Where and how should we build our homes?

Residential location, activity participation and travel behavior (RESACTRA)

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Differences in our approach to studies of residential location and travel compared to mainstream research

- Drawing on theories of urban planning, transport geography and mobility sociology, not only transport economics
- Aiming at explaining causal mechanisms by which urban form influences travel
- Combining qualitative and quantitative research methods
- Emphasis on being aware of the basic assumptions of the studies, seen from a philosophy of science perspective

Research design

- Meta-theoretical work on the causal nature of the built environment for human actions (such as, for example, travel behavior)
- Questionnaire surveys in the metropolitan areas of Oslo and Stavanger. 3340 responses.
- Qualitative interviews (each lasting 1-1.5 hours) with persons with different demographic and socioeconomic characteristics and with their dwellings located in different parts of the urban structure. 33 interviews altogether; 17 in the Oslo and 16 in the Stavanger case
- Using available national travel survey data as a supplement (Bergen and Trondheim)
- Separate analyses of influences of residential location on health, based on register data for Oslo
- Moreover, data collection similar to the Oslo and Stavanger studies (qualitative interviews as well as questionnaire survey) has recently been completed for Reykjavik metropolitan area

An **interpretation scheme** was developed for the qualitative analyses

- Most textbooks on interview interpretation focus on discovering unexpected things and a ‘bottom-up’ way of generating research questions
- But we had already clearly formulated questions based on lots of earlier research
- We wanted to **explain** the geographical differences in travel behavior that had already been identified (but also to be open for new, previously overlooked aspects)
- An interpretation scheme was developed in earlier studies as an important tool for analysis of the interview transcripts, and refined for this study
- This scheme originally comprised around 30 research questions which we, as researchers, try to answer, based on the information given by the interviewees. During the interpretation work, the number of questions increased to 41.

Example of using the interpretation scheme in the interpretation of one interview

20. Have the interviewees taken up any new activities or dropped previous activities as a result of having moved from one residential location to another? (The summarizing interpretation of the information given in the interviews relevant to research question no. 20)	E. V. Residential area: Grefsen stasjonsby Household members: K1	The organized walks in Frognerparken and the corporate-organized exercise at Ullevaal hospital are new activities. She actually mentions these activities when discussing how she utilizes the time saved by not having to spend so much time on traveling as when she lived at her previous residential location (at Vollebekk, Lunden 9b).But she still thinks that changes in her activity patterns are more a result of changes in her life situation than due to the move. For other kinds of physical activity, it sounded as if she had become less active physically after moving and living more central – not the least because of not having a dog any longer. Further, having a moped seems to reduce her biking activity.	
21. Have the interviewees changed their travel behavior as a result of having moved from one residential location to another? (The summarizing interpretation of the information given in the interviews relevant to research question no. 21)	E. V. Residential area: Grefsen stasjonsby Household members: K1	Not really in terms of travel modes. She got rid of her car some years before moving to her present dwelling. But her traveling distances and the time spent on traveling has been reduced, both for journeys to work and shopping and also, it seems, for regular leisure activities	
22. Have the interviewees changed their car ownership (or ownership of other motor vehicles) as a result of having moved from one residential location to another? (The summarizing interpretation of the information given in the interviews relevant to research question no. 22)	E. V. Residential area: Grefsen stasjonsby Household members: K1	No, the car was sold/wrecked some years prior to the move.	
23. Do the interviewees consider that they would have had a different activity pattern if they lived in a different part of the metropolitan area? If so: what would have been different? (The summarizing interpretation of the information given in the interviews relevant to research question no. 23)	E. V. Residential area: Grefsen stasjonsby Household members: K1	Living even more centrally (e.g. at Grünerløkka or Grønland) would not have mattered much. But living in the villa areas of Bærum, for example, might have led to some limitation of her activities. She used until nine years ago to live at Risløkka in a house with a garden, and then her range of leisure activities was more limited, but only partly because of less easy accessibility to facilities. Also, her life situation was different then, and gardening activity also took time that might have been spent otherwise. Car independency is very important for this interviewee.	

