected with walking, cycling and use of public transport. However, the analysis also shows that those with an identity connected with these other transport modes have significantly lower car-use on these shopping trips than those who don’t express these identities.

The variable representing the perception of the problem related to cars – “*It is necessary to do something about the pollution from cars*” – has a significantly negative influence on car-use in the winter and spring analysis, but the relation is not very strong. This suggests, even though Table 3.5 shows that quite a large majority agree with this statement, that only a minority let this perception influence their travel mode choice on shopping trips.

Political preference, representing basic values, has no significant influence on mode choice on shopping trips in these analyses.

When it comes to the effects of temperature, precipitation and wind in choosing the car for shopping, the analysis shows that temperature has a positive effect in winter and summer but not in the other two seasons, and the relation is not strong. Precipitation has a negative effect on car-use in spring and summer, which is difficult to explain. Wind has no influence on the car being chosen in these analyses.

10 A Short summary and preliminary conclusions

The aim of this report has been to analyse perceptions of different aspects of weather (preliminary precipitation, temperature and wind) and to find relationships in everyday travel. Different aspects of actual and perceived weather and the connection with everyday mobility have received little study to date.

Weather, however, is only one aspect, and in most cases not the most important one in travel mode choice or in other aspects of daily mobility. In studying the effect of weather, characteristics of where people live and of their household have to be examined too (see model in Figure 1). The spatial context is represented by the two cities chosen, namely Oslo and Stavanger. The individual variables are socio-demographic, transport resources, attitudes, norms and habits operationalised in the questionnaire and shown in the analysis.

Since our knowledge of this topic is limited, we wanted to cover a wide range of aspects, and to have a good basis on which to ask the “right” questions, focus group interviews were carried out prior to the survey.

We concentrated the bivariate analysis on differences between the two cities, primarily because they differ significantly in regard to important weather indicators (temperature, precipitation and wind). While Oslo has an inland climate, with cold winters and warm summers, Stavanger is coastal, with less variation in temperature during the year and more precipitation and wind than Oslo. Our hypothesis is that this will influence how the inhabitants travel. But there are also other differences between the two cities that are important for daily mobility. Oslo is about three times the size of Stavanger and has a much better public transport supply to offer its inhabitants than Stavanger has.

Since the survey consists of random samples from the two cities, the distributions of age and gender correspond in the public statistics. But this does not mean that other characteristics of the samples are distributed in the same way. Before the multivariate analysis, bivariate analysis determined whether respondents from the two cities vary when it comes to individual attitudinal characteristics.

10.1 The favourite seasons and what the others do

To a general question about favourite season, respondents from both cities gave the same answer, half of them saying that it was the summer, with the winter the season the least favourable. But when it came to describing a typical summer day respectively winter day in the two cities, it is clear that summer and winter are perceived differently. According to the respondents from Oslo, 23 percent say a typical summer day is sunny, while 34 percent claim that the temperature is in the interval 20–25°C. The corresponding figure from Stavanger is 6% for both sun and temperature. A typical winter day in Oslo is described as light snow (35%) with a

temperature between -5 and 0°C (59%). In Stavanger, a typical winter day is characterized by light rain (34%) and a temperature between 0 and 5°C (56%).

When asked what other people do in similar situations, they might relate this to what they do themselves or answer believing that others are less (or more) socially acceptable as expected (as they would report for themselves). The respondents in Oslo are more inclined than those in Stavanger to cycle regardless of weather conditions, while respondents in Stavanger are more likely to say the wind is sometimes so strong that it is impossible to cycle. The respondents in Stavanger also say that people in their city drive irrespective of the weather, while people in Oslo use public transport in all weather conditions.

10.2 Values, norms and attitudes

Political preference is an indicator of people's values and is significantly different between the two cities. In Stavanger the people are more on the right wing than the respondents in Oslo, which corresponds with the parliamentary election results in 2013. Political preference covariates with environmental questions, about which respondents from Oslo are more concerned than those in Stavanger.

There are also significant differences between the two cities on questions about self-identity and travel habits. While the respondents in Stavanger have clear car identities and car-use habits, people in Oslo have their "transport identity" and travel habits connected to public transport.

10.3 Commuting, shopping and weather

Transport identities are reflected in the mode of transport chosen on commuting and shopping trips. In Stavanger, car-driving is typical in all seasons on both commuting and shopping. In Oslo, people travel by public transport to and from work, and around 60 percent walk when shopping. In both cities, people cycle more in summer and spring than in winter, but this difference is less marked in Stavanger than in Oslo. Around 20–30 percent believe that the weather (temperature, precipitation and wind) is an important consideration in their choice of transport, a little more in Stavanger than in Oslo concerning the wind for both travel purposes.

The respondents were asked about the combination of temperature and precipitation when they would cycle (3–5 km) and, correspondingly, walk (2–3 km). For cycling, it is precipitation that is the more important, the percentage decreasing with increasing precipitation. There are minor differences between the cities. Walking is less influenced by rain, and less in Oslo than in Stavanger.

Even though as many as 70–80 percent say that they have experienced weather changes during recent years, about 75 percent don't think they influence the mode of transport they choose.

10.4 The effect of weather

Does weather influence travel mode choice, especially car-use, when controlling for the effects of the other variables?

