Universiteit Utrecht

Faculty of Geosciences

How Good is our Commute?

An overview of empirical findings, methodological issues and policy implications

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Commuting: some facts

	Positive
Activities	
Intimate relations	5.10
Socializing	4.59
Relaxing	4.42
Pray/worship/meditate	4.35
Eating	4.34
Exercising	4.31
Watching TV	4.19
Shopping	3.95
Preparing food	3.93
On the phone	3.92
Napping	3.87
Taking care of my children	3.86
Computer/e-mail/Internet	3.81
Housework	3.73
Working	3.62
Commuting	3.45
Interaction partners	
Friends	4.36
Relatives	4.17
Spouse/SO	4.11
Children	4.04
Clients/customers	3.79
Co-workers	3.76
Boss	3.52
Alone	3.41

Kahneman et al. (2004)

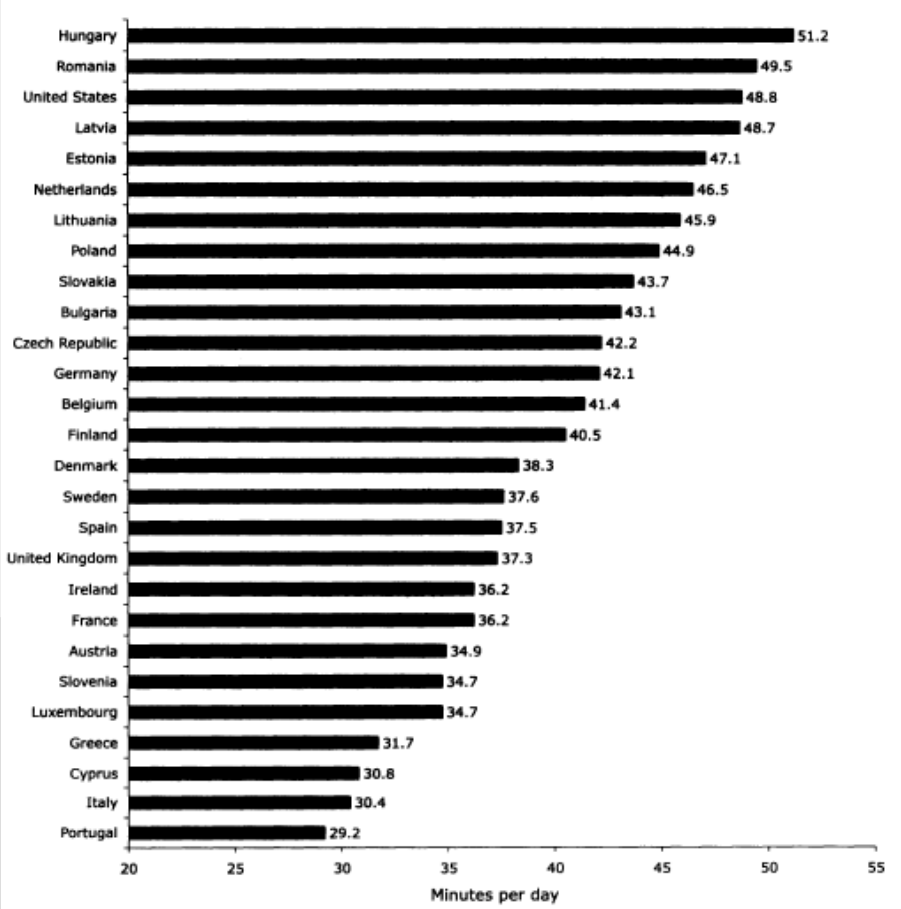


Fig. 1. Average daily commuting time in Europe and the US

Stutzer and Frey (2008)

Commuting as a (recurrent) daily activity

- Means to an end (work or get home)
- Lived, embodied experience
- Physical activity
- Time use (daily and during commute trip)
- Structural life domain