An excerpt of the 45-pages synthesizing interpretation of the question group: Activity location rationales.

among some of the Stavanger interviewees. The aspects mentioned are that the job should meet the interviewee's professional interests and educational qualifications (AS 32356, TGE 52803, BM 41053). This indicates an emphasis on self-realization. This sub-rationale is probably also relevant to many other interviewees, although it is usually not stated explicitly in the interviews, probably because the interviewees take this for granted. For BM 41053, who has not yet managed to get any job matching her education, finding such a job cannot be taken for granted, and this aspect is thus reflected on and articulated explicitly in a way differing from most other interviewees. Salary or working conditions are not mentioned by any of the interviewees. The Oslo metropolitan area interviews do not give information making it possible to identify what aspects of job quality are most important (e.g. job content vs. salary. For outdoor recreation, experiencing nature and having opportunities for mental relaxation/restoration are important, in addition to the practical possibilities for performing particular outdoor recreation activities (dog-walking, hiking, cross-country skiing, alpine skiing, jogging, diving and mushroom picking were mentioned) are criteria indicating that outdoor recreation will be located to different area types, depending on the desired kind of outdoor recreation. For special commodity shopping, parking conditions and the general atmosphere were also mentioned (see below). Apart from the instrumental suitability of the facility for the activity in question, the interviews show examples of the following sub-rationales under the rationale of choosing the best facility: Cultural/symbolic preference (PIW 37424, GS 17833 and KBS 10749), landscape esthetics (HL 33352 and KRV 53940) and atmosphere (AS 40363). PIW 37424's cultural taste for (mainly) classical music influences his choice of leisure activity facilities, whereas interest for folk music and folk dancing influences GS 17833's location of the cultural events that she attends. Cultural taste also influences what kinds of restaurants (KBS 10749) and urban atmospheres the interviewees appreciate. Landscape esthetics seem to be an important underlying criterion underlying the preference of KRV 53940 for locating his weekend outdoor recreation activities to large and continuous natural areas. For daily necessities shopping, the quality aspects mentioned by interviewees are assortment and kindliness of staff (EF		**37a Which among competing rationales seem to be the strongest one for the interviewees' choices of activity locations?**	For most activity locations, this interviewee is able to combine a rationale of minimizing the friction of distance with a rationale of choosing the best facility. Her residential location close to one of the metropolitan area's second-order centers makes this possible. For job locations, she would still accept a more distant location if necessary, whereas this does not seem to be the case for shopping.
	16030 S.H, Bærums Verk. M41 + wife and 3 children (M3, M3, F5)	4. **How important has the distance from the dwelling been for the interviewees' choices of workplaces/ places of education, kindergartens/ crêches, shops and leisure facilities?**	There is a sort of maximum acceptable distance for commuting, based on travel time, but within this threshold other criteria are more important for which job to apply for. Kindergartens and schools are much of the same quality, so the closest one or the one with the most convenient access (e.g. because it is located on the route from home to work) is chosen. For grocery shopping, the range of the assortment is more important than distance minimizing, resulting in a preference for a large store (REMA Lommedalen) 5 km from home rather than one of the smaller shops closer to home. This could be due to the dominance of the car as his main mode of transport. They also most often go to Sandvika Storsenter when buying special commodities like books or clothes, although closer opportunities exist and they find the Storsenter very charmless. Again, the wide assortment trumps proximity (and in this case also atmosphere). The interviewee does not normally use the many shopping opportunities near the workplace. This is mainly because he wants to get quickly home from work in the afternoon.
		36a On which rationales do the interviewees base their choices of activity locations?	The interviewee accepts a rather long commute in order to have a suitable job, but there is a maximum distance somewhere, determined by travel time and convenience (in terms of congestion) rather than physical distance. The interviewee points at Alnabru as the easternmost acceptable workplace location but says he would not mind having to commute to Drammen because the journey there is less congested. The interviewee works on his computer at home nearly every evening but does not regularly uses the possibility of working at home as an opportunity for not traveling to the workplace. Working at home is instead utilized as a way to avoid too long afternoons at the workplace. For daily necessities shopping, the 'best facility' is chosen, i.e. a well-assorted shop where you can get everything you need instead of having to go to several smaller shops. This well-assorted store is still not located very far away from home (5 km), but still further away than some other, less well-assorted shops used only for occasional supplementary purchases. The kindergarten of the children was chosen because they can drive past it on the way to the job, whereas another kindergarten located slightly closer to home would require that they walked down to it and back before setting out for their journey to work. In addition, their present kindergarten was recommended in order to have a better mix of children when beginning in primary school. The children will go to the closest school, which can be accessed in a safe way by foot. There is no perceived quality difference between the four different schools in the area, so they opt for the closest one.

