Working from home and its integration into agent-based-simulation

Presentation

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Working from home and its integration into agent-based-simulation

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IVT
ETH
Zürich

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- Projects
  - Swiss New Normal (SNN) (ETH Mobility initiative)
  - TimeUse+ (SNF)

TimeUse+

TimeUse+

Survey of

- Time use based on GPS activity locations
- Expenditure for the activities
- Travel behaviour via GPS tracking

TimeUse+ protocol

- Recruitment survey (official registries)
- Qualified forwarded with a personalised app download link

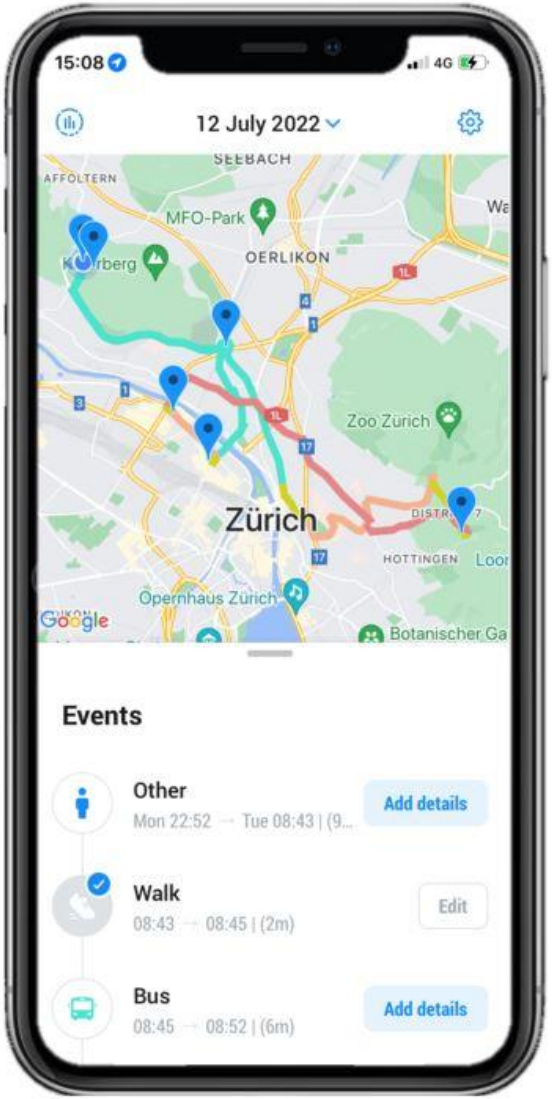
- 4 week of GPS validation, time use and expenditures
- Reminders, if not enough validation, and exclusi0n, if needed

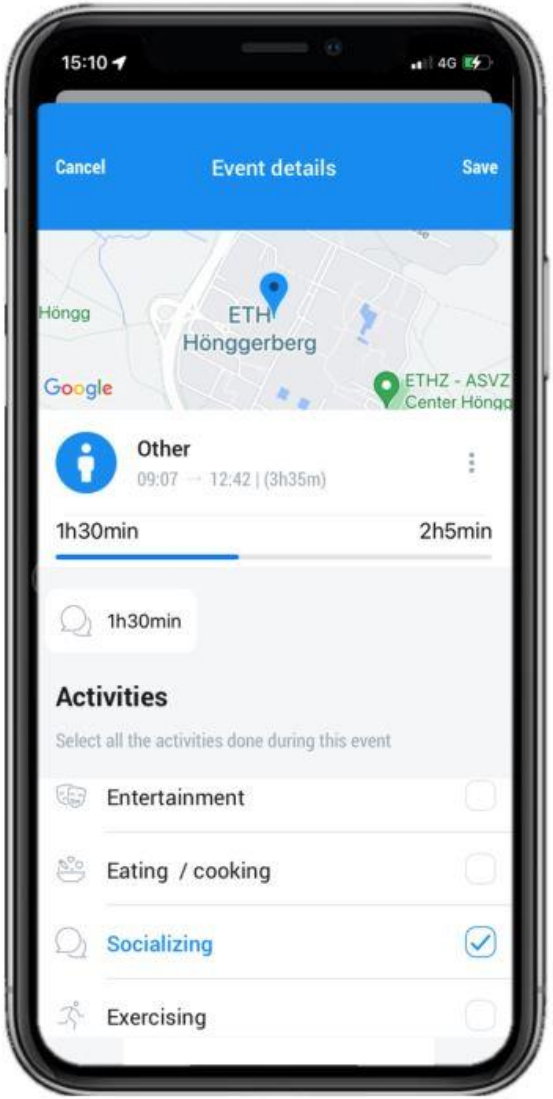
- Debriefing survey
- Payment of incentive (28 validated days with a bit of leeway)

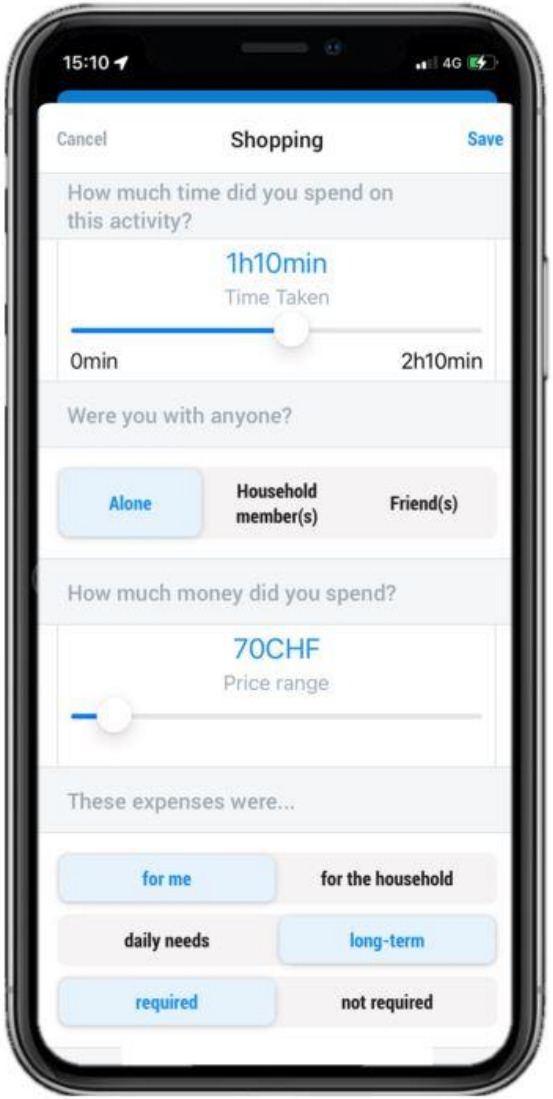
Necessities for GPS studies

- Download and installation, if eligible
  - FAQ leaflet
  - Strong help desk (ready for peak loads, therefore waves are better for the study)
  - Standard answers with blanks for the queries
- Validation
  - Second imputation for later analysis
- Feedback about behaviour (longer studies)
  - Dashboard for continuous observation
  - Pipeline for participant feedbacks
- Debrief survey
  - Questions to check, if they understood the idea tested
- Incentive payment
  - Batch payment, if possible for your finance department

