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Collecting and organising time-use data

KW Axhausen

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Institut für Verkehrsplanung und Transportsysteme
Institute for Transport Planning and Systems

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Structure of the talk

- Why ?

- Scopes of a time use survey
- Scope of the associated survey elements

- Inherent biases

- A technological fix ?

Why ? - Objectives

(Proxy) measure of human welfare (against normative scales)

- Mean
- Distribution

- Basis for modelling activity scheduling

Why ? - Schedules as proxy welfare measures

- Budget constraints
- Capability constraints

- Generalised costs of the schedule

  - Generalised cost of travel
  - Generalised cost of activity participation

    - Risk and comfort-adjusted weighted sums of time, expenditure and social content

Why ? - Schedules as proxy welfare measures

- Budget constraints
- Capability constraints

- Generalised costs of the schedule

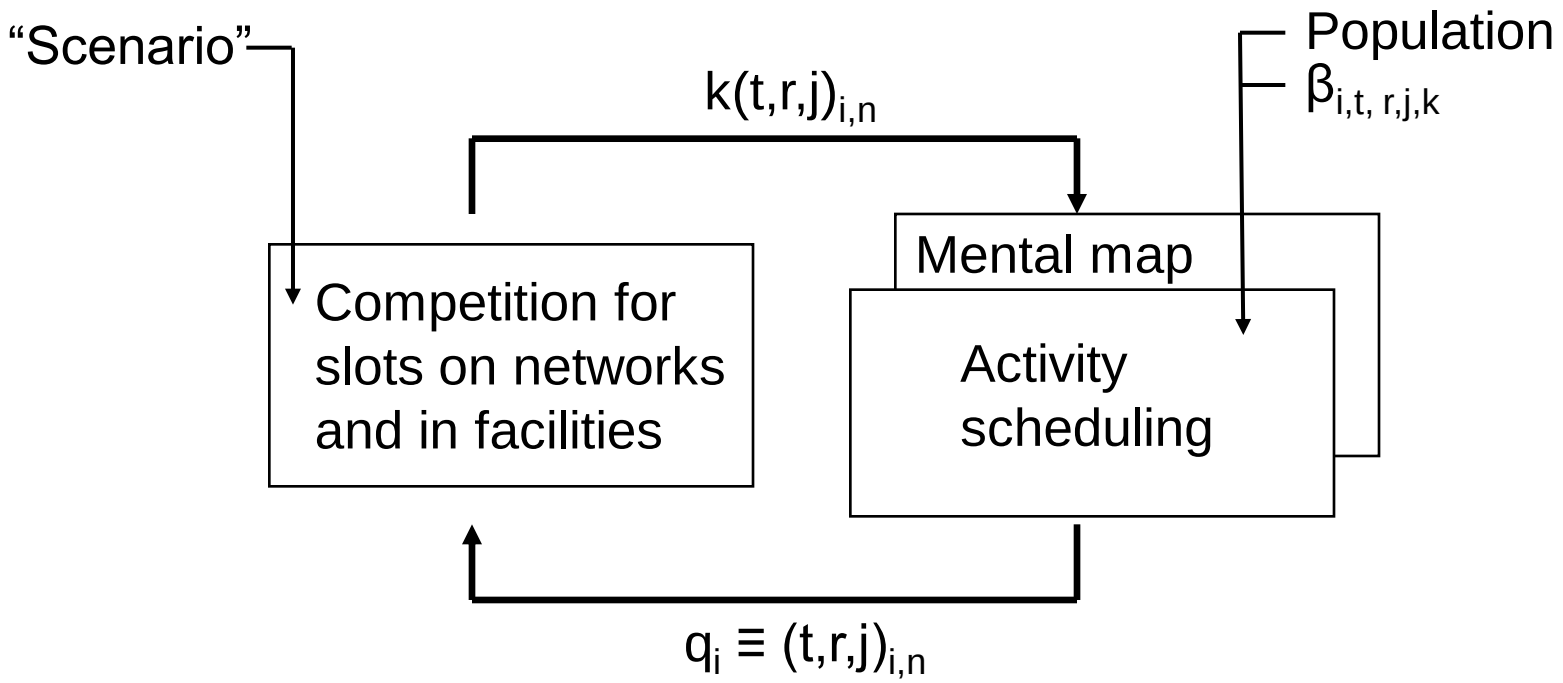
  - Generalised cost of travel
  - Generalised cost of activity participation