Publications from the project (published or submitted so far)

Paper title	***Authors***	***Status***	***Presentation at conference***	***Publication channel (journal/book)***
Built Environment, Causality and Travel	Petter	Published March 2015	Xian 2014, IACR 2014	*Transport Reviews*
Built Environment, Causality and Urban Planning	Petter	Published February 2016		*Planning Theory and Practice*
Urban Planning: Residential Location and Compensatory Behaviour in Three Scandinavian Cities	Petter	Published August 2016		Ch. 10 in book on rebound effects (Springer)
Urban containment and inner-city densification reduce auto ownership	Jason, Petter and Fitwi	Submitted as conference paper	WSTLUR 2017	Not yet decided

Planned additional publications (so far)

- Attitude-based residential self-selection: implications for the influence of residential location on travel?
- A second paper addressing residential self-selection
- Residential location, activity location and time-geographical constraints
- Residential location, car travel and car dependency
- Residential location, commuting and non-work travel in monocentric and polycentric urban regions
- Residential location and travel in four Norwegian cities (based on RVU data)
- Residential location, active travel and physical activity
- Residential location and health
- Residential location, travel and access to facilities: a social justice perspective
- Urban atmospheres downtown and in other urban neighborhoods
- Sustainable urban development revisited: compact or polycentric cities?

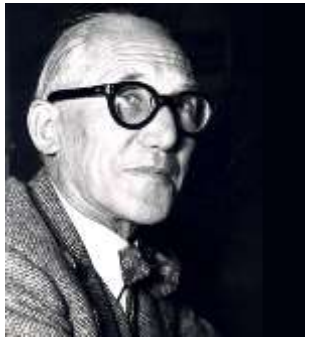
A quick glance at some of the papers

First, the two papers on the causal nature of the built environment:

- Built environment, causality and travel
- Built environment, causality and urban planning

Some problematic conceptualizations of the status of the built environment as causes of human actions and social phenomena:

- **Deniers**
  - long-standing sociological tradition
  - neo-Marxist tradition (Harvey, Castells)
  - individualist reductionism within microeconomics
- **Environmental determinists**
  - Le Corbusier/CIAM
  - Chermayeff
  - ….but do they really exist anymore?
- **Correlationists**
  - Humean empiricism
  - neo-positivism
  - dominating in contemporary transport research



Statistics can't show causality!

- There is an important ***contradiction in the correlationist position***: If causality is nothing more than (statistically controlled) correlations, how then can the necessary control variables be identified among the myriad of circumstances likely to correlate in some way or other with travel behavior?

- The correlation-based understanding of causality provides little or no guidance for determining ***which variables to include or not include*** in a multivariate analytical model, nor which ones among those included to consider as ***endogenous*** or ***exogenous*** variables

The built environment as a sub-set of social structures

- Has high degree of **permanence**
- Is in some ways more **compelling** and makes up more absolute constraints than non-material structures
- Has been theorized as **affordances** (Gibson) and as **facticity** (Sartre, Østerberg)

- Instead of conceiving of causality as correlations, our concept of causality is as **tendencies** or dispositions operating in non-closed systems together with other causal powers that can counteract or amplify the causal mechanisms we are investigating

Rationales for activity location

Among the 33 interviewees living in the metropolitan areas of Oslo and Stavanger, the following rationales for activity locations are encountered in the interviews :

- **Minimizing the friction of distance** (all interviews)
- **Choosing the best facility** (all interviews)
- **Maintaining social contacts** (nearly half of the interviews)
- **Variety seeking** (several interviews)
- **Place attachment** (a few interviews)
- **Caretaking** (a few interviews)
- **Money-saving** (a few interviews)

Figure 1: Availability of relevant job opportunities within moderate distance from the dwelling, depending on residential location and degree of specialized job qualifications/interests