TimeUse+


15:08
4G
12 July 2022
SEEBACH
AFFOLTERN
MFO-Park
OERLIKON
Zoo Zürich
Zürich
HOTTINGEN
Opernhaus Zürich
Google
Botanischer Ga
Events
Other
Mon 22:52 → Tue 08:43 | (9...
Add details
Walk
08:43 → 08:45 | (2m)
Edit
Bus
08:45 → 08:52 | (6m)
Add details

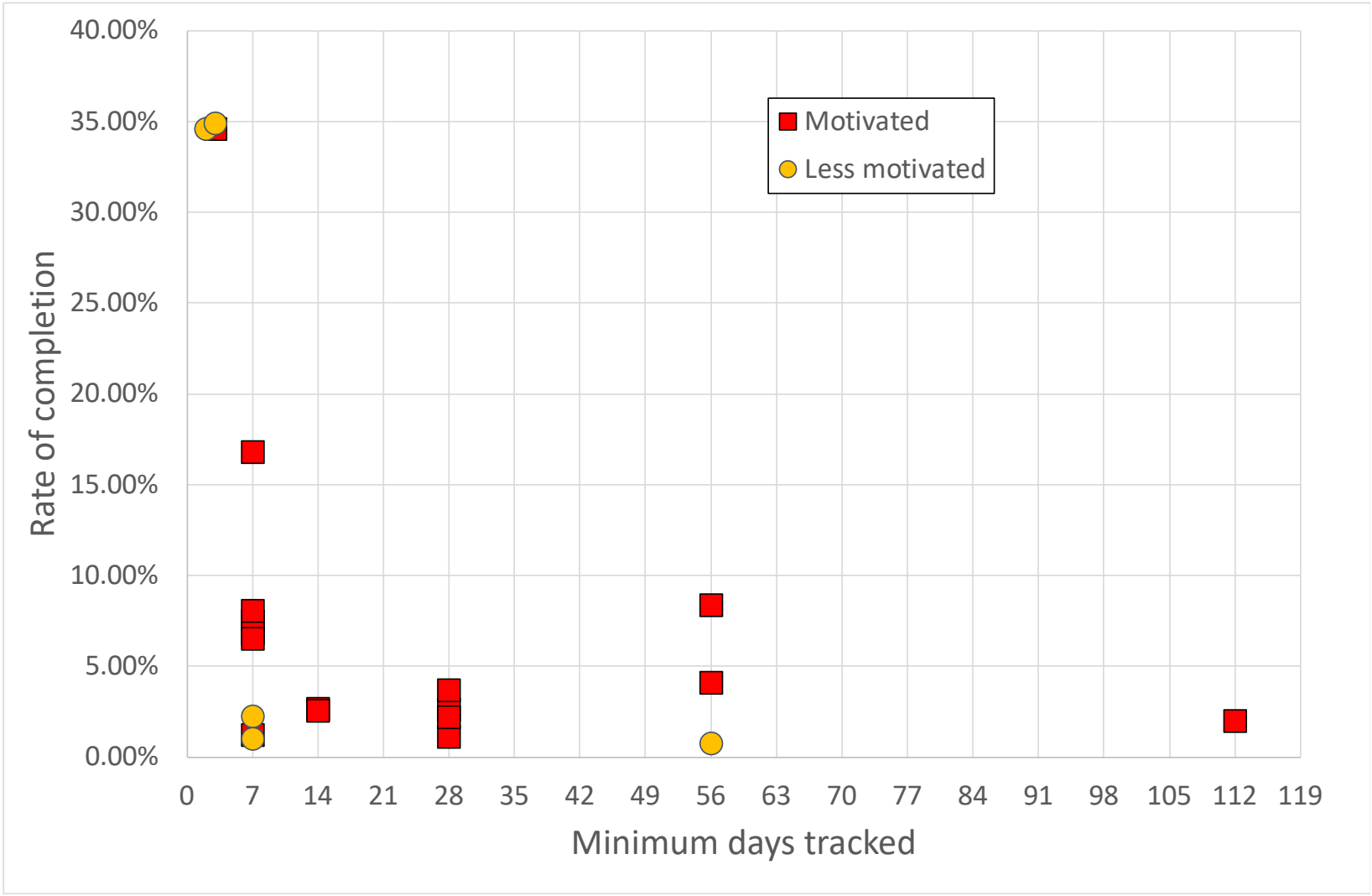

15:10
4G
Cancel
Event details
Save
Hönggerberg
Google
ETHZ - ASVZ Center Hönggerberg
Other
09:07 → 12:42 | (3h35m)
1h30min
2h5min
1h30min
Activities
Select all the activities done during this event
Entertainment
Eating / cooking
Socializing
Exercising


15:10
4G
Cancel
Shopping
Save
How much time did you spend on this activity?
1h10min
Time Taken
0min
2h10min
Were you with anyone?
Alone
Household member(s)
Friend(s)
How much money did you spend?
70CHF
Price range
These expenses were...
for me
for the household
daily needs
long-term
required
not required