    - Happiness/Satisfaction

Why ? – Basis for models of scheduling

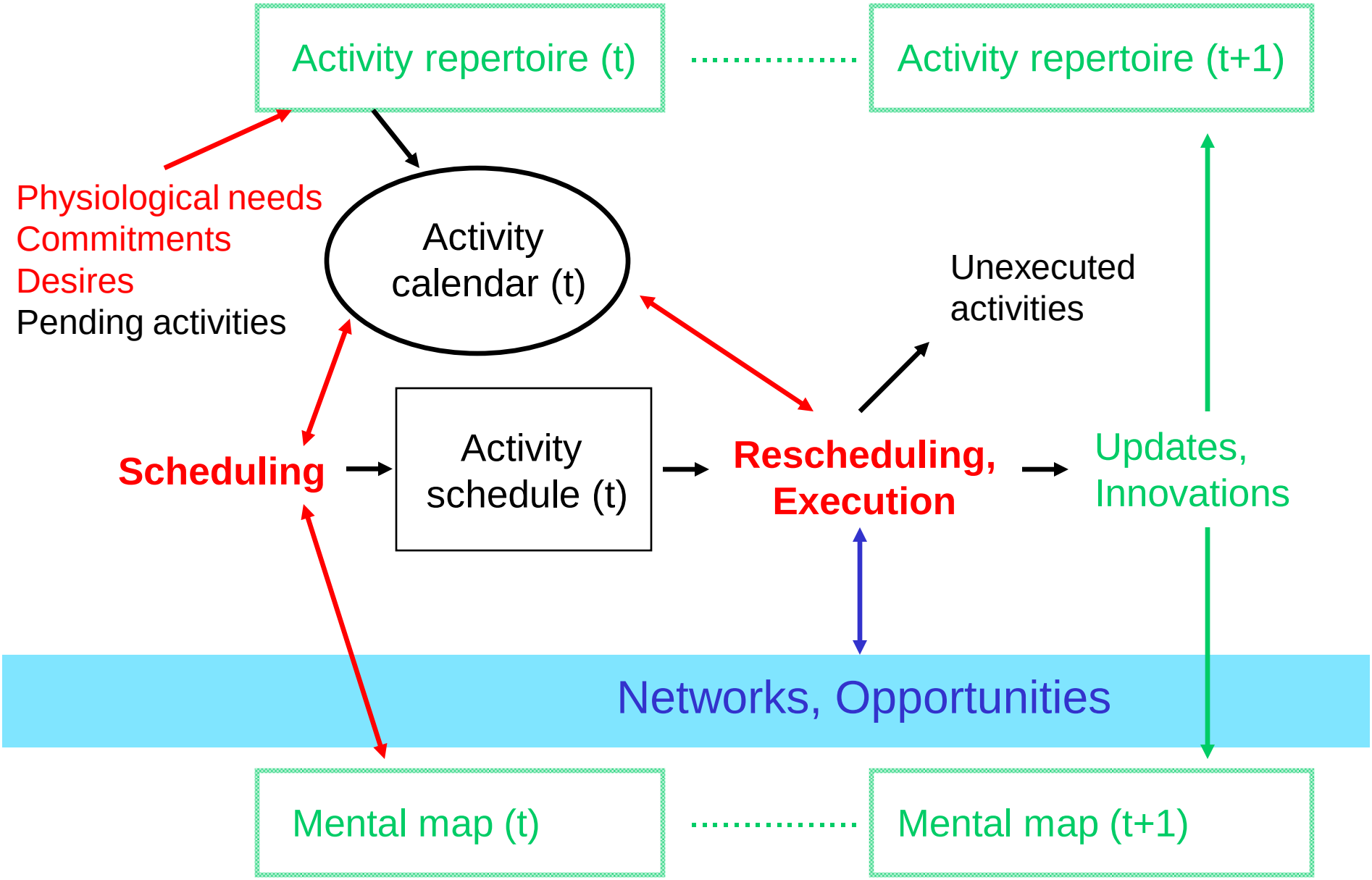
- Number and type of activities
- Sequence of activities
    - Start and duration of activity
    - Composition of the group undertaking the activity
    - Expenditure division
    - Location of the activity
        - Connection between sequential locations
            - Location of access and egress from the mean of transport
            - Vehicle/means of transport
            - Route/service
            - Group travelling together
            - Expenditure division