	Specialized	Non-specialized
Inner city	Many	Very many
Suburbs	Few (if any)	Some

Figure 2: Availability of relevant cultural facilities within moderate distance from the dwelling, depending on residential location and whether the resident has specialized or non-specialized cultural taste

	Specialized	Non-specialized
Inner city	Many	Many
Suburbs	Few	Few

Figure 3: Availability of relevant outdoor recreation opportunities within moderate distance from the dwelling, depending on residential location and the typical duration of the activities

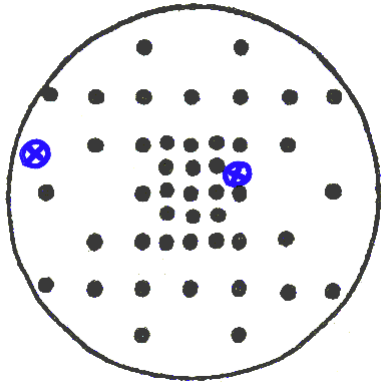
	Long-duration activities	Short-duration activities
Inner city	None	Some
Suburbs	Some	Many

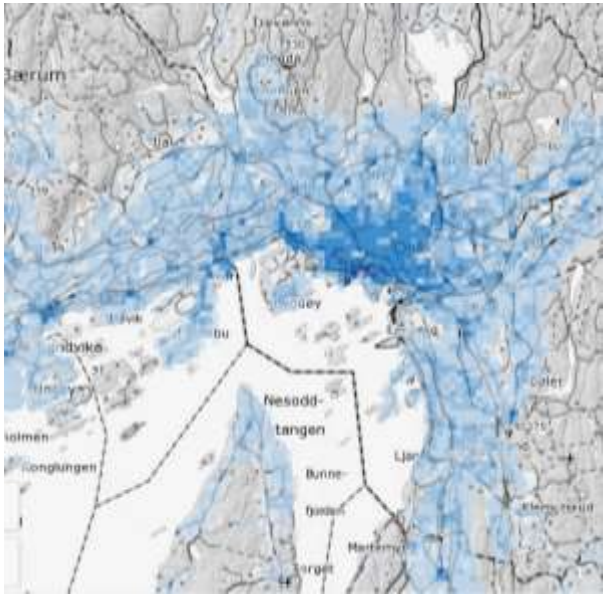
Implications of activity location rationales for influences of residential location on travel distances

- Suburbanites tend to have longer **commuting distances** than inner-city residents, especially if they have specialized job qualifications and interests.
- This is especially the case in metropolitan areas with a strong concentration of workplaces in the inner areas, such as **Oslo**. In urban regions with a polycentric employment structure, such as **Stavanger**, commuting distances may depend more on proximity to a secondary center (such as the Forus area) than on proximity to the main city center
- For visits to **cultural facilities** (and also restaurants, cafes etc.), suburbanites tend to make longer trips than inner-city residents do, regardless of whether their cultural taste is specialized or popular
- For visits to **outdoor recreation areas**, suburbanites normally tend to make shorter trips than their inner-city counterparts both for short-duration and long-duration activities. This still depends considerably on the topographical context of the urban region

Combined built environment characteristics, time-geographical restrictions and transport rationales – an example

Built environment characteristics, e.g.





Time-geographical restrictions, e.g.