To examine this, we carried out a multivariate analysis on car-use on shopping trips in all four seasons. Compared to other variables, the different aspects of the weather have relatively little influence on car choice. The indicators on weather in this analysis were how important people reported temperature, precipitation and wind in their choice of mode on shopping trips. The temperature had a significant, but minor effect on car-use in winter and summer. Those who consider precipitation important in their choice select modes other than the car in all seasons except winter.

10.5 Some conclusions

Several factors influence how people travel in daily life and the mode they decide on or have available, and weather is one among many others. In this report we have tried to connect different aspects of weather with both attitudinal and other variables to show how weather can play a role in daily mobility. We have tried to include weather in a wide range of situations to illustrate the impact it has on everyday life.

The results show that even though the weather (of course) is embedded in people's daily lives, it is not so clear how everyday travel is influenced by it. People cycle less when it rains, and temperature has an impact on mode choice, but there is also a range of other factors that influence choice. As this report indicates, access to alternative modes, the family situation, environmental consciousness and self-identity are all examples of variables that have a greater impact on transport mode than weather conditions in it self. However, this doesn't mean that weather will not influence daily mobility. This report shows that precipitation and wind – indicators that have an significant impact – will be more important in the future, because the weather in most of the country will be wetter and wilder.

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Appendix 1 Spørreskjema

CAWI Questionnaire

Name of survey

Klimaforandring og daglig mobilitet

Client name

Author(s)

Nylen, Joakim

This questionnaire was written according to TNS quality procedures

checked by



Repeating study (if this survey has been previously conducted)	
Name of survey	Klimaforandring og daglig mobilitet
Version	1
Author(s)	Nylen, Joakim
Contact	
Panel	
Duration of questionnaire	
Sample size	Gross: Net:
Sample description	
Quota	
If several countries: indicate the countries	
If several targets	
Check-in site	www.tns-nipo.com
Comments	

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Q029 - Q029

Q030 - Q030

End B008

Q031 - Q031

Q001 - Q001

Single coded

[Not back](#)

Utvalg

[Normal](#)

- 1 Oslo, panel
- 2 Stavanger / Sandnes, panel
- 3 Stavanger / Sandnes, SMS

Ask only if Q001 - Q001,3

Q002 - Q002

Single coded

[Not back](#)

Hva regner du som din hovedbeskjeftigelse?

[Normal](#)

- 1 Inntektsgivende arbeid heltid (100 % stilling)
- 2 Inntektsgivende arbeid deltid (mindre enn 100 % stilling)
- 3 Selvstendig næringsdrivende
- 4 Alderspensjonist
- 5 For tiden arbeidsledig/arbeidstrygd
- 6 Annen type trygd
- 7 Elev, student
- 8 Hjemmeværende/husarbeid i hjemmet
- 9 Annet

Q016 - Q016

Single coded

[Answer not required](#) | [Not back](#)

Har du førerkort for bil?

[Normal](#)

- 1 Ja
- 2 Nei

Q018 - Q018

Single coded

[Not back](#)

Har du bil i husholdet?

[Normal](#)

- 1 Ja, en
- 2 Ja, flere
- 3 Nei

Q019 - Q019

Multi coded

[Answer not required](#) | [Not back](#)

Har du sykkel tilgjengelig til bruk?

Flere svar mulig.

Normal

- 1 Ja, egen sykkel
- 2 Ja, egen sykkel utstyrt for vintersykling
- 3 Ja, El-sykkel
- 4 Ja, bysykkel
- 5 Nei **Exclusive*

B001

Begin block

Q003 - Q003

Single coded

[Answer not required](#) | [Not back](#)

Hvordan er været en typisk **sommerdag** i BY?

Normal

- 1 Sol
- 2 Halvskyet
- 3 Overskyet
- 4 Lett regn
- 5 Mye regn
- 6 Vet ikke

Q004 - Q004

Single coded

[Answer not required](#) | [Not back](#)

Hvordan er temperaturen en typisk **sommerdag** i BY?

Normal

- 1 Under 15 °C
- 2 15-20 °C
- 3 20-25 °C
- 4 Over 25 °C
- 5 Vet ikke

Q005 - Q005

Single coded

[Answer not required](#) | [Not back](#)

Hvordan er været en typisk **vinterdag** i BY?

Normal

- 1 Sol
- 2 Halvskyet
- 3 Overskyet
- 4 Lett regn
- 5 Lett snø / slaps
- 6 Mye snø
- 7 Mye regn
- 8 Vet ikke

Q006 - Q006

Single coded

[Answer not required](#) | [Not back](#)

Hvordan er temperaturen en typisk **vinterdag** i BY?

Normal

- 1 Under -5 °C
- 2 -5-0 °C
- 3 0-5 °C
- 4 Over 5 °C
- 5 Vet ikke

Q007 - Q007

Single coded

[Answer not required](#) | [Not back](#)

Hva er din favorittårstid?

Normal

- 1 Vinter
- 2 Vår
- 3 Sommer
- 4 Høst
- 5 Har ingen favorittårstid

B001

End block

B002

Begin block

Q008 - Q008

Matrix

Answer not required | Not back | Number of statements: 5 | Number of Scales: 6

Her kommer noen påstander om hvordan folk her i BY forholder seg til været. Hvor enig eller uenig du er i at...