Why ? – Models of equilibrium



Demand q are the i^{th}movements of person p from the current location at time t on route (connection) r to location j. The resulting generalised costs k are used to adjust the schedules and to change the capacities C and prices P of facilities f

Why ? – Path dependent models



Why ? – Where do the benefits accrue ?

- Changes in generalised costs (for the static/adapted schedule)
- Productivity and income change
- Changes in health and educational status
- Change in land and real estate rents
- Changes in happiness

Scope: Flow of activity

Target	All activity (and secondary activity)
Base unit	Blocks of pre-specified length
Activity definition	All coherent set of acts (code book)
Reporting period	Usually one (two) day(s)
Minimum distance	Irrelevant
Minimum duration	Pre-specified
Spatial exclusions	None
Temporal exclusions	None
Reference location	None (but normally no details covered)

Scope: Activity episodes

Target	All activity
Base unit	User-perceived coherent set of acts
Activity definition	Coherent set of acts (code book)
Reporting period	Usually one (two) day(s)
Minimum distance	Irrelevant
Minimum duration	None
Spatial exclusions	None
Temporal exclusions	None
Reference location	None (but normally no details covered)

Scope: Movement

Target	All movement
Base unit	(Stage), trip, (tour)
Activity definition	Coherent set of acts (code book)
Reporting period	Usually one (two) day(s)
Minimum distance	Minimum defined by survey
Minimum duration	None
Spatial exclusions	Work places
Temporal exclusions	Undertaken as part of work
Reference location	Home or place of overnight stay

Scope: Associated elements

- Participants and the strength and type of their link
- Beneficiary
- Attention, irritation, wellbeing
- Planning horizon
- Expenditure and its allocation