Travel and Well-being

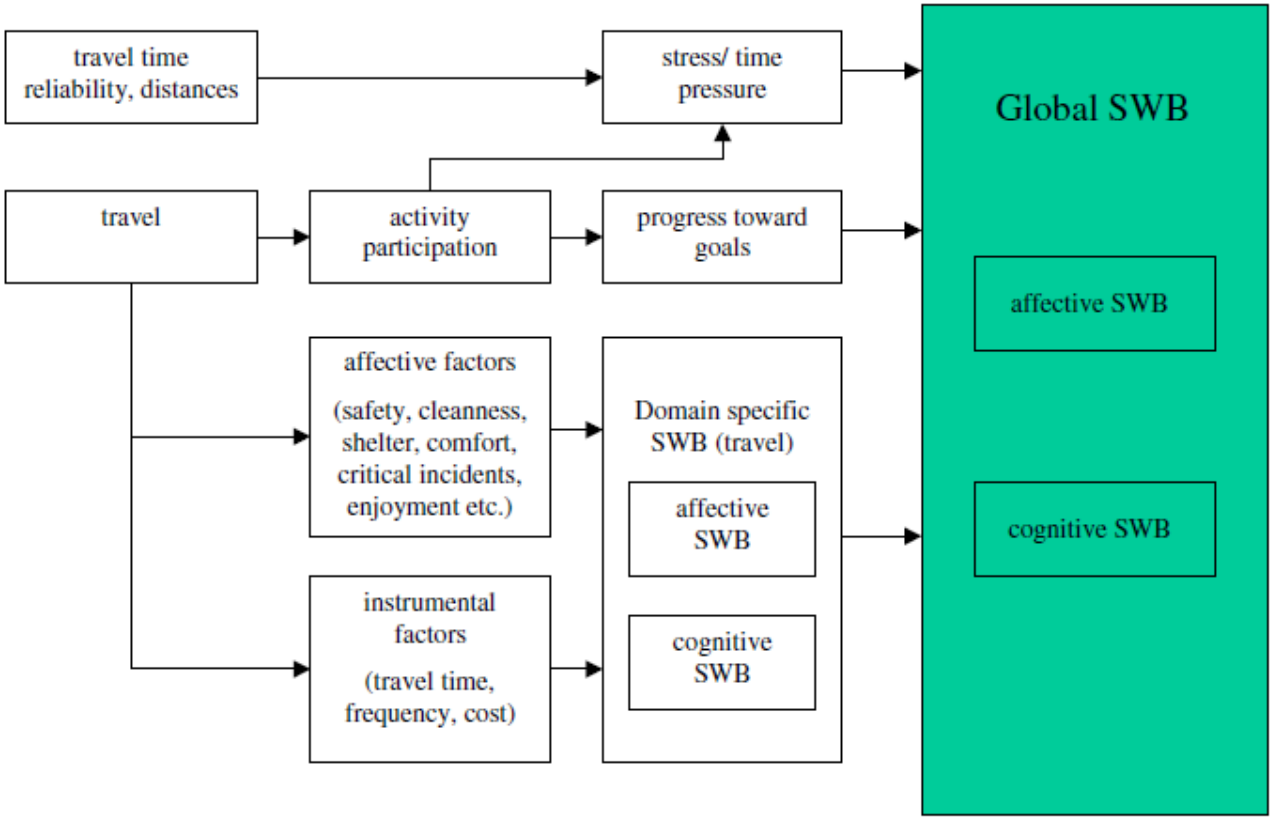
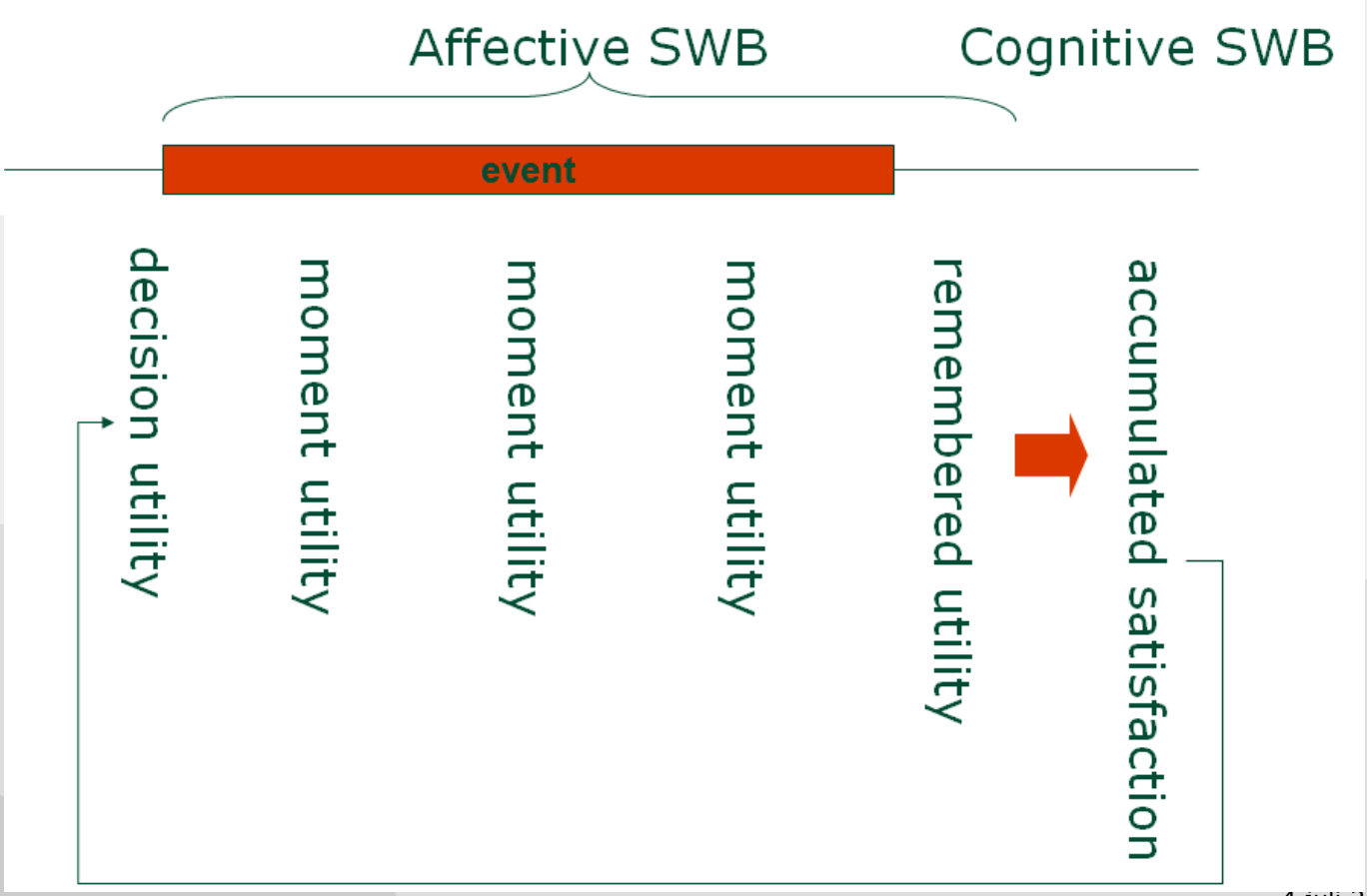