Random

	Helt uenig	Litt uenig	Verken enig eller uenig	Litt enig	Helt enig	Vet ikke
Det virker som om mange i BY sykler nesten uansett vær	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det blåser nesten aldri så mye i BY at det hindrer folk fra å sykle hvis de har lyst	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det virker som folk i BY bruker bil til det meste uansett vær	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det virker som folk i BY holder seg inne når det er regnvær	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg tror at folk i BY reiser mye kollektivt uansett vær	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B002

End block

B003

Begin block

Q032 - Q009b

Numeric

Not back | Max = 999

Omtrent hvor langt er det til arbeidsplassen din?

Oppgi omtrentlig antall km.

Ask only if Q002 - Q002,1,2,3,7

Q009 - Q009

Matrix

Answer not required | Not back | Number of statements: 4 | Number of Scales: 6Hvilken reisemåte bruker du vanligvis til **arbeid/skole** i de forskjellige årstidene?

Velg den reisemåten/det transportmidler du reiser lengst med.

Normal

	Går hele veien	Sykler hele veien	Bil som fører	Bil som passasjer	Buss, trikk, bane, tog	Annen reisemåte
Vinter (desember-februar)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vår (mars-mai)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sommer (juni-august)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Høst (september-november)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ask only if Q002 - Q002,1,2,3,7

Q010 - Q010

Matrix

[Answer not required](#) | [Not back](#) | [Number of statements: 3](#) | [Number of Scales: 5](#)

Hvor viktig er temperatur, nedbør eller vind for hvilken reisemåte du velger til **arbeid/skole**?

[Random](#)

	Helt uviktig	Litt uviktig	Verken viktig eller uviktig	Litt viktig	Veldig viktig
Hvor varmt eller kaldt det er	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Om det er nedbør (mer enn bare duskgregn) eller ikke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Om det blåser eller ikke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ask only if Q002 - Q002,1,2,3,7

Q011 - Q011

Matrix

[Answer not required](#) | [Not back](#) | [Number of statements: 6](#) | [Number of Scales: 5](#)

Hvor viktig er følgende faktorer for hvilken reisemåte du velger til **arbeid/skole**?

[Random](#)

	Helt uviktig	Litt uviktig	Verken viktig eller uviktig	Litt viktig	Veldig viktig
Reisetid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kostnader	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At det er praktisk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At det er lett vint	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At det gir helsegevinst	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At det er miljøvennlig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q012 - Q012

Matrix

[Answer not required](#) | [Not back](#) | [Number of statements: 4](#) | [Number of Scales: 6](#)

Hvilken reisemåte bruker du vanligvis når du **handler dagligvarer** i de forskjellige årstidene?

Velg den reisemåten/det transportmidler du reiser lengst med.

[Normal](#)

	Går hele veien	Sykler hele veien	Bil som fører	Bil som passasjer	Buss, trikk, bane, tog	Annen reisemåte
Vinter (desember-februar)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vår (mars-mai)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sommer (juni-august)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Høst (september-november)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q013 - Q013

Matrix

[Answer not required](#) | [Not back](#) | [Number of statements: 3](#) | [Number of Scales: 5](#)Hvor viktig er temperatur, nedbør eller vind for hvilken reisemåte du velger når du skal **handle dagligvarer**?[Random](#)

	Helt uviktig	Litt uviktig	Verken viktig eller uviktig	Litt viktig	Veldig viktig
Hvor varmt eller kaldt det er	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Om det er nedbør (mer enn bare duskgregn) eller ikke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Om det blåser eller ikke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q014 - Q014

Matrix

[Answer not required](#) | [Not back](#) | [Number of statements: 6](#) | [Number of Scales: 5](#)Hvor viktig er følgende faktorer for hvilken reisemåte du velger når du skal **handle dagligvarer**?[Random](#)

	Helt uviktig	Litt uviktig	Verken viktig eller uviktig	Litt viktig	Veldig viktig
Reisetid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kostnader	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At det er praktisk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At det er lett vint	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At det gir helsegevinst	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At det er miljøvennlig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q015 - Q015

Matrix

[Answer not required](#) | [Not back](#) | [Number of statements: 10](#) | [Number of Scales: 5](#)

Her kommer noen påstander om hvordan du forholder deg til vær og reisemåter. Hvor enig eller uenig er du i følgende påstander?

[Random](#)

	Helt uenig	Litt uenig	Verken enig eller uenig	Litt enig	Helt enig
Jeg er vant til å ferdes ute i all slags vær	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg tar alltid bilen når det regner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg sykler uansett vær i sommerhalvåret	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg sykler uansett vær i vinterhalvåret	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å kjøre bil er del av min daglige rutine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg kjører bil til nesten alle gjøremål	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg sykler til nesten alle gjøremål i sommerhalvåret	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å reise kollektivt er del av min daglige rutine i sommerhalvåret	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å reise kollektivt er del av min daglige rutine i vinterhalvåret	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg reiser kollektivt til nesten alle gjøremål uansett vær	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B003

End block

B004**Begin block****Q017 - Q017****Matrix****Not back | Number of statements: 9 | Number of Scales: 5**

Her kommer noen påstander om ditt forhold til transport. Hvor enig eller uenig er du i følgende påstander?

Random

	Helt uenig	Litt uenig	Verken enig eller uenig	Litt enig	Helt enig
Jeg liker å kjøre bil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å kjøre bil er typisk meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hvis jeg ikke kan kjøre bil, dropper jeg aktiviteten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg liker å sykle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å sykle er typisk meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg liker å reise kollektivt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å reise kollektivt er typisk meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg liker å gå	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å gå til fots er typisk meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B004**End block****B005****Begin block****Q020 - Q020****Matrix****Answer not required | Not back | Number of statements: 9 | Number of Scales: 5**

Her kommer noen påstander om trafikk og miljø. Hvor enig eller uenig er du i følgende påstander?