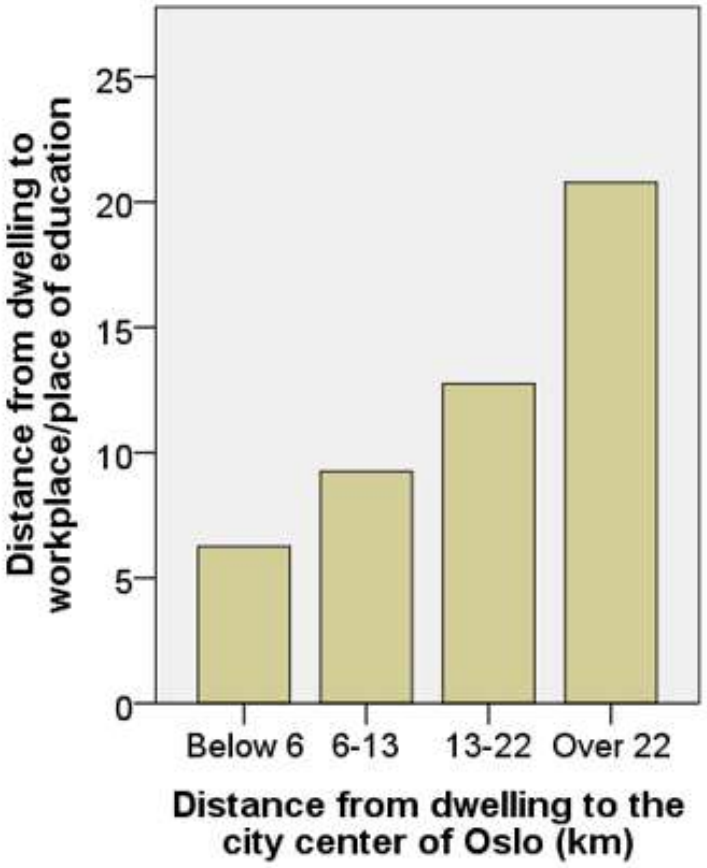
- Coupling constraints
  - Need to present at the workplace
  - Need to pick up child in kindergarten
- Capacity constraints
  - Need to be at home in the evening and night for family obligations and sleep
  - Do not have physical fitness for bike commuting at distances exceeding 5 km
- Steering constraints
  - Working hours, kindergarten opening hours
  - Transit lines and timetables

Rationales for location of activities, e.g. employment

- Limitation of the friction of distance, in terms of
  - Time consumption
  - Monetary expenses
  - Physical effort
- Choosing the best facility, in terms of
  - Job content
  - Salary
  - Work conditions
  - Colleagues

A few preliminary results from analyses of residential location and commuting (not yet published):

