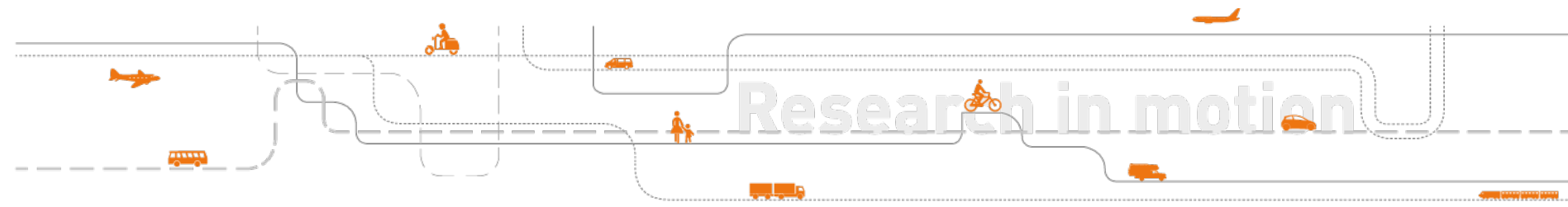


Når koster reisetida mest? Resultater fra den nye norske tidsverdistudien 2018-2019

Askill H. Halse (ash@toi.no),

S. Flügel, N. Hulleberg, G. N. Jordbakke, K. Veisten & H. B. Sundfør

Trafikdage, Aalborg, 26. august 2019

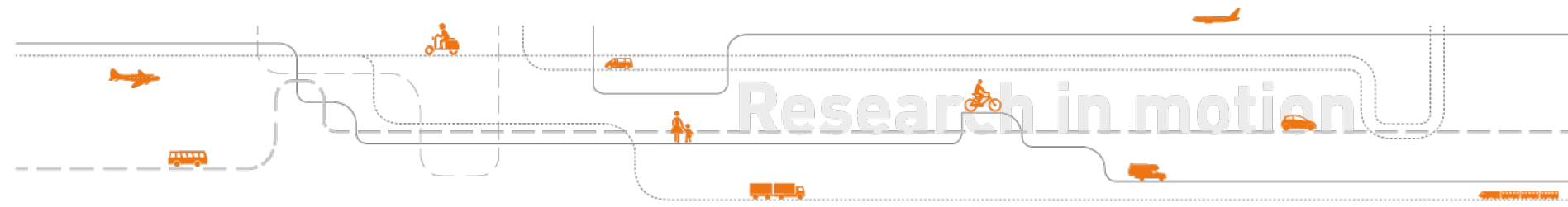


When is travel time more costly? Results from the new Norwegian value of time study 2018-2019

Askill H. Halse (ash@toi.no),

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Value of travel time (VTT)

- Key component in cost-benefit analysis (CBA) of transport projects, typically accounting for the larger share of benefits
- Many countries have official values based on national studies
- VTT grows with income, but also depends on changes in travel technology and preferences
- More productive use of travel time → VTT could decrease/become more differentiated (OECD 2018)



About the project



- R&D project for the Norwegian Transport agencies*
- Carried out by TØI together with Menon and Significance
- Purpose: Unit values for use in CBA of transport projects – particularly the national transport plan for 2022-2033
- Duration: 2018-2019. Preliminary results March 2019.

- Focus on value of travel time and (mainly) other drivers of travel demand – not external effects of transport
- Covers personal travel. Parallel project on freight transport

(*Statens vegvesen – Vegdirektoratet, Jernbanedirektoratet, Kystverket, Avinor AS, Nye Veier AS + PROSAM)