Random

	Helt uenig	Litt uenig	Verken enig eller uenig	Litt enig	Helt enig
Forurensning fra biltrafikk er ikke så alvorlig som mange hevder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det er nødvendig å gjøre noe med forurensning fra biltrafikk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg tror at klimaproblemene er menneskeskapte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Om jeg kjører bil har det negative konsekvenser for miljøet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å bruke sykkel mest mulig på daglige reiser er bra for miljøet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ut fra mine verdier føler jeg en forpliktelse til å redusere bilbruken mest mulig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg forsøker å gå, sykle og reise kollektivt for å spare miljøet selv om det er dårlig vær	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mine nærmeste venner og familie synes det er viktig å redusere bilbruken selv om det regner/snør eller blåser	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mine nærmeste venner og familie synes man bør bruke sykkel mest mulig selv om det regner/snør eller blåser	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B005**End block**

Q021 - Q021

Matrix

Answer not required | Not back | Number of statements: 5 | Number of Scales: 4

I hvilke av følgende kombinasjoner av temperatur og nedbør kan du tenke deg å sykle (ca. 3-5 km)?

Flere svar mulig for hver påstand. Hvis ingen av svaralternativene passer, gå til neste påstand.

Normal

	Ikke noe nedbør	Duskregn/lett snø	Varierende bygevær	Jevnt regn/snøvær
Under 0 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0-9 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10-19 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20-24 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Over 25 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q022 - Q022

Matrix

Answer not required | Not back | Number of statements: 5 | Number of Scales: 4

I hvilke av følgende kombinasjoner av temperatur og nedbør kan du tenke deg å gå (ca. 2-3 km)?

Flere svar mulig for hver påstand. Hvis ingen av svaralternativene passer, gå til neste påstand.

Normal

	Ikke noe nedbør	Duskregn/lett snø	Varierende bygevær	Jevnt regn/snøvær
Under -10 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-1 til -9 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0-9 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10-19 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Over 19 °C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q023 - Q023

Matrix

[Answer not required](#) | [Not back](#) | [Number of statements: 6](#) | [Number of Scales: 6](#)

I de senere årene har det vært mye snakk om at klimaet forandrer seg.

Hvor enig eller uenig er du i følgende utsagn om klimaendringer?

Det er...

[Random](#)

	Helt uenig	Litt uenig	Verken enig eller uenig	Litt enig	Helt enig	Vet ikke
Mer regn enn tidligere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Varmere vær enn tidligere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mer snø enn tidligere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mindre snø enn tidligere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mer vind enn tidligere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mer skiftende vær enn tidligere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q024 - Q024

Matrix

[Answer not required](#) | [Not back](#) | [Number of statements: 4](#) | [Number of Scales: 3](#)

Har disse endringene hatt betydning for hvordan du reiser i hverdagslivet?

[Random](#)

	Mer enn tidligere	Mindre enn tidligere	Ingen endring
Sykler	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Går	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kjører bil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reiser kollektivt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B007

End block

Ask only if Q001 - Q001,3

B008

Begin block

Q025 - Q025

Single coded

[Answer not required](#) | [Not back](#)

Er du...

[Normal](#)

- 1 Kvinne
2 Mann

Q026 - Q026

Numeric

[Answer not required](#) | [Not back](#) | [Min = 12](#) | [Max = 105](#)

Hva er alderen din?

Q027 - Q027

Single coded

[Answer not required](#) | [Not back](#)

Hvilken beskrivelse passer best til din bolig/familiesituasjon?

Normal

- 1 Jeg bor sammen med ektefelle / samboer
- 2 Jeg bor sammen med ektefelle / samboer og barn
- 3 Jeg bor sammen med mine barn
- 4 Jeg bor sammen med mine foreldre
- 5 Jeg bor alene
- 6 Jeg deler bolig med andre voksne (bofelleskap eller tilsvarende)
- 7 Annet

Ask only if Q001 - Q001,3 and Q027 - Q027,2,3

Q033 - Q033

Numeric

[Not back](#) | [Max = 99](#)

Hva er alderen til det eldste barnet du bor med?

Ask only if Q027 - Q027,2,3,4

Q028 - Q028

Numeric

[Answer not required](#) | [Not back](#) | [Max = 40](#)

Hva er alderen til det yngste barnet du bor sammen med?

Q029 - Q029

Single coded

[Answer not required](#) | [Not back](#)

Hva er din høyeste fullførte skolegang?

Normal

- 1 Grunnskoleutdanning (10-årig grunnskole, 7-årig folkeskole eller lignende)
- 2 Videregående utdanning (Allmennfag, yrkesskole eller annet)
- 3 Fagutdanning/yrkesutdanning/fagbrev/videregående yrkesfaglig utdanning
- 4 Universitets-/høgskoleutdanning med inntil 4 års varighet
- 5 Universitets-/høgskoleutdanning med mer enn 4 års varighet

Q030 - Q030

Single coded

[Answer not required](#) | [Not back](#)

Omtrent hvor høy bruttoinntekt hadde du siste år?