Commuting distances



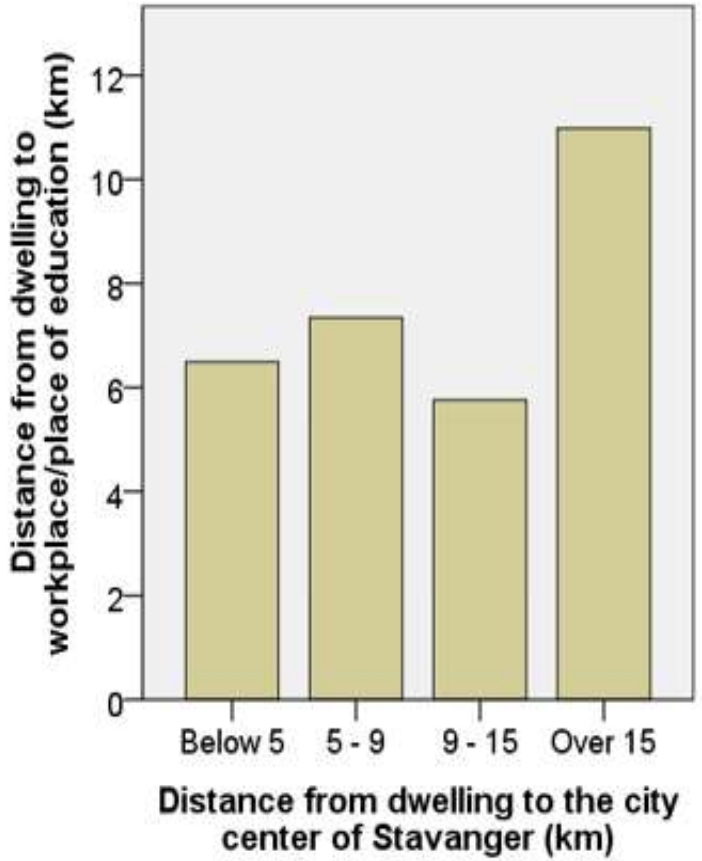


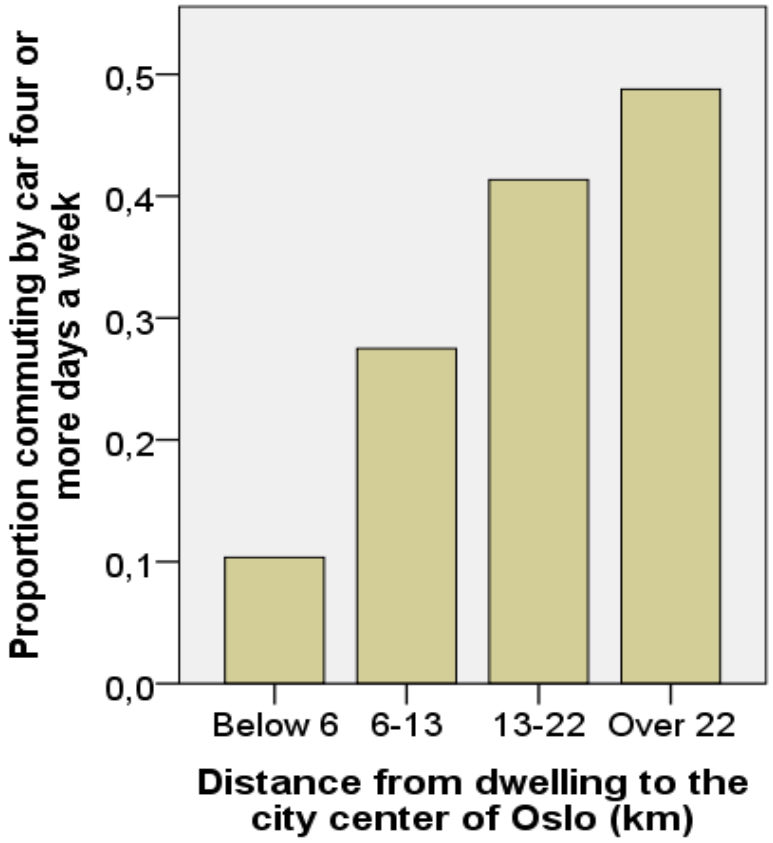
Table 1: Factors influencing commuting distances among respondents living at different locations in Oslo metropolitan area[1]. N = 982. Adj. R2 = 0.257.

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1,375	,849		1,620	,106
Distance from dwelling to the city center of Oslo (km)	,530	,030	,488	17,749	,000
Personal gross annual income (1000 NOK)	,005	,001	,127	4,607	,000

Table 1: Factors influencing commuting distances among respondents living at different locations in Stavanger metropolitan area[2]. N = 639. Adj. R2 = 0.234.

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	4,357	,904		4,822	,000
Distance from dwelling to the city center of Stavanger (km)	,244	,032	,262	7,522	,000
Distance from dwelling to Forus second-order center (km)	,440	,044	,353	10,059	,000
Gender	-1,393	,407	-,119	-3,420	,001
Number of household members younger than 7 years	,606	,305	,069	1,990	,047
Number of household members 18 years or older	-,472	,234	-,070	-2,015	,044