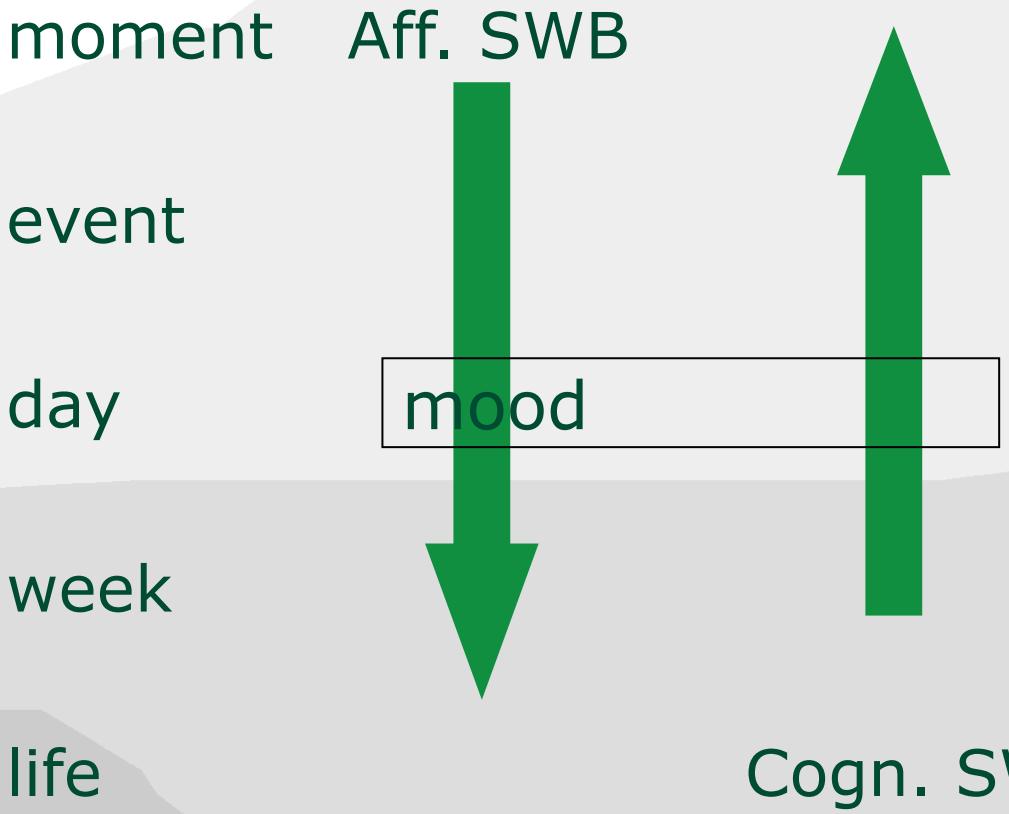
Fig. 1. Theoretical framework.