Normal

- 1 Under 100 000
- 2 100 000 – 299 000
- 3 300 000 – 499 000
- 4 500 000 – 699 000
- 5 700 000 eller mer
- 6 Vet ikke

[Answer not required](#) | [Not back](#)

Et siste spørsmål... Hvis det var stortingsvalg i morgen, hva ville du stemt?

[Random](#)

- 1 Arbeiderpartiet
- 2 Høyre
- 3 Fremskrittspartiet
- 4 Senterpartiet
- 5 Kristelig folkeparti
- 6 Venstre
- 7 Sosialistisk Venstreparti
- 8 Miljøpartiet De Grønne
- 9 Rødt
- 10 Annet parti/liste
- 11 Vet ikke **Position fixed*

Appendix 2 Tables

Table A.1 Degree of agreement with the statement “Pollution from car traffic is not as serious as many say” by political preference. Percent

Pollution from car traffic is not as serious as many say						
Political preference***	Strongly disagree	Disagree	Neither/nor	Agree	Strongly agree	Total
The Labour party	43	27	16	10	4	100
The Conservative party	23	28	23	18	8	100
The Progress party	10	23	25	22	21	100
The Centre party	27	30	16	16	11	100
The Christian democratic party	37	37	23	2	2	100
The Liberals	52	26	10	8	3	100
The Socialist left party	68	22	4	4	1	100
The Norwegian green party	81	12	3	4	0	100
The Red party	64	16	11	7	2	100
Other parties	39	22	17	0	22	100
Don't know	36	27	26	6	5	100

Table A.2 Degree of agreement with the statement “It is necessary to do something about pollution from car traffic” by political preference. Percent

It is necessary to do something about pollution from car traffic						
Political preference***	Strongly disagree	Disagree	Neither/nor	Agree	Strongly agree	Total
The Labour party	3	4	12	31	50	100
The Conservative party	6	5	21	42	26	100
The Progress party	19	15	24	26	16	100
The Centre party	3	5	19	32	41	100
The Christian democratic party	0	3	12	28	57	100
The Liberals	3	2	9	22	64	100
The Socialist left party	0	3	7	24	66	100
The Norwegian green party	1	2	2	14	81	100
The Red party	1	2	17	11	69	100
Other parties	0	9	4	35	52	100
Don't know	5	3	19	35	38	100

Table A.3 Degree of agreement with the statement "I think climate problems are anthropogenic" by political preference. Percent

I think climate problems are anthropogenic						
Political preference***	Strongly disagree	Disagree	Neither/nor	Agree	Strongly agree	Total
The Labour party	3	4	11	27	55	100
The Conservative party	6	7	23	36	28	100
The Progress party	17	21	23	24	15	100
The Centre party	11	8	3	32	46	100
The Christian democratic party	2	8	16	30	44	100
The Liberals	0	2	12	18	68	100
The Socialist left party	0	0	2	19	79	100
The Norwegian green party	2	1	4	12	82	100
The Red party	2	0	7	17	73	100
Other parties	8	42	8	21	21	100
Don't know	5	4	17	32	41	100

Appendix 3 Factor analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.123	30.085	30.085	8.123	30.085	30.085	3.715	13.760	13.760
2	3.108	11.512	41.597	3.108	11.512	41.597	3.709	13.738	27.498
3	2.567	9.509	51.106	2.567	9.509	51.106	3.453	12.787	40.285
4	1.685	6.239	57.345	1.685	6.239	57.345	3.400	12.592	52.877
5	1.354	5.013	62.359	1.354	5.013	62.359	1.995	7.388	60.265
6	1.269	4.701	67.060	1.269	4.701	67.060	1.835	6.796	67.060
7	.914	3.385	70.446						
8	.819	3.032	73.478						
9	.759	2.813	76.290						
10	.629	2.330	78.620						
11	.586	2.171	80.791						
12	.522	1.932	82.722						
13	.515	1.908	84.631						
14	.475	1.758	86.389						
15	.398	1.474	87.863						
16	.366	1.354	89.217						
17	.352	1.305	90.522						
18	.332	1.229	91.751						
19	.311	1.153	92.904						
20	.306	1.134	94.037						
21	.277	1.025	95.062						
22	.269	.996	96.059						
23	.244	.904	96.963						
24	.236	.874	97.837						
25	.229	.848	98.684						
26	.208	.772	99.456						
27	.147	.544	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix^a