TimeUse+ 2021 – Pre-test of the incentive level

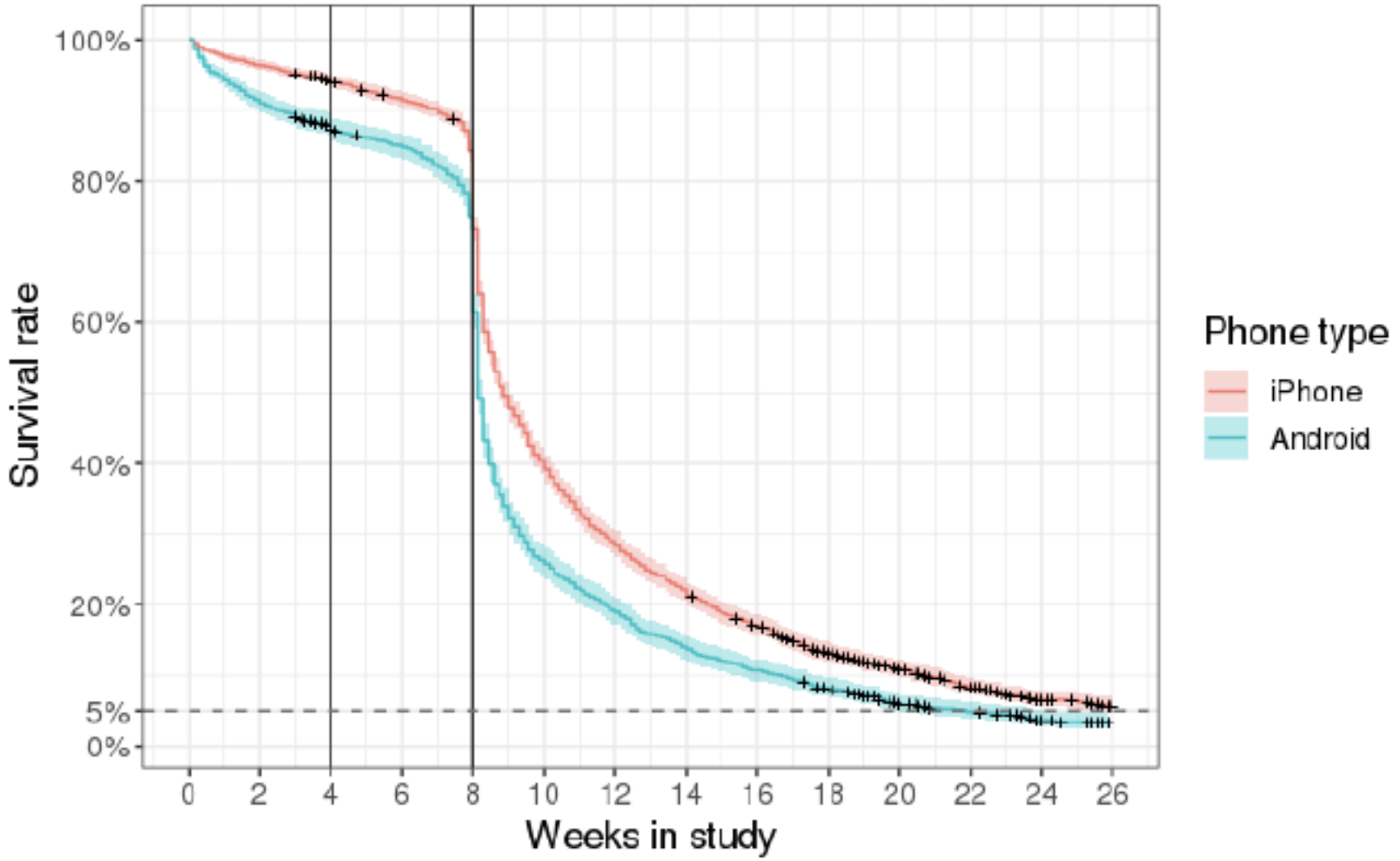
Incentive	Level of detail	Days to track	Contacted	Completed/ Contacted
50	Low	14	122	2.53%
50	Low	28	92	2.20%
50	High	14	124	2.67%
50	High	28	126	2.60%
100	High	28	157	3.67%

Completion rate by minimum days tracked & «motivation»