Ettema et al., 2010

Decision making and experience



Decision making and experience



Measuring Well-Being: Satisfaction with Travel Scale (STS)

- Cognitive component
- Affective component

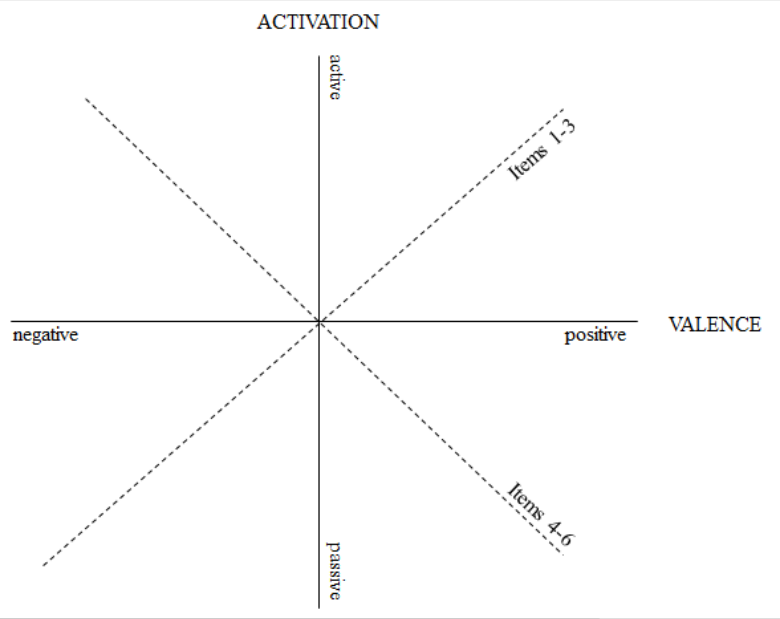


Table 1
The satisfaction with travel scale (STS).

Positive deactivation–negative activation
Time pressed (−4) – relaxed (4)
Worried I would not be in time (−4) – confident I would be in time (4)
Stressed (−4) – calm (4)
Positive activation–negative deactivation
Tired (−4) – alert (4)
Bored (−4) – enthusiastic (4)
Fed up(−4) – engaged (4)
Cognitive evaluation
Travel was worst (−4) – best I can think of (4)
Travel was low (−4) – high standard (4)
Travel worked well (−4) – worked poorly

Ettema et al. 2012

Overview of Examples

- Commute trip experience > effect on mood (2)
- Commute trip satisfaction > remembered utility (1)
- Effect of commute/travel on SWB (3)

Commute Travel and Travel satisfaction

- Survey among 520 commuters from Stockholm, Goteborg, Malmo
- Q's about activities during travel, company, crowding, SES of last typical commute
- STS, daily affect, satisfaction with life (SWLS)

5. To the right there are 9 pairs of opposite adjectives. Put a cross in the box that best correspond to your experience during the trip. For instance, if you were very stressed put a cross on -3, were you very calm put a cross on 3, or were you neither stressed nor calm put a cross on 0. If you were only slightly stressed or slightly calm, put a cross on any number in between corresponding to the degree of your experience.	Commute TO work			Commute FROM work		
		-3 -2 -1 0 1 2 3			-3 -2 -1 0 1 2 3	
	Very stressed	□------□------□------□------□------□------□	Very calm	Very stressed	□------□------□------□------□------□------□	Very calm
	Very bored	□------□------□------□------□------□------□	Very enthusiastic	Very bored	□------□------□------□------□------□------□	Very enthusiastic
	Worked very poorly	□------□------□------□------□------□------□	Worked very well	Worked very poorly	□------□------□------□------□------□------□	Worked very well
	Very tired	□------□------□------□------□------□------□	Very exited	Very tired	□------□------□------□------□------□------□	Very exited
	Very low standard	□------□------□------□------□------□------□	Very high standard	Very low standard	□------□------□------□------□------□------□	Very high standard
	Very worried	□------□------□------□------□------□------□	Very confident	Very worried	□------□------□------□------□------□------□	Very confident
	Worst trip I can imagine	□------□------□------□------□------□------□	Best trip I can imagine	Worst trip I can imagine	□------□------□------□------□------□------□	Best trip I can imagine
	Very tense	□------□------□------□------□------□------□	Very relaxed	Very tense	□------□------□------□------□------□------□	Very relaxed
	Very unengaged	□------□------□------□------□------□------□	Very engaged	Very unengaged	□------□------□------□------□------□------□	Very engaged

Fig. 1. Illustration of the STS scale in the questionnaire.

Commute Travel and Travel Satisfaction

- Commute invokes positive satisfaction

- Highest satisfaction with active modes, lowest with public transport

Table 2 Means (M) and standard deviations (SD) on a composite measure of satisfaction (STS) with the commutes to and from work related to primary travel mode

	Primary travel mode								
	Car			Public transit			Walking/biking		
	n	M	(SD)	*n*	M	(SD)	*n*	M	(SD)
Commute to work	269	0.9	(1.0)	251	0.5	(0.8)	165	1.2	(0.9)
Commute from work	259	0.9	(1.0)	254	0.5	(0.8)	164	1.2	(0.9)

Commute Travel and Travel satisfaction

- Effects of trip characteristics and activities during travel (public transport trips)

Table 10
Results of regression analyses of commute to work.