	Component					
	1	2	3	4	5	6
Jeg tar alltid bilen når det regner	-.103	-.211	.701	-.219	-.223	-.047
Jeg sykler uansett vær i sommerhalvåret	.081	-.030	-.268	.809	.031	.151
Å kjøre bil er del av min daglige rutine	-.076	-.152	-.267	.648	-.091	.214
Jeg kjører bil til nesten alle gjøremål	-.114	-.361	.711	-.258	-.141	-.076
Jeg sykler til nesten alle gjøremål i sommerhalvåret	-.133	-.345	.700	-.271	-.196	-.029
Å reise kollektivt er en del av min daglige rutine i sommerhalvåret	.122	.086	-.236	.756	-.006	.144
Å reise kollektivt er en del av min daglige rutine i vinterhalvåret	.084	.895	-.129	-.048	.032	.034
Jeg reiser kollektivt til nesten alle gjøremål uansett vær	.101	.903	-.200	.017	.051	.011
Jeg liker å kjøre bil	.083	.846	-.212	-.007	.070	.102
Å kjøre bil er typisk meg	-.146	-.032	.610		.106	-.087
Hvis jeg ikke kan kjøre bil, dropper jeg aktiviteten	-.168	-.258	.772	-.215	-.123	-.091
Jeg liker å sykle	-.232	-.082	.462	-.087	-.313	.141
Å sykle er typisk meg	.205	.035	.150	.715	.271	-.119
Å reise kollektivt er typisk meg	.107	.049	-.152	.856	.112	.010
Jeg liker å gå	.164	.846	-.224	.018	.101	.052
Å gå til fots er typisk meg	.124	.086	-.022	-.027	.865	.023
Forurensning fra biltrafikk er ikke så alvorlig som mange hevder	.013	.154	-.184	.001	.781	.139
Det er nødvendig å gjøre noe med forurensning fra biltrafikk	-.728	-.044	.253	-.037	.032	-.071
Jeg tror at klimaproblemene er menneskeskapte	.811	.107	-.166	.025	.073	.139
Om jeg kjører bil har det negative konsekvenser for miljøet	.675	.136	-.028	.021	.069	.031
Å bruke sykkel mest mulig på daglige reiser er bra for miljøet	.795	.093	-.132	.063	-.001	.209
Ut fra mine verdier føler jeg en forpliktelse til å redusere bilbruken mest mulig	.736	-.011	-.035	.186	.087	-.052
Jeg forsøker å gå, sykle og reise kollektivt for å spare miljøet selv om det er dårlig vær	.620	.191	-.205	.161	.129	.374
Mine nærmeste venner og familie synes det er viktig å redusere bilbruken selv om det regner/snør eller blåser	.370	.368	-.416	.329	.138	.277
Mine nærmeste venner og familie synes man bør bruke sykkel mest mulig selv om det regner/snør eller blåser	.246	.120	-.112	.062	.063	.815
Jeg er vant til å ferdes ute i all slags vær	.152	.032	-.018	.190	-.002	.836
	.031	-.021	-.120	.224	.481	-.046

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 6 iterations.

Appendix 4 Logistic regression

Shopping car-use – winter

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a						
v1(1)	-.970	.170	32.545	1	.000	.379
Kjønn(1)	.079	.163	.236	1	.627	1.082
Alder	.020	.005	13.954	1	.000	1.020
Boligsituasjon(1)	.956	.170	31.524	1	.000	2.602
Utdanning(1)	-.211	.163	1.662	1	.197	.810
Q020_2_slice			5.221	3	.156	
Q020_2_slice(1)	-.702	.310	5.117	1	.024	.496
Q020_2_slice(2)	-.537	.301	3.172	1	.075	.585
Q020_2_slice(3)	-.606	.340	3.181	1	.075	.545
Q015_9_slice			15.891	3	.001	
Q015_9_slice(1)	-.630	.227	7.728	1	.005	.533
Q015_9_slice(2)	-.809	.249	10.562	1	.001	.445
Q015_9_slice(3)	-.670	.301	4.956	1	.026	.512
Q017_2_slice			44.519	3	.000	
Q017_2_slice(1)	1.546	.254	37.074	1	.000	4.693
Q017_2_slice(2)	1.068	.210	25.769	1	.000	2.911
Q017_2_slice(3)	.606	.223	7.346	1	.007	1.833
Q017_5_slice			5.284	3	.152	
Q017_5_slice(1)	-.417	.244	2.918	1	.088	.659
Q017_5_slice(2)	.157	.212	.552	1	.457	1.170
Q017_5_slice(3)	.110	.210	.274	1	.601	1.116
Q017_8_slice			9.507	3	.023	
Q017_8_slice(1)	-.635	.415	2.338	1	.126	.530
Q017_8_slice(2)	-.545	.421	1.674	1	.196	.580
Q017_8_slice(3)	.249	.498	.251	1	.617	1.283
Q020_9_slice			1.818	3	.611	
Q020_9_slice(1)	-.036	.401	.008	1	.928	.964
Q020_9_slice(2)	-.271	.234	1.336	1	.248	.763
Q020_9_slice(3)	-.178	.178	.996	1	.318	.837
Q013_1_slice			3.557	2	.169	
Q013_1_slice(1)	.570	.359	2.527	1	.112	1.769
Q013_1_slice(2)	.701	.429	2.668	1	.102	2.016
Q013_2_slice			.516	2	.773	
Q013_2_slice(1)	-.096	.281	.116	1	.733	.909
Q013_2_slice(2)	-.338	.471	.516	1	.472	.713
Q013_3_slice			1.097	2	.578	
Q013_3_slice(1)	-.013	.342	.001	1	.970	.987
Q013_3_slice(2)	.359	.402	.799	1	.371	1.432
Q031(1)	-.137	.162	.711	1	.399	.872
Constant	.370	.565	.429	1	.512	1.448

a. Variable(s) entered on step 1: v1, Kjønn, Alder, Boligsituasjon, Utdanning, Q020_2_slice, Q015_9_slice, Q017_2_slice, Q017_5_slice, Q017_8_slice, Q020_9_slice, Q013_1_slice, Q013_2_slice, Q013_3_slice, Q031.

Case Processing Summary

Unweighted Cases ^a		N	Percent
Selected Cases	Included in Analysis	1091	69.8
	Missing Cases	472	30.2
	Total	1563	100.0
Unselected Cases		0	.0
Total		1563	100.0

a. If weighted is in effect, see classification table for the total number of cases.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1049.292 ^a	.260	.354

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than 0.001.