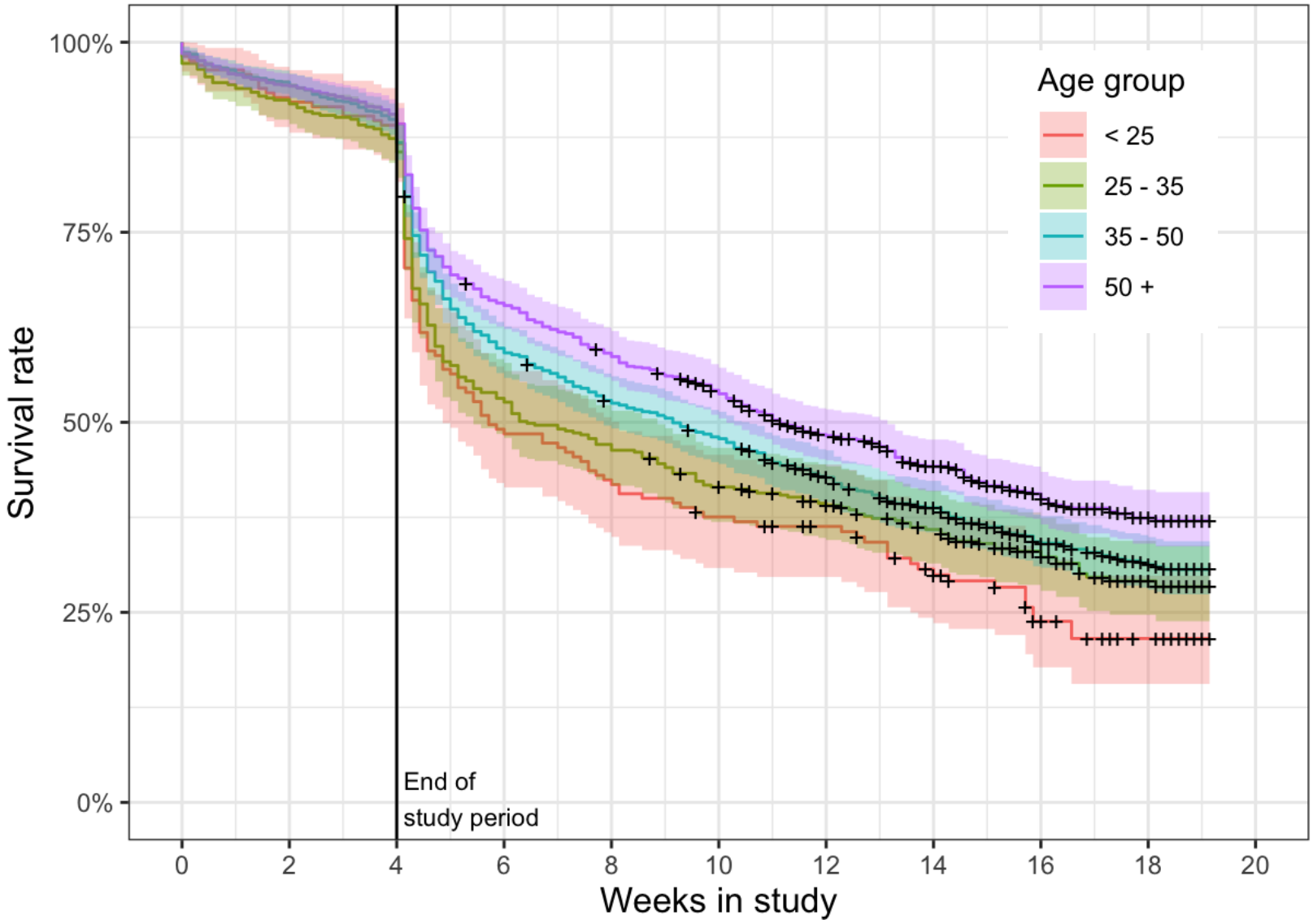


Methodological issues with GPS tracking

Speed of drop out – MOBIS by OS

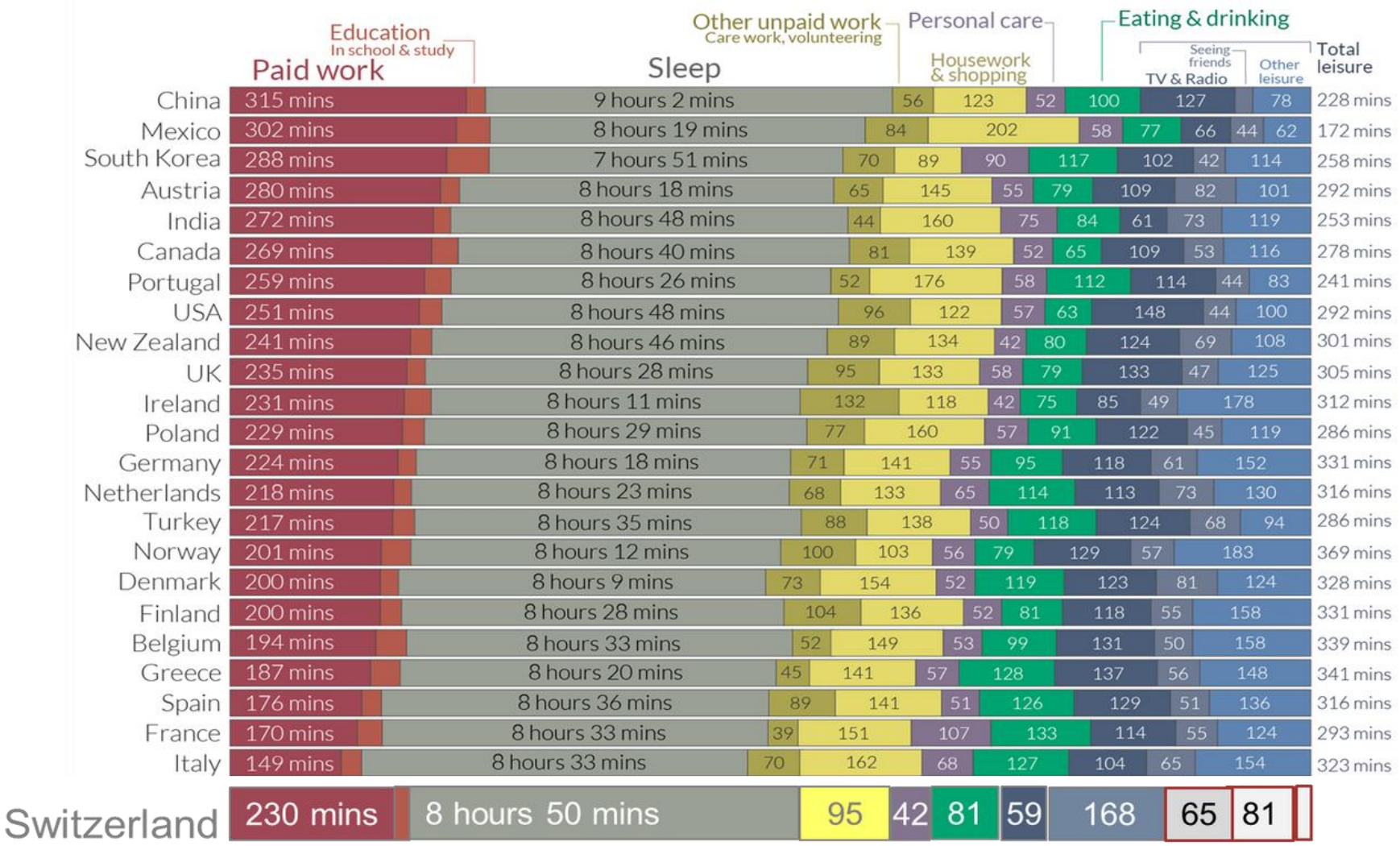


EBIS: Drop out by age for groups B and C



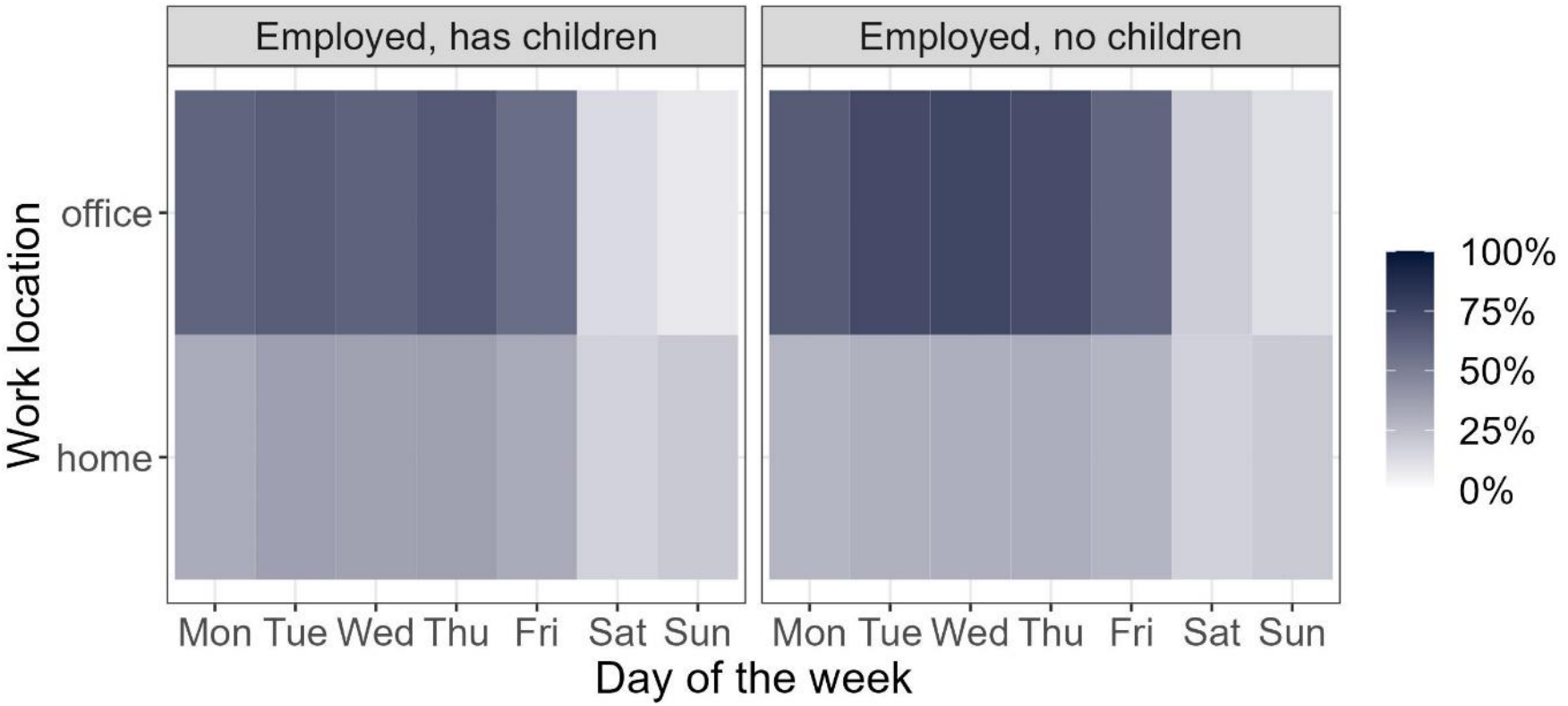
Hours worked from home by days WFH

Swiss time use 2022/23 in comparison