Previous VTT studies

Country (year of data collection)	Central research institution/ researchers	Main type of recruitments	Type of interview/questionnaire	Choice experiment(s) (No. of attributes per alternative)	Estimation model	Assumed distribution
Switzerland (2002)	Institute of Transport Planning and Systems (IVT), ETH Zurich / K. Axhausen	From another survey (KEP2)	paper self-completion questionnaires	Mode- (4) and route choice (4)	Heteroscedastic MNL	Deterministic function of distance and income
Denmark (2004)	Technical University of Denmark (DTU) / M. Fosgerau	Web and phone panel	Web-survey and CAPI	Route choice (2)	Integrated approach (MXL)	Lognormal with SNP-terms
Sweden (2007, 2008)	Centre for Transport Studies, KTH Royal Institute of Technology / M. Börjesson, J. Eliasson	Population register (2008)*	web-survey or call-back interview (2008)**	Route choice (2)	Integrated approach (MXL)	Lognormal
Norway (2009)	Institute of Transport economics (TØI) / F. Ramjerdi, S. Flügel	Internet panel	Web-survey	Route choice (2)	Integrated approach (MXL)	Lognormal with SNP-terms
Netherlands (2009, 2011)	Significance / M. Kouwenhoven, G. deJong	Internet panel (2009), field (2011)	Web-survey	Route choice (2)	Latent class models	Discrete distribution
Germany (2012)	IVT, ETH Zürich / K. Axhausen, I. Ehreke	Phone (non-business), Panel (business)	Phone (RC), pen-pencil or web (SC)	Mode (up to 11), route (up to 11) and residential/work place choice (up to 14)	Heteroscedastic MNL	Deterministic function of distance and income
UK (2014)	University of Leeds / S. Hess, A. Daly	Intercept method (field) and telephone	Web-survey and telephone interview	Route choices (2, 4 and 4)	WTP-space MXL	Log-uniform
Norway (2018)	Institute of Transport Economics (TØI) / A. Halse, S. Flügel	Internet panel, email register, and field	Web-survey	Route choice (2)	Integrated approach (MXL)	Log-normal

Source: Flügel, S. and A. H. Halse (2019). Estimation of value of time. In: Vickerman, R. (red.) *Encyclopedia of Transportation*, forthcoming

Methodology

Stated preferences (SP)

Please pick your preferred alternative

	Alternative A	Alternative B
Travel time	25 min.	35 min.
Cost	52 NOK	40 NOK
	Choose A	Choose B

Methodology

Stated preferences (SP)

	Alternativ A	Alternativ B
Kostnad	28 kr	40 kr
Reisetid	30 min	24 min
Forventet tid i kø	40 prosent av tiden i moderat kø 5 prosent av tiden i sterk kø	10 prosent av tiden i moderat kø 10 prosent av tiden i sterk kø
	<input type="checkbox"/> Alternativ A	<input type="checkbox"/> Alternativ B

Methodology


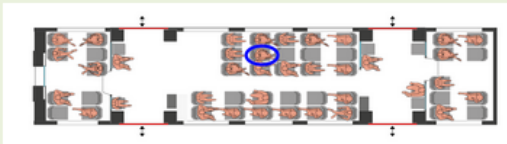
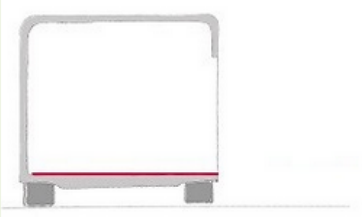
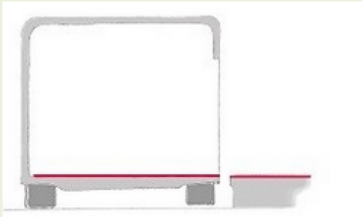

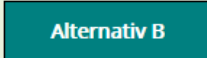
Stated preferences (SP)

Reisetid om bord

Overgang mellom kjøretøy og stasjon
(gjelder både ved din påstigning og
avstigning)

Informasjon om neste stasjon

Trengselnivå om bord og din plass (ringet
rundt)

	Alternativ A	Alternativ B
Reisetid om bord	80 minutter	101 minutter
Overgang mellom kjøretøy og stasjon (gjelder både ved din påstigning og avstigning)	Uten trapp og liten avstand (mindre enn 10 cm mellom dør og plattform)	Uten trapp, men ingen tilpasning av plattform (høydeforskjell på minst 10 cm)
Informasjon om neste stasjon	Ingen annonsering	Kun skriftlig med sanntidsinformasjon (neste stasjon og forventet ankomsttid vises på skjerm)
Trengselnivå om bord og din plass (ringet rundt)		
		