Proportions commuting by car



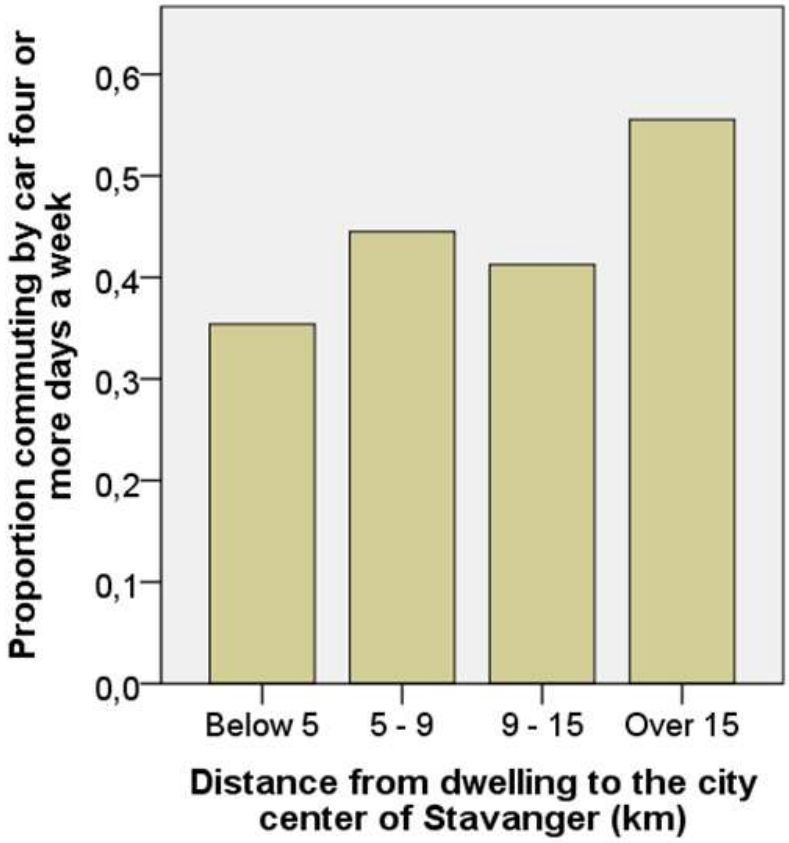


Table 2: Factors influencing the likelihood of commuting by car at least four days during the week among respondents living at different locations in Oslo metropolitan area[2]. N = 983. Nagelkerke R square = 0.250.

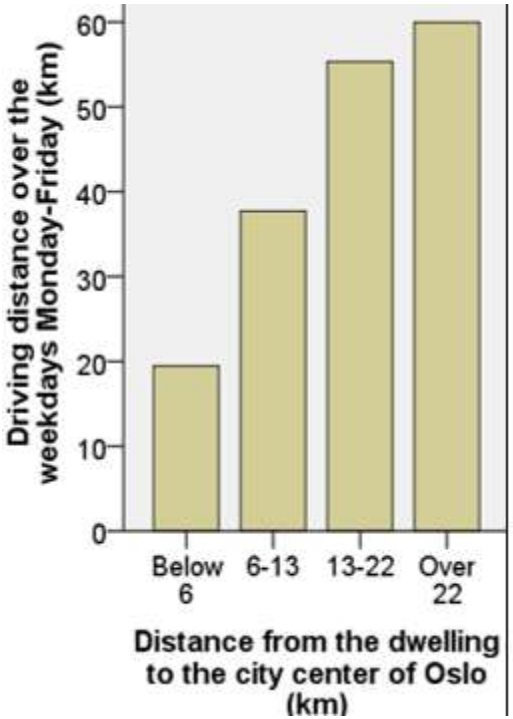
	B	S.E.	Wald	df	Sig.	Exp(B)
Distance from dwelling to the city center of Oslo (km)	,070	,008	83,730	1	,000	1,072
Age of the respondent	-,016	,007	5,075	1	,024	,984
Personal gross annual income (1000 NOK)	,001	,000	12,094	1	,001	1,001
Highest completed education	-,280	,072	15,213	1	,000	,756
Driver's license for car	4,056	1,032	15,440	1	,000	57,748
Constant	-4,755	1,044	20,725	1	,000	,009

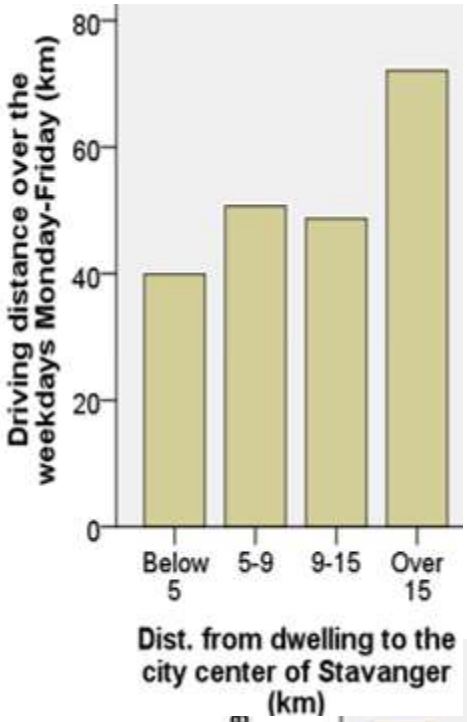
Table 2: Factors influencing the likelihood of commuting by car at least four days during the week among respondents living at different locations in Stavanger metropolitan area[3]. N = 700. Nagelkerke R square = 0.113.