Car-use shopping – Spring

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a						
v1(1)	-1.083	.168	41.558	1	.000	.339
Kjønn(1)	.073	.159	.209	1	.647	1.076
Alder	.015	.005	8.296	1	.004	1.015
Boligsituasjon(1)	.909	.166	30.057	1	.000	2.481
Utdanning(1)	-.075	.159	.219	1	.640	.928
Q020_2_slice			10.188	3	.017	
Q020_2_slice(1)	-.872	.307	8.067	1	.005	.418
Q020_2_slice(2)	-.669	.298	5.029	1	.025	.512
Q020_2_slice(3)	-.983	.333	8.707	1	.003	.374
Q015_9_slice			7.773	3	.051	
Q015_9_slice(1)	-.505	.227	4.938	1	.026	.603
Q015_9_slice(2)	-.454	.251	3.281	1	.070	.635
Q015_9_slice(3)	-.519	.298	3.033	1	.082	.595
Q017_2_slice			51.314	3	.000	
Q017_2_slice(1)	1.476	.246	35.968	1	.000	4.376
Q017_2_slice(2)	1.153	.210	30.160	1	.000	3.166
Q017_2_slice(3)	.292	.221	1.752	1	.186	1.339
Q017_5_slice			5.316	3	.150	
Q017_5_slice(1)	-.536	.242	4.903	1	.027	.585
Q017_5_slice(2)	-.192	.205	.881	1	.348	.825
Q017_5_slice(3)	-.021	.207	.010	1	.919	.979
Q017_8_slice			10.030	3	.018	
Q017_8_slice(1)	-.850	.418	4.135	1	.042	.427
Q017_8_slice(2)	-.813	.423	3.692	1	.055	.444
Q017_8_slice(3)	-.089	.490	.033	1	.856	.915
Q020_9_slice			.896	3	.826	
Q020_9_slice(1)	.222	.396	.314	1	.575	1.248
Q020_9_slice(2)	-.133	.232	.328	1	.567	.875
Q020_9_slice(3)	-.076	.175	.190	1	.663	.927
Q013_1_slice			1.536	2	.464	
Q013_1_slice(1)	.382	.353	1.170	1	.279	1.466
Q013_1_slice(2)	.445	.420	1.123	1	.289	1.560
Q013_2_slice			6.211	2	.045	
Q013_2_slice(1)	-.702	.282	6.202	1	.013	.495
Q013_2_slice(2)	-.611	.469	1.698	1	.193	.543
Q013_3_slice			4.885	2	.087	
Q013_3_slice(1)	.121	.336	.131	1	.718	1.129
Q013_3_slice(2)	.818	.397	4.237	1	.040	2.266
Q031(1)	-.160	.159	1.008	1	.315	.853
Constant	1.015	.567	3.208	1	.073	2.760

a. Variable(s) entered on step 1: v1, Kjønn, Alder, Boligsituasjon, Utdanning, Q020_2_slice, Q015_9_slice, Q017_2_slice, Q017_5_slice, Q017_8_slice, Q020_9_slice, Q013_1_slice, Q013_2_slice, Q013_3_slice, Q031.

Case Processing Summary

Unweighted Cases ^a		N	Percent
Selected Cases	Included in Analysis	1090	69.7
	Missing Cases	473	30.3
	Total	1563	100.0
Unselected Cases		0	.0
Total		1563	100.0

a. If weight is in effect, see classification table for the total number of cases.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1077.021 ^a	.263	.354

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Car-use shopping trips – summer

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a						
v1(1)	-.917	.167	30.267	1	.000	.400
Kjønn(1)	-.055	.157	.122	1	.726	.947
Alder	.013	.005	6.638	1	.010	1.013
Boligsituasjon(1)	.808	.162	24.922	1	.000	2.243
Utdanning(1)	-.023	.157	.022	1	.883	.977
Q020_2_slice			3.768	3	.288	
Q020_2_slice(1)	-.443	.289	2.355	1	.125	.642
Q020_2_slice(2)	-.419	.278	2.260	1	.133	.658
Q020_2_slice(3)	-.602	.314	3.678	1	.055	.548
Q015_9_slice			7.340	3	.062	
Q015_9_slice(1)	-.382	.228	2.797	1	.094	.683
Q015_9_slice(2)	-.516	.253	4.165	1	.041	.597
Q015_9_slice(3)	-.564	.298	3.596	1	.058	.569
Q017_2_slice			54.668	3	.000	
Q017_2_slice(1)	1.505	.239	39.628	1	.000	4.505
Q017_2_slice(2)	1.226	.209	34.504	1	.000	3.408
Q017_2_slice(3)	.406	.221	3.364	1	.067	1.500
Q017_5_slice			7.740	3	.052	
Q017_5_slice(1)	-.664	.242	7.525	1	.006	.515
Q017_5_slice(2)	-.105	.202	.271	1	.603	.900
Q017_5_slice(3)	-.073	.202	.129	1	.719	.930
Q017_8_slice			13.001	3	.005	
Q017_8_slice(1)	-1.052	.409	6.595	1	.010	.349
Q017_8_slice(2)	-.924	.414	4.979	1	.026	.397
Q017_8_slice(3)	-.247	.477	.268	1	.604	.781
Q020_9_slice			1.689	3	.639	
Q020_9_slice(1)	.152	.392	.150	1	.698	1.164
Q020_9_slice(2)	-.214	.231	.858	1	.354	.808
Q020_9_slice(3)	-.156	.172	.819	1	.365	.856
Q013_1_slice			4.390	2	.111	
Q013_1_slice(1)	.612	.363	2.845	1	.092	1.844
Q013_1_slice(2)	.811	.418	3.774	1	.052	2.250
Q013_2_slice			16.127	2	.000	
Q013_2_slice(1)	-1.145	.292	15.360	1	.000	.318
Q013_2_slice(2)	-.567	.463	1.501	1	.221	.567
Q013_3_slice			1.993	2	.369	
Q013_3_slice(1)	-.283	.338	.701	1	.402	.753
Q013_3_slice(2)	.210	.399	.278	1	.598	1.234
Q031(1)	-.270	.156	2.977	1	.084	.763
Constant	.922	.552	2.792	1	.095	2.515