		

Methodology

Stated preferences (SP)

- *Advantage: Get data on the relevant trade-offs (internal validity)*
- *Disadvantage: Hypothetical (external validity)*

For estimating the value of in-vehicle time, we rely on a two-attribute experiment

- *Advantage: Convenient for modelling, can control for design effects*
- *Disadvantage: Too simple/hypothetical?*

	Alternativ A	Alternativ B
Reisetid	38 min.	45 min.
Kostnad	107 kr	90 kr
	Alternativ A	Alternativ B

We also investigate the effect of survey recruitment method on VTT

VTT by transport mode

Common to segment VTT by mode and trip purpose (and distance)

Differences between modes reflect:

1. *Characteristics of the mode (comfort, how travel time can be spent)*
2. *Characteristics of the traveler (e.g. income)*
3. *Trip characteristics (other than purpose)*

Including (2.) and (3.) in VTT → CBA results inconsistent if travelers switch modes

- *Also puts more weight on rich travelers – is this a problem?*

VTT by transport mode

Common to segment VTT by mode and trip purpose (and distance)

Differences between modes reflect:

1. *Characteristics of the mode (comfort, how travel time can be spent)*
2. *Characteristics of the traveler (e.g. income)*
3. *Trip characteristics (other than purpose)*

Our solution: VTT by mode that only capture (1.) and (3.)

- *Benefits low-income modes (i.e. long-distance bus)*

	Main mode:			Alternative mode:	
	Alternativ A	Alternativ B		Alternativ A	Alternativ B
Reisetid	38 min.	45 min.	➔	38 min.	45 min.
Kostnad	107 kr	90 kr		107 kr	90 kr
	Alternativ A	Alternativ B		Alternativ A	Alternativ B

VTT by transport mode

Vennligst velg...

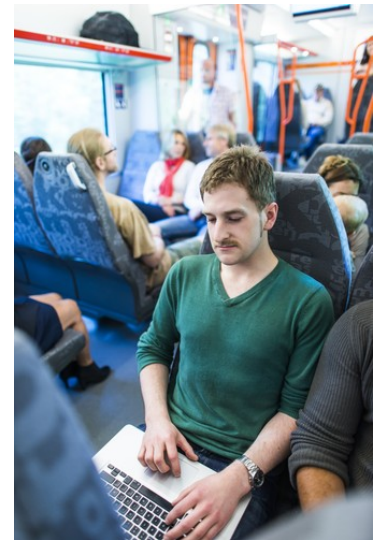
	Alternativ A	Alternativ B	Alternativ C	Alternativ D
Transportmiddel	Sykkel	Sykkel	Bil	Bil
Reisetid	35 min	30 min	25 min	32 min
Kostnad			60 kr	47 kr
Hovedtype vei (sykkel)	Gang og sykkelvei	Sykkelfelt i veibanen		
Antall lyskryss	5	4		
Andre kryss	5	6		
1. Jeg liker dårligst ...	Alternativ A	Alternativ B	Alternativ C	Alternativ D
2. Jeg liker best ...	Alternativ A	Alternativ B	Alternativ C	Alternativ D
3. Av de som er igjen foretrekker jeg...	Alternativ A	Alternativ B	Alternativ C	Alternativ D

Tilbakestill

Growth in VTT over time

Current practice in Norway: Assume that VTT grows at the same rate as GDP/capita (elasticity = 1)