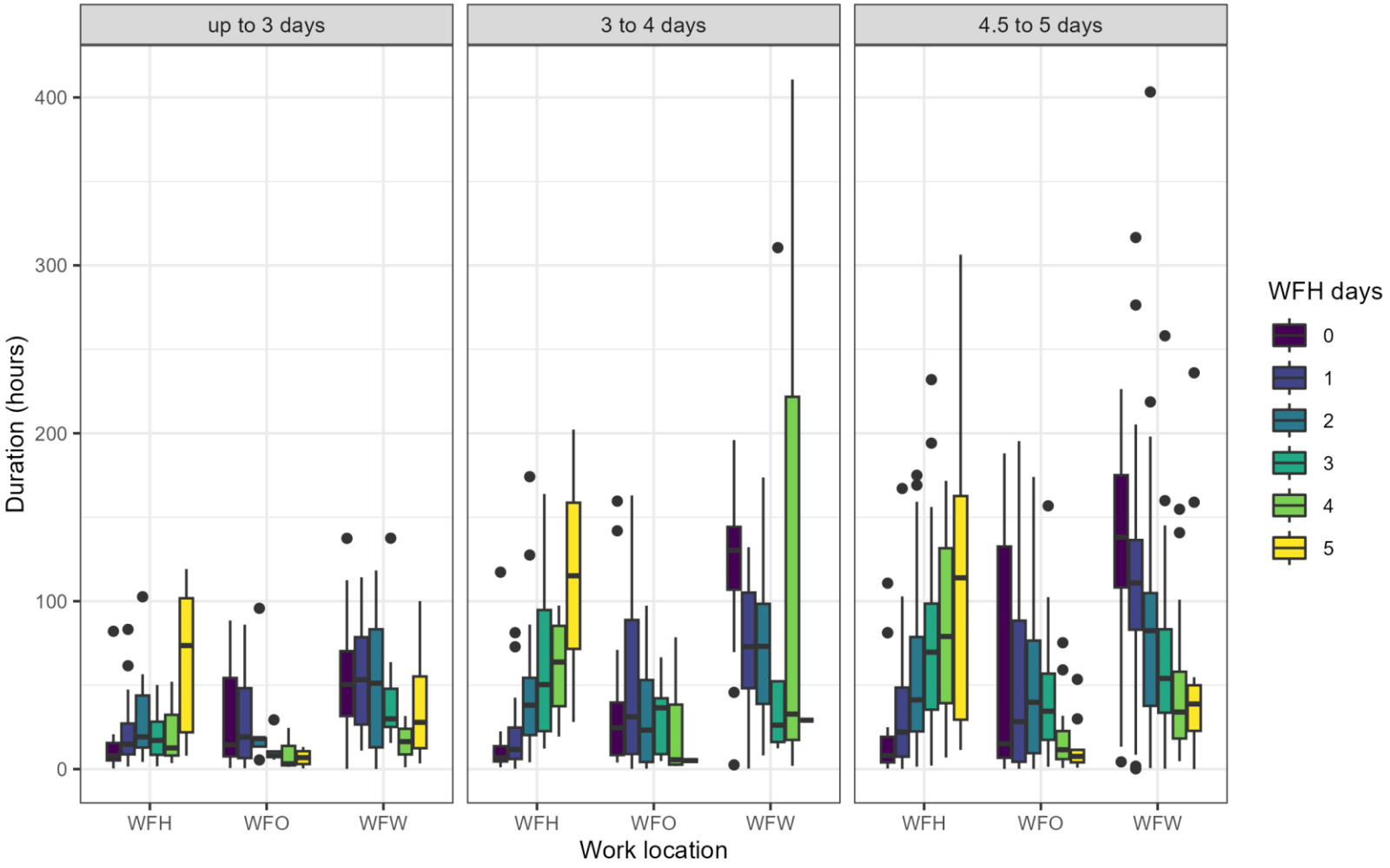


Delft 24/06

TimeUse+: WFH by presence of children in the household



TimeUse+: Work duration, location by agreed WFH days



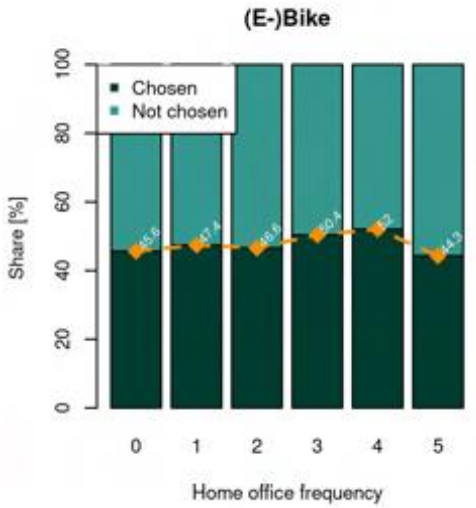
Integrating WFH in MATSim

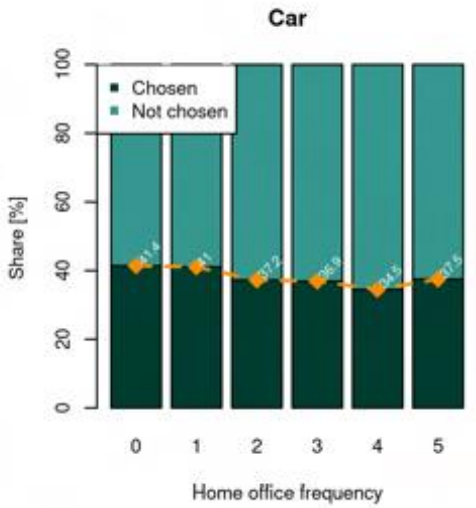
Integrating WFH in MATSim – a first attempt