a. Variable(s) entered on step 1: v1, Kjønn, Alder, Boligsituasjon, Utdanning, Q020_2_slice, Q015_9_slice, Q017_2_slice, Q017_5_slice, Q017_8_slice, Q020_9_slice, Q013_1_slice, Q013_2_slice, Q013_3_slice, Q031.

Case Processing Summary

Unweighted Cases ^a		N	Percent
Selected Cases	Included in Analysis	1092	69.9
	Missing Cases	471	30.1
	Total	1563	100.0
Unselected Cases		0	.0
Total		1563	100.0

a. If weight is in effect, see classification table for the total number of cases.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1104.851 ^a	.261	.349

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Car-use shopping trips – autumn

		Variables in the Equation					
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	v1(1)	-1.083	.170	40.741	1	.000	.339
	Kjønn(1)	-.033	.162	.043	1	.836	.967
	Alder	.015	.005	7.625	1	.006	1.015
	Boligsituasjon(1)	.827	.168	24.269	1	.000	2.286
	Utdanning(1)	-.211	.163	1.674	1	.196	.810
	Q020_2_slice			4.666	3	.198	
	Q020_2_slice(1)	-.519	.305	2.885	1	.089	.595
	Q020_2_slice(2)	-.489	.295	2.744	1	.098	.613
	Q020_2_slice(3)	-.711	.332	4.596	1	.032	.491
	Q015_9_slice			12.904	3	.005	
	Q015_9_slice(1)	-.634	.230	7.615	1	.006	.530
	Q015_9_slice(2)	-.627	.251	6.248	1	.012	.534
	Q015_9_slice(3)	-.668	.303	4.877	1	.027	.513
	Q017_2_slice			59.761	3	.000	
	Q017_2_slice(1)	1.577	.249	40.267	1	.000	4.840
	Q017_2_slice(2)	1.377	.214	41.488	1	.000	3.963
	Q017_2_slice(3)	.495	.222	4.987	1	.026	1.640
	Q017_5_slice			7.946	3	.047	
	Q017_5_slice(1)	-.658	.246	7.168	1	.007	.518
	Q017_5_slice(2)	-.076	.209	.132	1	.717	.927
	Q017_5_slice(3)	.012	.209	.003	1	.953	1.012
	Q017_8_slice			9.858	3	.020	
	Q017_8_slice(1)	-.849	.423	4.029	1	.045	.428
	Q017_8_slice(2)	-.726	.428	2.871	1	.090	.484
	Q017_8_slice(3)	-.054	.498	.012	1	.913	.947
	Q020_9_slice			2.721	3	.437	
	Q020_9_slice(1)	.112	.403	.077	1	.781	1.119
	Q020_9_slice(2)	-.292	.236	1.537	1	.215	.747
	Q020_9_slice(3)	-.220	.178	1.541	1	.215	.802
	Q013_1_slice			1.282	2	.527	
	Q013_1_slice(1)	.406	.360	1.271	1	.260	1.501
	Q013_1_slice(2)	.199	.425	.219	1	.640	1.220
	Q013_2_slice			3.965	2	.138	
	Q013_2_slice(1)	-.555	.285	3.781	1	.052	.574
	Q013_2_slice(2)	-.274	.471	.339	1	.560	.760
	Q013_3_slice			3.665	2	.160	
	Q013_3_slice(1)	.256	.341	.563	1	.453	1.291
	Q013_3_slice(2)	.762	.402	3.601	1	.058	2.143
	Q031(1)	-.162	.161	1.007	1	.316	.851
	Constant	.882	.569	2.400	1	.121	2.415

a. Variable(s) entered on step 1: v1, Kjønn, Alder, Boligsituasjon, Utdanning, Q020_2_slice, Q015_9_slice, Q017_2_slice, Q017_5_slice, Q017_8_slice, Q020_9_slice, Q013_1_slice, Q013_2_slice, Q013_3_slice, Q031.

Case Processing Summary

Unweighted Cases ^a		N	Percent
Selected Cases	Included in Analysis	1089	69.7
	Missing Cases	474	30.3
	Total	1563	100.0
Unselected Cases		0	.0
Total		1563	100.0

a. If weight is in effect, see classification table for the total number of cases.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1054.696 ^a	.273	.369

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

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Visiting and postal address:
Institute of Transport Economics
Gaustadalléen 21
NO-0349 Oslo

+ 47 22 57 38 00
toi@toi.no
www.toi.no