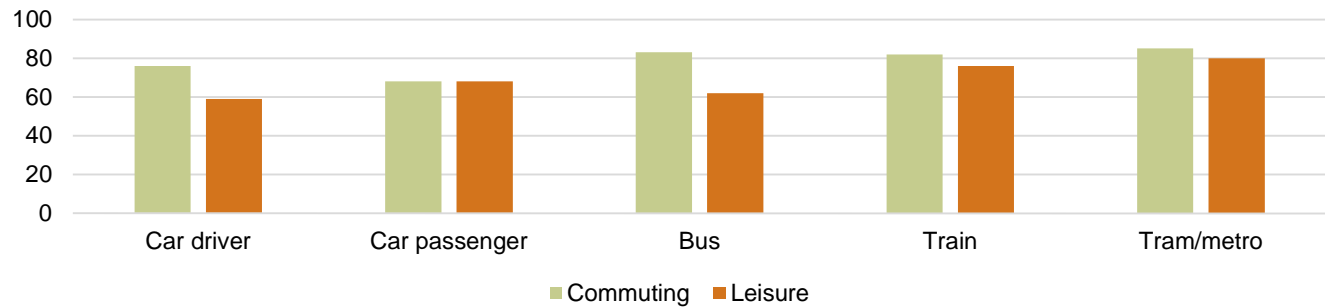
- *2009-values have been adjusted to the present date*
- *Also applies to future growth during period of analysis (e.g. 40 years)*
→ *large impact on CBA results*
- ICT technology → more productive use of travel time → lower VTT
- Vehicle automation could lower VTT even further (OECD 2018)



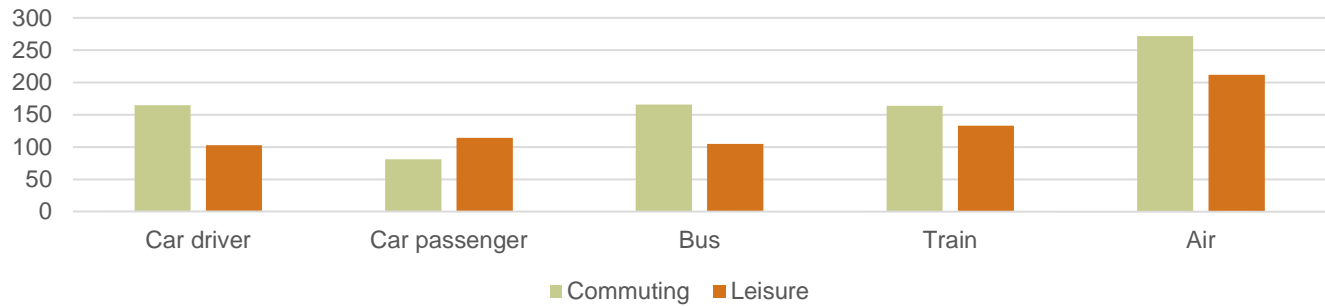
(Photo: NSB)

Results (preliminary)

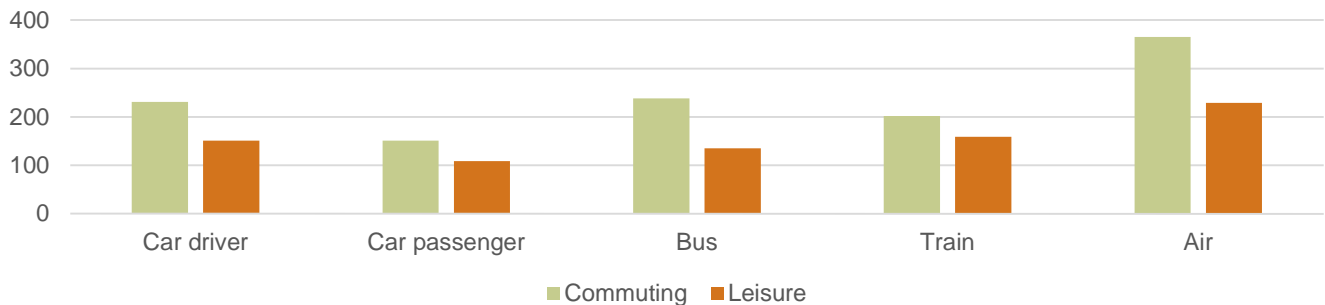
Short trips
(< 70 km):



Medium trips
(70-200 km):



Long trips
(> 70 km):