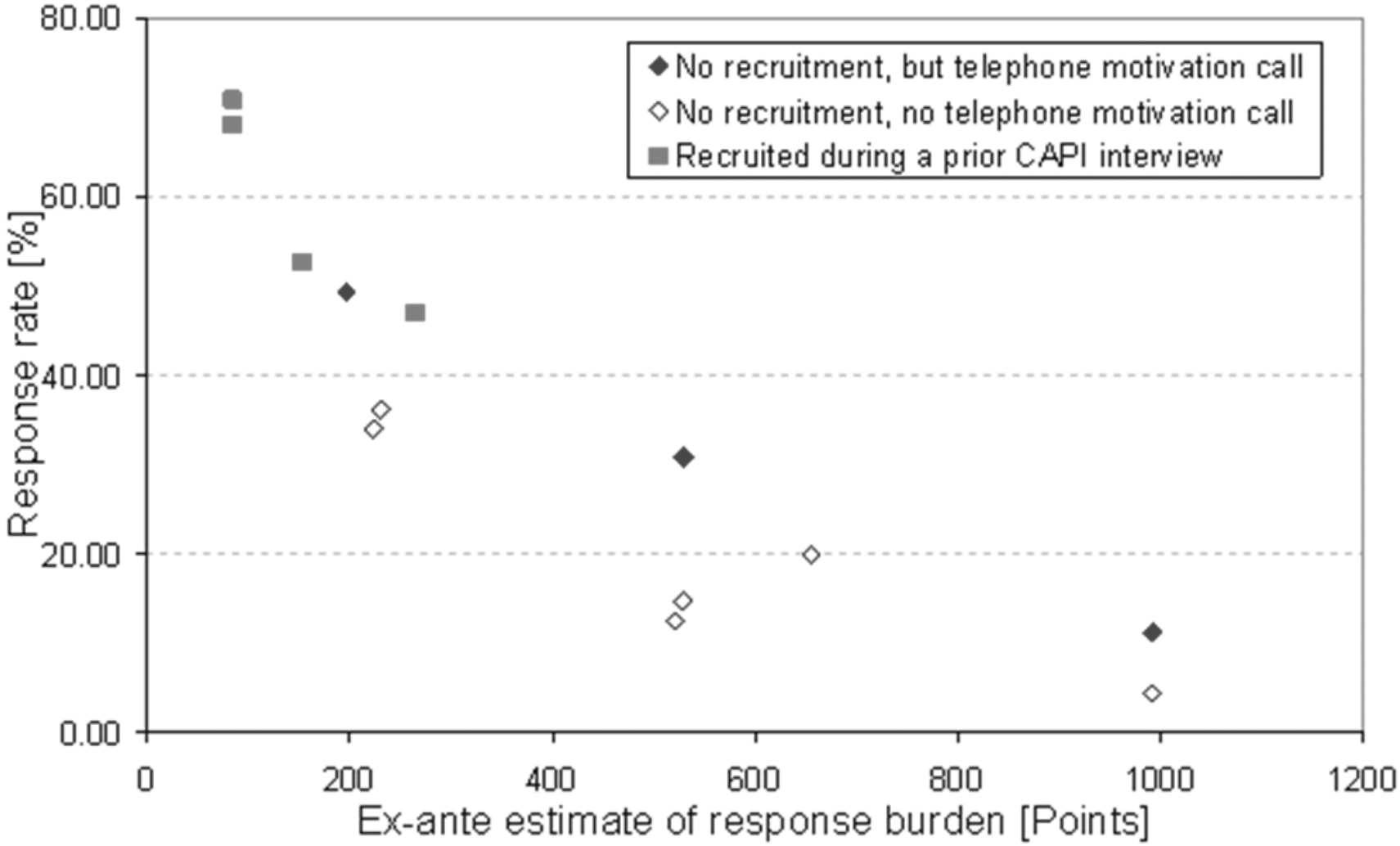
- Person
  - Socio-demographics
  - Mobility tools
  - Risk aversion
  - Variety seeking
  - Environmental attitudes