	Positive activation		Positive deactivation		Cognitive evaluation	
	Coeff.	*Sign.*	*Coeff.*	*Sign.*	*Coeff.*	*Sign.*
(Constant)	0.737	0.025	0.731	0.030	10.039	0.000
Crowdedness	0.148	<0.001	0.204	<0.001	0.227	<0.001
Tram	0.052	0.813	−0.058	0.796	−0.047	0.804
Train	−0.529	0.008	−0.257	0.214	−0.102	0.564
Bus	−0.073	0.628	0.000	0.998	−0.034	0.801
Activities during travel						
ICT use	−0.085	0.518	0.116	0.408	0.284	0.017
Entertainment	0.073	0.598	0.091	0.521	0.192	0.112
Relaxation	−0.234	0.051	−0.194	0.114	−0.200	0.056
Study/work	0.223	0.318	0.047	0.834	0.049	0.798
Talk to others	0.820	<0.001	0.581	0.001	0.595	<0.001
Duration	−0.009	0.182	−0.002	0.705	−0.012	0.026
Duration squared	0.000	0.623	0.000	0.651	0.000	0.169
Sociodemographics						
Age2040	−0.382	0.065	−0.300	0.146	−0.316	0.069
Age4060	−0.364	0.098	−0.312	0.154	−0.216	0.237
Male	0.111	0.342	0.106	0.377	0.148	0.150
Commute trips per week normally	−0.016	0.734	0.106	0.026	0.036	0.378
Malmö*	0.107	0.513	0.070	0.681	0.029	0.844
Göteborg	−0.183	0.283	−0.012	0.945	−0.142	0.337
Child	−0.163	0.200	−0.220	0.097	−0.134	0.232
Cohabiting	0.039	0.728	−0.183	0.118	−0.075	0.453
HighInc	−0.022	0.896	0.176	0.308	0.195	0.182
R^2	0.22		0.21		0.31	

* Stockholm is the reference category against which Malmö and Göteborg are compared.

Commute Travel and Travel Satisfaction

- METPEX study (EU FP7: www.metpex.eu)
- Stockholm, n=232
- Quality factors: safety, ticketing, cleanliness, information provision, other passengers, weather protection, comfort, staff and assistance
- Station and vehicle design (travellers with special needs, infrequent travellers), aesthetics, infotainment (stations and vehicles)

	Model 5 Whole trip + SA & ML
<17	
18-24	-
25-34	(-)
35-44	(-)
45-54	
55-64	
No Disruption	+
Positive mood	+
Active mood	
Main trip leg Sat.	+
PT integration	
Passenger rights	
Accessibility	
Unplanned info.	
Pre-trip info.	
infrastructure	
Safety & Security	
Inter-modality	
Station design	+
Interchang. design	
Stops design	
General info.	
PT staff	-
Ticket purchase	
Vehicle design	+
Pedestrian (Sec)	
Nagelkerke Ps. R2	**0.586**

Ettema, Abenoza, Susilo, 2016

Commute Travel and Travel satisfaction

- Effects of trip characteristics (Ettema et al., 2015)
- Car
  - +: independence, freedom, mastery, prestige, scenery, speed, privacy, security
  - - : stress, long commutes, unsafety, congestion
- Public Transport
  - +: seat availability, cleanliness, conversation, information, attractive stations, vehicle design, rail
  - - : crowding, waiting time, critical incidents, duration, unsafety
- Walking/cycling
  - +: physical activity, arousal, autonomy, social interaction, sidewalks, cycle paths, aesthetics
  - - : motorized traffic, crossings, rain, wind, cold, duration, unsafety

Commute Travel and Mood

- Smartphone based survey in Stockholm, Goteborg, Karlstad
- February (n=188), June (n=175)
- Mood measured using Swedish Core Affect Scale (SCAS)
  - Positive activation
  - Positive de-activation