VTT in business travel

$$VBTTs = (1 - pq)MPL + VP$$

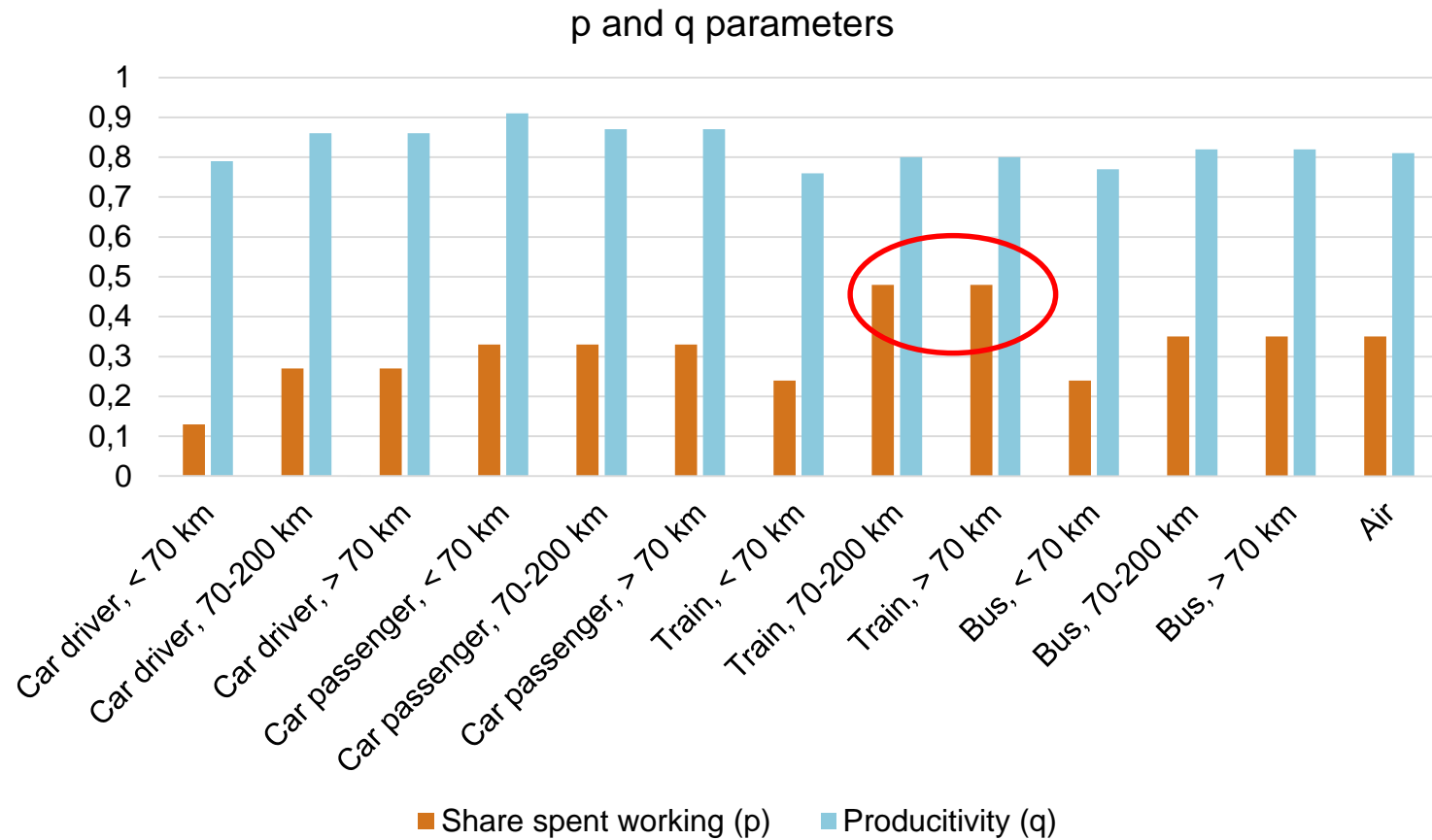
where

p: share of travel time spent working

q: relative productivity of work while traveling

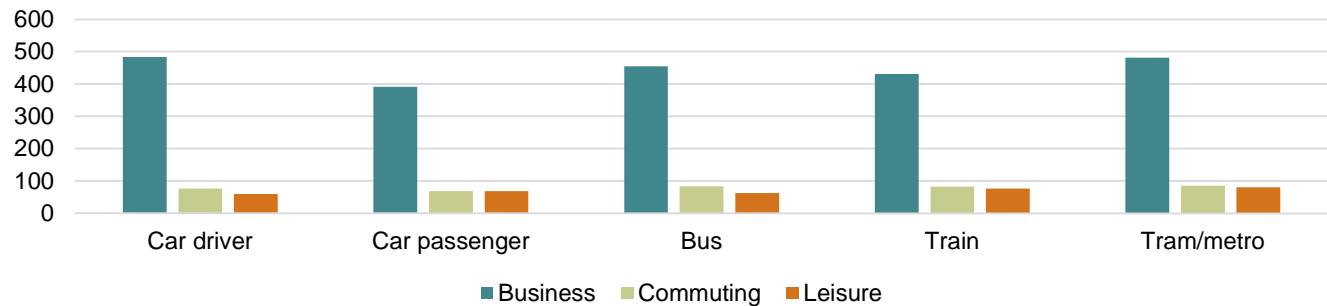
VP: private valuation (SP)

VTT in business travel

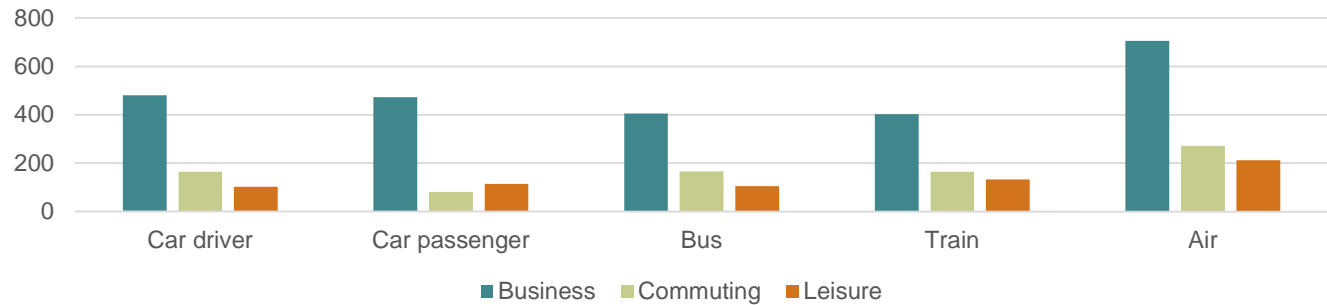


Results (preliminary)

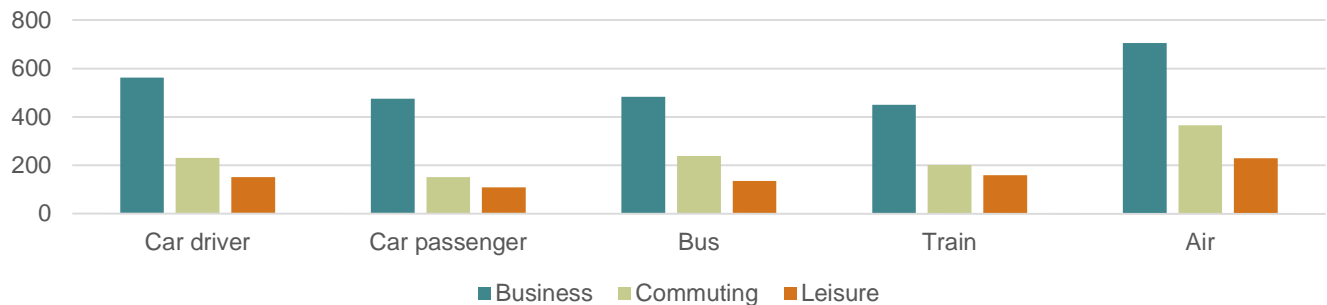
Short trips
(< 70 km):



Medium trips
(70-200 km):



Long trips
(> 70 km):



Results (preliminary)

- Low VTT for car passengers, high for air travel.
- Business VTT higher for car drivers than public transport
- Otherwise no large/systematic differences
- Cycling VTT similar to motorized modes, VTT in walking higher

Comparison with 2009 values suggest income elasticity < 1

Results (preliminary)