- Household characteristics

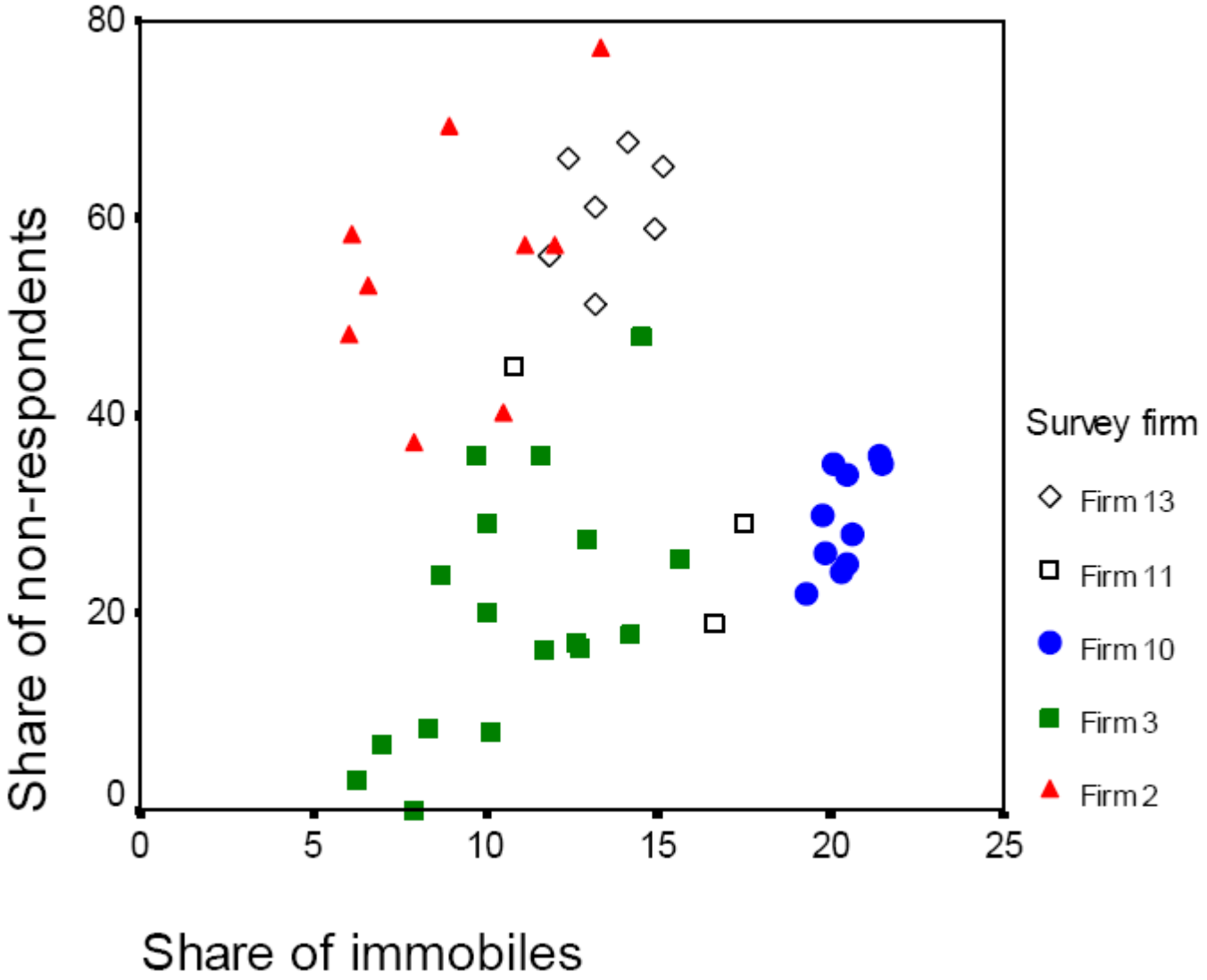
Biases: Sources

- Non-participation
- Unit non-response (change in flow, episode, movement)

Bias: Non-participation



Bias: Unit-nonresponse- Soft refusals



Bias: Trip underreporting (Time budget vs trip diary)

Daily number of trips	Belgium		Great-Britain	
	MOBEL	TUS	NTS	TUS
	1999	1999	1999-01	2000
1	6%	7%	3%	8%
2	34%	30%	48%	32%
3	10%	16%	9%	17%
4&5	26%	30%	27%	29%
6 and more	24%	17%	13%	14%

Bias: Trip underreporting (Selfselection in VATS 96)

Response to the	Relative to answers to the first mailing	Relative to face-to-face interviews of persistent non-responders
First reminder	12.1	19.3
Second reminder	17.6	24.3
Second mailing	27.9	33.7
Third reminder	24.5	30.6

Bias: Trip underreporting (GPS versus diary)

Location	Year	Number of households for comparison	Rate of trip under-reporting
Laredo	2002	87	81%
Los Angeles	2001/2	293	35%
Austin	1997	200	31%
Pittsburgh	2001/2	46	31%
Ohio	2002	230	30%
California	2001	292	23%
St. Louis	2002	150	11%
Kansas City	2004	228	10%
Zürich, Winterthur, Geneve			13%

Biases

Time use surveys:

- Against short activities/movements
- (No movement or spatial detail)

Movement based surveys:

- More immobiles via soft refusal
- Less trips as soft refusal
- Less trips via self-selection of the day, if participating at all

A technoligical fix ?

Light weight

GPRS (microphone)
Bluetooth

GPS
3D accelerometer
Thermometer

Battery for 24 hours

Up to 512 MB RAM

A technological fix ? - What is on offer ?

- Continuous and precise detection of movement (activity) in time and space
- Little respondent input
- Multiple days of tracking easy (desirable)
- Map matching service

A technological fix ? – What is missing ?

- 3D maps (walking) and self-learning algorithms

- Smooth integration of GPS/GSM positioning

- Reliable detection of movement/activity
- Reliable detection of stages in their logical order
- Imputation of missing movement

- Purpose imputation/capture
- Detection/capture of the interacting third parties