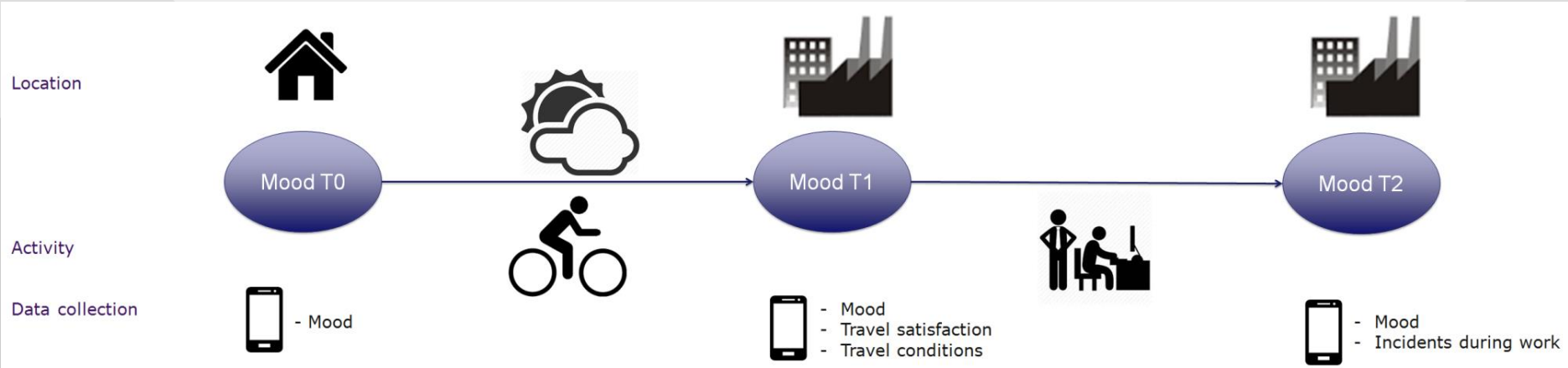


Figure 1: Conceptual model and data collection

Commute Travel and Mood

	February	June	Total
Valence T0	0.82	1.00	0.91
Valence T1	1.15	1.21	1.18
Valence T2	1.31	1.43	1.37
Increase Valance (T1-T0)	0.33	0.21	0.27
Increase Valance (T2-T0)	0.50	0.43	0.44
Activation T0	0.26	0.28	0.27
Activation T1	1.09	1.10	1.09
Activation T2	1.29	1.36	1.32
Increase Activation (T1-T0)	0.83	0.81	0.82
Increase Activation (T2-T0)	1.03	1.05	1.04

Ettema et al., 2017

Commute Travel and Mood

	Valence T1	Activation T1
Intercept	0,391	0,134
Valence T0	0,420**	
Activation T0		0,427**
Valence T1		
Activation T1		
Stockholm	-0,073	-0,021
Goteborg	-0,147	0,043
Male	-0,078	-0,016
Car	-0,110	-0,147
Public Transport	-0,269*	-0,484**
Alone	0,007	-0,051
Negative Incidents	-0,268*	-0,187
Positive incidents	0,220**	0,263**
Delay	-0,054	0,128
Trip duration Time	0,001	0,001
Age	-0,016	0,041
Age_square	0,000	0,000
Daily trip	-0,253**	-0,178
February	0,410^	0,225
Rain	-0,180^	-0,109
Temperature	0,042*	0,019
Variance component	0,094*	0,179

Commute Travel and Mood

- Other studies
  - Travel influences daily mood significantly (5-10% explanation)
  - Morris & Hirsch (2015) : negative mood effects from driving in peak and in large cities, long duration, positive effect of interaction with other
  - Novaco et al. (1990, 1991): commuting stress, carry over effects
  - Mood ≠ travel satisfaction

Commute Travel and Life Satisfaction

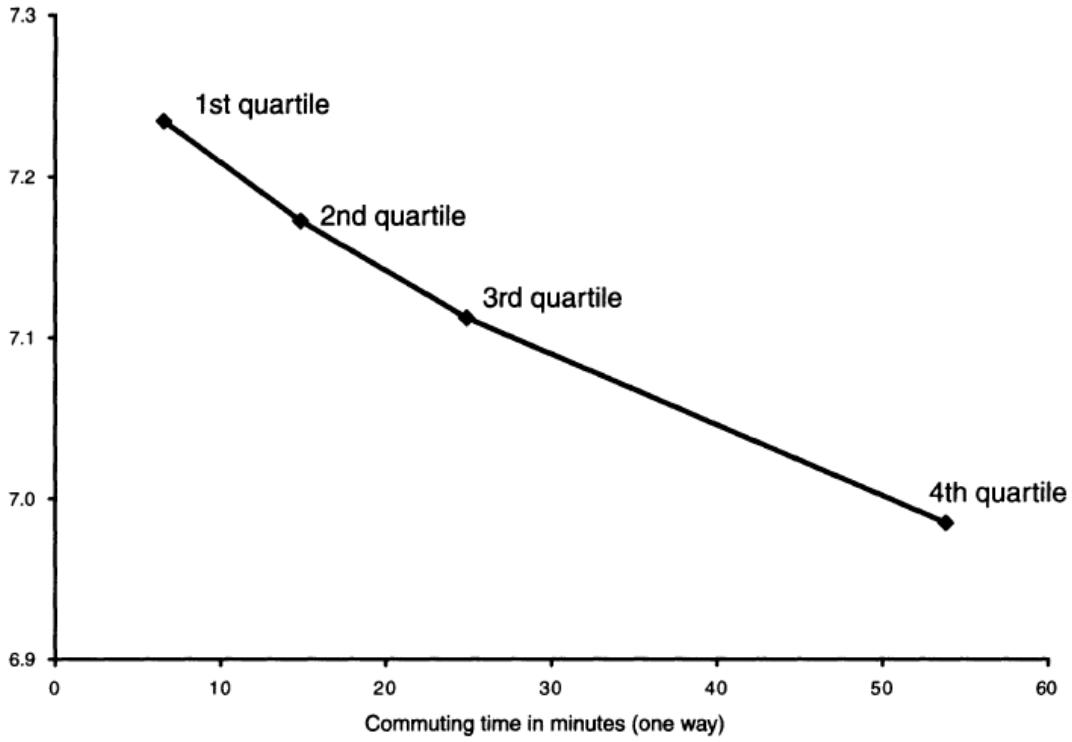


Fig. 3. Commuting time and average reported satisfaction with life, Germany, 1985–2003
Data source: GSOEP.