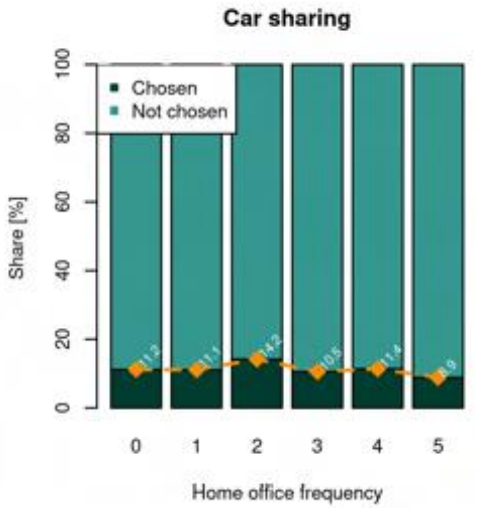
Scenario setup

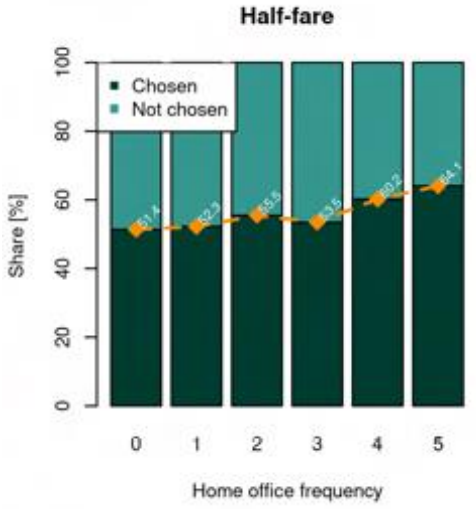
- Population
  - Registry data for persons
  - TimeUse+ and MZ 2015 daily activity patterns
  - Mobility tools based on *Swiss New Normal (SNN)* SP study
- Network
  - IVT Zürich
- Scenarios
  - Extreme cases to assess the possible impact

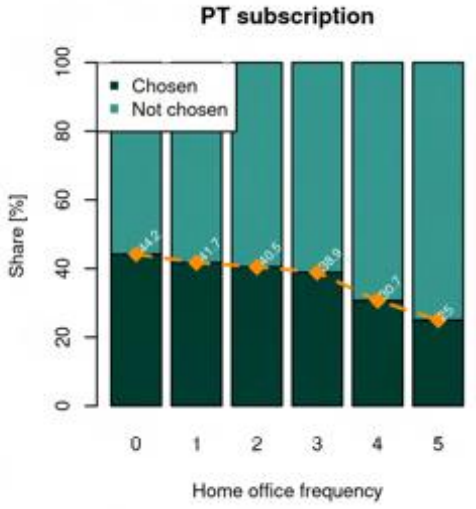
SP SNN: Mobility tool ownership and days WFH