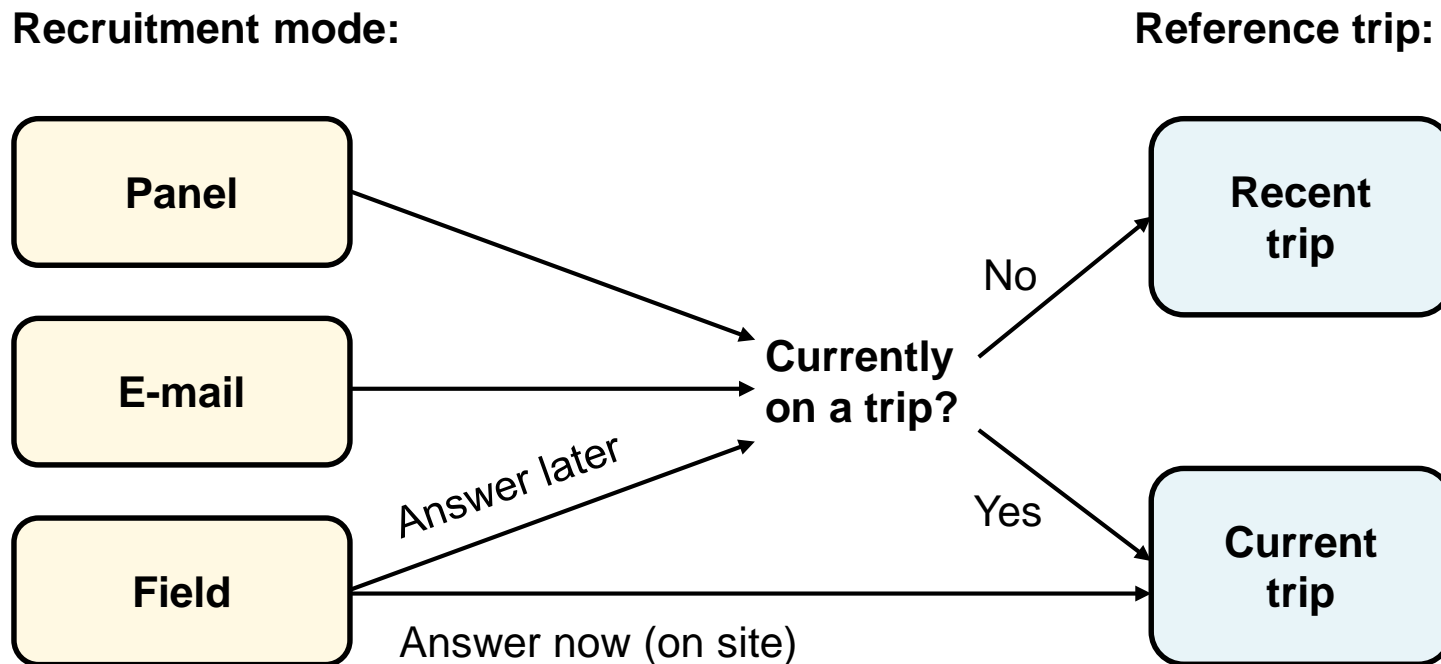
Factors that increase VTT:

- Congestion: Severe vs. no congestion → factor 2.9
- Crowding: High (6 people/m²) vs. no crowding → factor 2.2
- Cycling: No facilitation vs. separate path → factor 1.2-1.3

Headway time (short headways) \approx travel time → Waiting time factor 2

Note: Multipliers do not apply to business travel VTT in the same way

Effect of recruitment method



Effect of recruitment method

Substantial differences in VTT between recruitment modes

1. *Lower VTT in internet panel due to self-selection*
2. *Lower VTT in 'off-site' interviews due to hypothetical bias(?)*

We have accounted for (1.) (and partly (2.)) by giving a lower weight to panel members when simulating VTT

Consistent with experiences from previous Dutch study, but not the 2009 Norwegian study (where panel values are reasonably high)

- *Differences in panel quality?*

Summary

- New contribution to a well-established research field
- Updated unit values are important
- VTT depends both on mode and contextual factors
- Removing the user group effect → more similar VTT across modes
- VTT growth over time lower than assumed in current practice
- Survey recruitment method has a large impact