Stutzer and Frey (2008): The Commuting Paradox

Commute Travel and Life Satisfaction

- Smartphone based survey in Stockholm, Goteborg, Karlstad
- February (n=188), June (n=175)
- STS for general travel
- Monthly mood measured using Swedish Core Affect Scale (SCAS)
- Life satisfaction (SWLS)

- TRAVEL AS A LIFE DOMAIN

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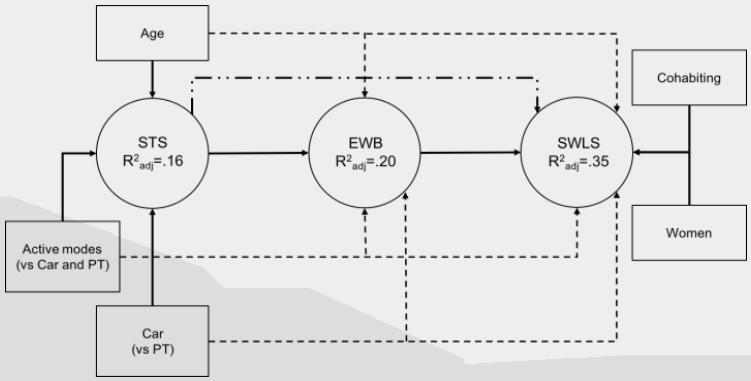
Commute Travel and Life Satisfaction

- Travel as a life domain



	STS			EWB			SWLS		
	β	±95%CI	p	β	±95%CI	p	β	±95%CI	p
Total effects									
Cohabiting (No=0, Yes=1)	.01	.10	.876	<.01	.05	.876	.28	.09	**<.001**
Sex (man=0, woman=1)	.04	.09	.460	.02	.03	.467	.15	.09	**.001**
Age	.31	.11	**<.001**	.14	.06	**<.001**	.16	.10	**.002**
Large (2) vs Other urban area (Medium=-1, Small=-1)	-.01	.09	.854	<-.01	.04	.855	<-.01	.08	.947
Medium (1) vs Small (-1) urban area	-.09	.09	.058	-.04	.04	.066	-.10	.09	**.043**
Multiple (3) vs Single modes (Active=-1, Car=-1, PT=-1)	<-.01	.09	.961	<-.01	.04	.961	<-.01	.03	.961
Active (2) vs Passive modes (Car=-1, PT=-1)	.20	.10	**<.001**	.09	.05	**<.001**	.07	.04	**.001**
Car (1) vs PT (-1) modes	.11	.10	**.030**	.05	.04	**.033**	.04	.04	**.043**
Satisfaction with Travel Scale (STS)				.44	.09	**<.001**	.35	.09	**<.001**
Emotional Well-Being (EWB)							.31	.10	**<.001**
Direct effects									
Cohabiting (No=0, Yes=1)	.01	.10	.876				.28	.09	**<.001**
Sex (men=0, women=1)	.04	.09	.460				.14	.08	**.001**
Age	.31	.11	**<.001**				.05	.09	.348
Large (2) vs Other urban area (Medium=-1, Small=-1)	-.01	.09	.854				<.01	.08	.993
Medium (1) vs Small (-1) urban area	-.09	.09	.058				-.07	.08	.145
Multiple (3) vs Single modes (Active=-1, Car=-1, PT=-1)	<-.01	.09	.961						
Active (2) vs Passive modes (Car=-1, PT=-1)	.20	.10	**<.001**						
Car (1) vs PT (-1) modes	.11	.10	**.030**						
Satisfaction with Travel Scale (STS)				.44	.09	**<.001**	.21	.09	**<.001**
Emotional Well-Being (EWB)							.31	.10	**<.001**
Indirect effects									
Cohabiting (No=0, Yes=1)				<.01	.04	.876	<.01	.04	.878
Sex (men=0, women=1)				.02	.04	.467	.01	.03	.458
Age				.14	.06	**<.001**	.11	.05	**<.001**
Large (2) vs Other urban area (Medium=-1, Small=-1)				<-.01	.04	.855	<-.01	.04	.856
Medium (1) vs Small (-1) urban area				-.04	.04	.066	-.03	.03	.069
Multiple (3) vs Single modes (Active=-1, Car=-1, PT=-1)				<-.01	.04	.961	<-.01	.03	.961
Active (2) vs Passive modes (Car=-1, PT=-1)				.09	.05	**<.001**	.07	.04	**.001**
Car (1) vs PT (-1) modes				.05	.04	**.033**	.04	.04	**.043**
Satisfaction with Travel Scale (STS)							.14	.05	**<.001**

Commute Travel and Life Satisfaction

- Time use effect (Hilbrecht et al., 2014)

Table 2. Contribution of demographics, selected time use categories, and perceived seriousness of traffic congestion to *life satisfaction*.