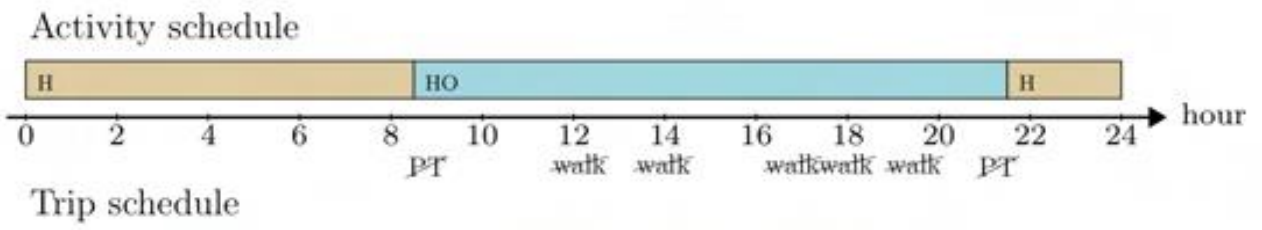




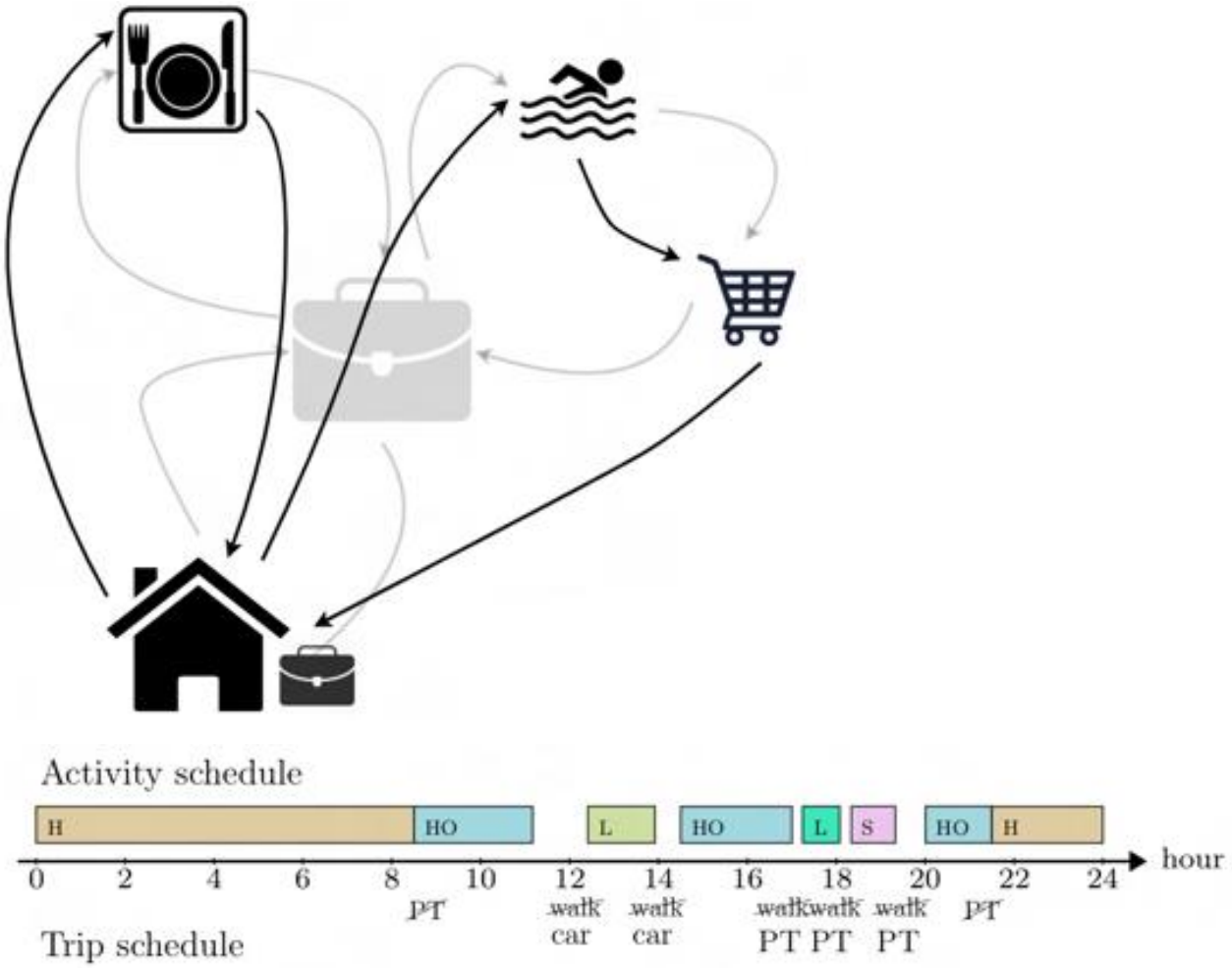


Scenarios

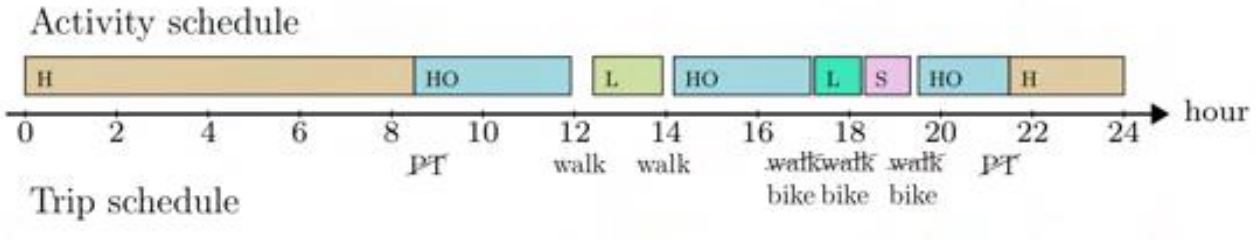
Scenarios: 1 Cancelling trips



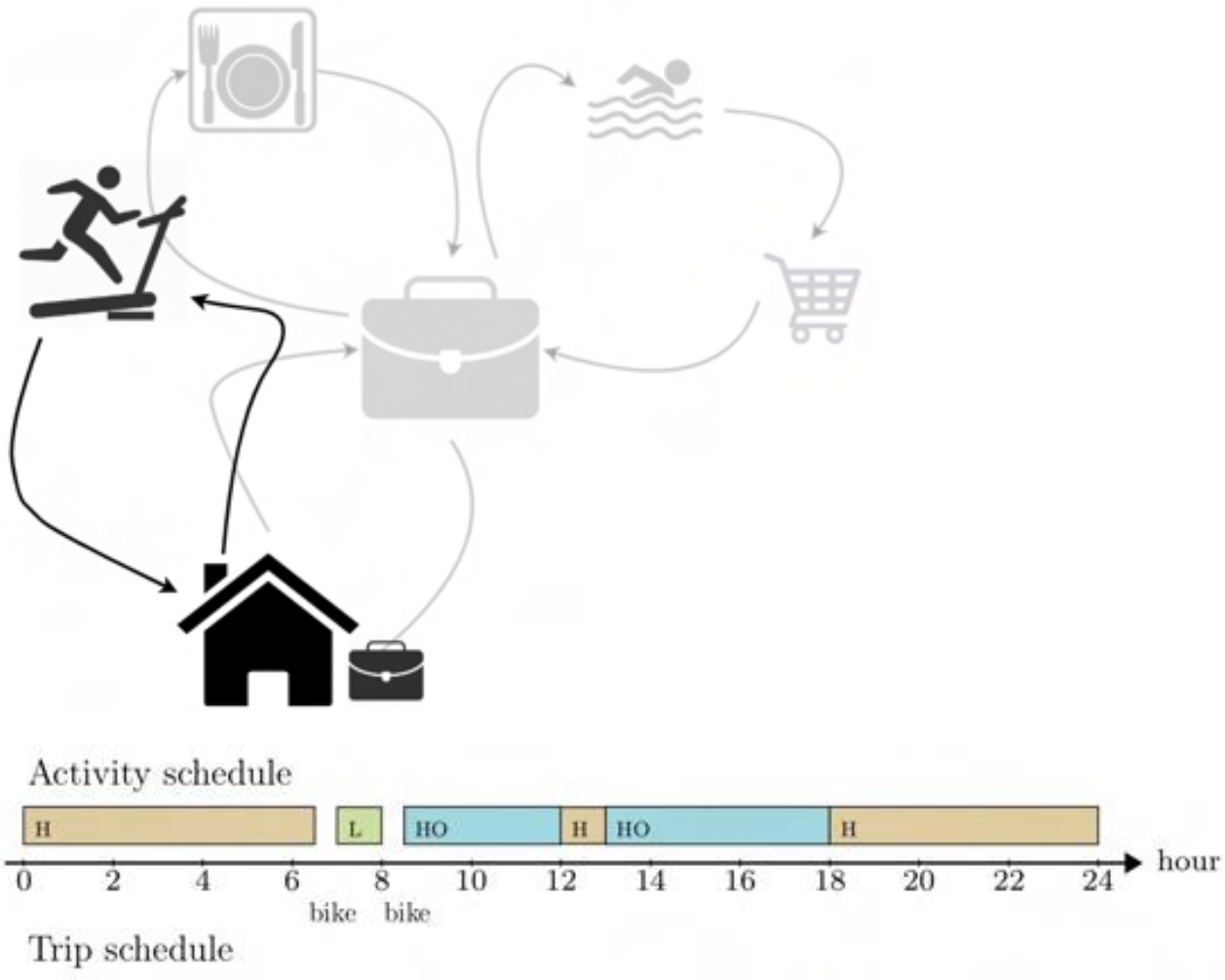
Scenarios: 2 Hybrid location choice



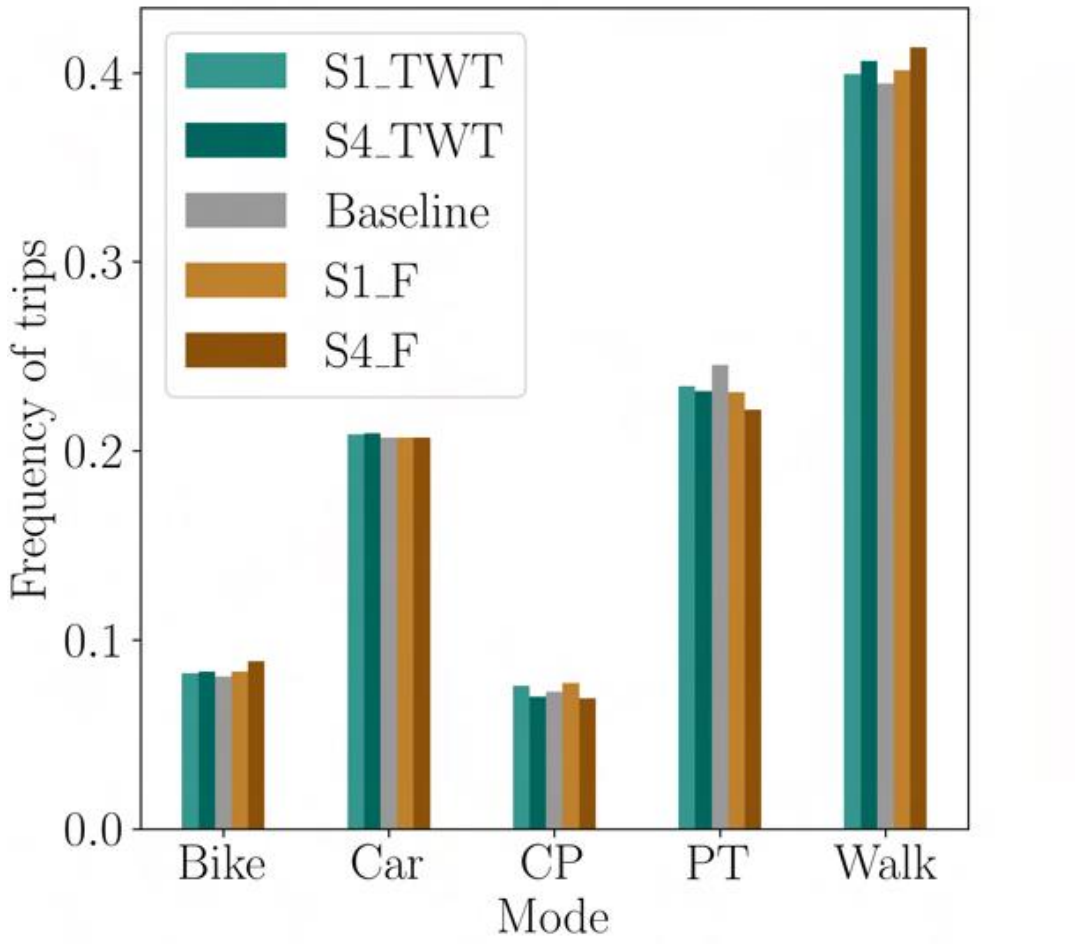
Scenarios: 3 Updated location choice



Scenarios: 4 TimeUse+ days



Scenarios: Mode choice results by day of week



What needs to be done ?

- Population
  - Swiss synthetic population
  - New schedules (based on Pougala (2023) thesis)
  - Mobility tools based on SNN SP study, but with the new season ticket types (SBB HT+)
- Network
  - E-bike-city network Zürich
- Scenarios
  - Mobility pricing
  - Number of WFH days model with new constraints

What needs to be done ?

- Survey
  - Repeat of TimeUse+ elsewhere
  - Update of TimeUse+ with the timing of the activities at the locations (and not only duration)
  - Update TimeUse+ to run from 4:00 am to 4:00 am

What needs to be done? Schedule construction/choice

Approach	Initial authors	DCM	Rules	Alter-natives
Statistical matching			X	
Activity based models	Bowman Ben-Akiva	X		Choice set
Shortest path + core patterns through day	Ordonez		X	Network
Shortest path through day	Feng Timmermans		X	Network
Schedule choice	(Feil); Pugala Hillel Bierlaire	X		Schedules
TASHA	Roorda Miller		X	
ADAPTS	Auld Mohamedian		X	
CTAP	Märki Janzen Penazzi		X	(multi-day)

E-Bike City: The idea

- 50% of road space to cyclists
- Vehicle access to all addresses
- Parking for services and visits within a 200m radius
- Existing transit network

E-Bike City: A first visualisation