	B	S.E.	Wald	df	Sig.	Exp(B)
Distance from dwelling to the city center of Stavanger (km)	,064	,015	17,920	1	,000	1,066
Distance from dwelling to Sandnes second-order center (km)	,036	,016	4,799	1	,028	1,036
Personal gross annual income (1000 NOK)	,002	,000	25,947	1	,000	1,002
Number of household members younger than 7 years	,250	,124	4,057	1	,044	1,284
Number of household members 7 to 17 years	-,264	,093	8,018	1	,005	,768
Highest completed education	-,311	,071	18,931	1	,000	,733
Constant	-,990	,392	6,376	1	,012	,371

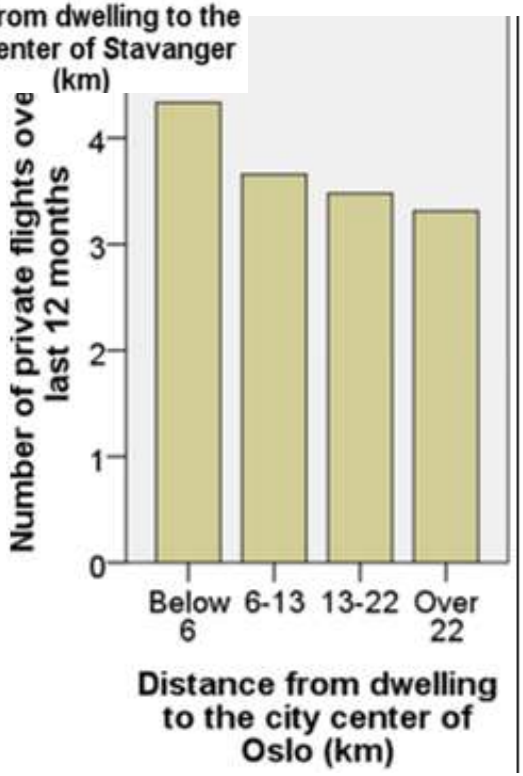
A quick glance at two more papers ..

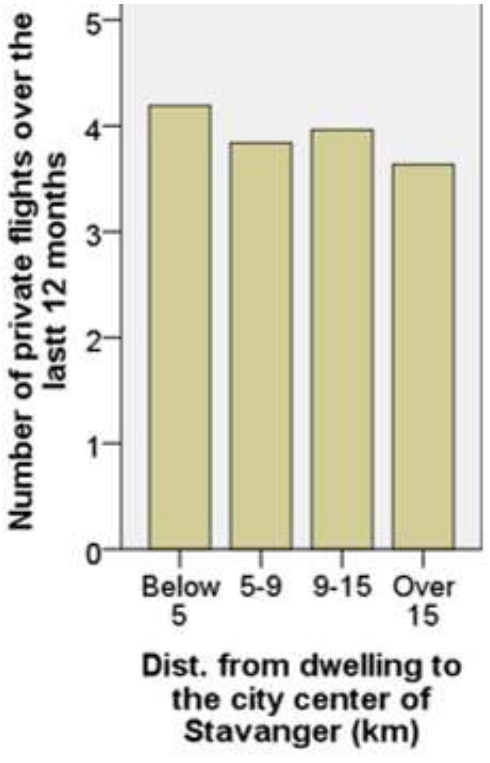
- Residential location and compensatory behavior in three Scandinavian cities
- Urban containment and inner-city densification reduce auto ownership





Money spent on low amount of car travel within the metropolitan area….





…. can be spent on more leisure flights

Changes in auto ownership due to moving

Table 4. Longitudinal comparisons of change in auto ownership for inward and outward movers

	Oslo		Stavanger	
	Coeff.	P-value	Coeff.	P-value
Change in distance to city center for inward relocation	0.022	0.000	0.012	0..300
Change in distance to city center for outward relocation	0.009	0.052	0.030	0.003
Change in household size	0.075	0.006	0.219	0.000
Constant	0.021	0.469	0.026	0.639
Number of observation	*427*		*206*	
R-square	*0.120*		*0.123*	