	Model 1		Model 2		Model 3	
Category (independent variables)	*B*	*SE*	*B*	*SE*	*B*	*SE*
Constant	7.08***	.17	7.36***	.19	8.10***	.64
Demographics						
Gender (female = 1)	−.01	.06	−.02	.06	−.05	.06
Age	.00	.00	.00	.00	.00	.00
Partnered	.53***	.07	.54***	.07	.51***	.07
Post-secondary education	−.13	.08	−.12	.08	−.12	.08
Urban residence	−.20**	.07	−.18**	.07	−.08	.08
Household income above median	.37***	.07	.37***	.07	.38***	.07
Flexible work hours	.21***	.06	.19**	.06	.20**	.06
Time allocation (minutes per day)						
Commuting			−.18**	.06	−.11	.07
Paid work					−.20	.22
Physically active leisure					.12**	.04
Social leisure					−.04	.03
Traffic congestion						
Perceived seriousness (1–4)					−.20***	.04
Adjusted R^2	.05		.05		.07	

Note: n = 2939; **p < .01, ***p < .001.

Commute Travel and Life Satisfaction

- Time use effect (Hilbrecht et al., 2014)

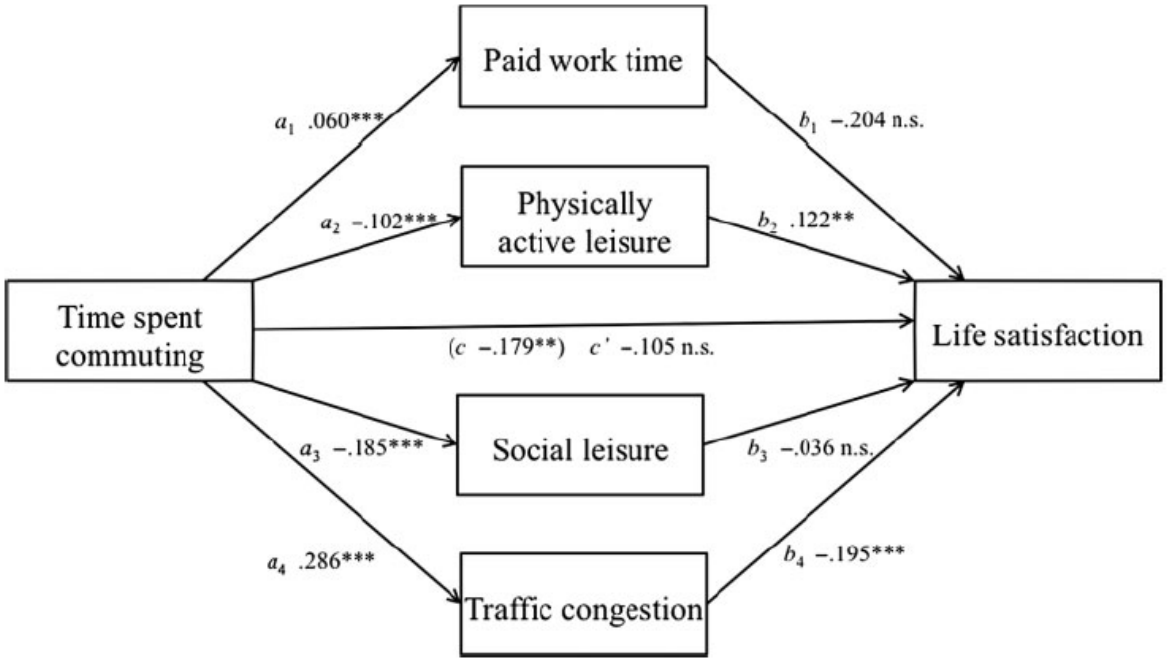


Figure 1. Association between time spent commuting and *life satisfaction* with tests for mediation by paid work time, time for physically active leisure, time for social leisure and perceived seriousness of traffic congestion; $n = 2939$; $^{**}p < .01$, $^{***}p < .001$.

Implications

- Commute travel has mood, trip satisfaction and time use effects!
- Effects go beyond “utility-based logsums” in CBAs (e.g. improved experience without behaviour change, carry over effects)
- Evaluation of commute is positive (see also e.g. Jain, Mokhtarian on positive utility of travel)

Remaining issues

- More attention to qualitative aspects (comfort, ambiance, aesthetics, ease, landscape, safety)
- More attention for travel time use (Lyons)
- Travel satisfaction & mood for new travel options (E-bike, autonomous vehicles)
- Dynamics: travel satisfaction and mode change > predictor of adherence?
- Health as a mediating effect?

Questions, suggestions, ideas?