Source: Nightnurse for ebikecity

E-Bike City: A first visualisation

Source: Nightnurse for ebikecity

Questions?

- www.ivt.ethz.ch
- www.ebikecity.ch (storymap)
- www.ivt.ethz.ch/en/vpl/projects.html

Appendix

IVT *et al*. GPS tracking studies

Project	MOBIS	MOBIS/ COVID19	EBIS	TimeUse+	Basel 2015 Mobility	Basel 2016 Mobiity	Geneva Mobility
Tracker	MotionTag	MotionTag	MotionTag	MotionTag	Studio Mobilita	MotionTag	MotionTag
Country	CH D, F	CH D, F	CH D	CH D	Basel Stadt	Basel Stadt	Geneva
Year	2019	2020-	2022	2022	2015	2020	2019-20
Tracking days	56	Open	7, 56	28+	7	7	7
Min. incentive	100	None	20, 50	50	15	15	20
Validation/ annotation	Optional	Optional	Yes	Yes	Yes	Yes	Yes
Invited persons	90'909	3700+	200'000+	42'595	1'218	1'104	4'108

Participation rates: GPS studies by 2019

Project	SPOT	in-the-Moment	ATLAS	AKTA	Cin-cinatti	Atlanta	Reno	Tel Aviv HTS
Tracker	MEILI	rMove	SITSS	Device	Device	Device	Device/ App	App
Country	Sweden	USA	NZ	Den-mark	USA	USA	USA	Israel
Year	2015	2015	2014	2001-2003	2010	2011	2015-2016	2016-2017
Tracking days	7	7	3	112	3	7	7	2
Min. incentive		$25		variable	$25	$25	$25	
Validation/ annotation	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Invited persons	130'000	1'427	186	25'000	11'118	16'374	25'817	67'199

References for IVT studies

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- Becker, H., F. Ciari, M. Brignoni and K.W. Axhausen (2015) Impacts of a new free-floating carsharing system traced with a smartphone app, paper presented at the *14th International Conference on Travel Behavior Research*, Windsor, July 2015.

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