Healthy people in healthy cities: the importance of daily physical activity…

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The importance of daily physical activity
Especially: walking

1) Natural importance of daily physical activity, especially walking

- Genetics (2 legs, made for walking, energetically efficient)
- Evolution & ancient history (wild and domestic animals, hunter-gatherers, contemporary traditional societies)
- Agricultural & industrial societies, recent changes <50 years ago
- Last 20-30 years, plummeting levels of physical activity and walking – globally!

2) The NCD crisis & urban health

- The epidemiological transition (please comment on this!) (double burden, triple burden)
- Cardiopulmonary diseases, cancer
- Overweight/obesity
- Hypertension
- Diabetes (type 2)
- Mental health
- Social cohesion

3) The situation in cities

- modal split, mode choice
- Air pollution, noise
- Climate change, CO2 emissions...

Healthy Cities: the importance of daily physical activity
Especially: walking!

4) What can be done about it

- Healthy cities & Health in All Policies
- Urban design, urban sprawl, street connectivity
- Promoting public transport, cycling and walking
- Greening the transportation system (please comment on this)

5) Frequent walkers (thesis)

- Making the case for urban walking
- Study focussing on people who "already" walk > 10'000 steps/day
- What we can learn from these "frequent walkers"
- The challenge of walking long distances in cities
- Facilitators/hindrances of frequent walker behaviour

6) Discussion & Conclusion (your ideas, please, now or later!)

- Knowledge gaps
- Policy priorities
- Research agenda
- Next steps

Walking is encouraged in several policy sectors

- For public health, especially cardiovascular and mental health
- For environmental protection, climate change
- For transportation policy (air pollution, congestion, noise)
- Walking is highly prevalent among other animal species. Domestic cows typically cover 7-10 km per day (Rouda et al. 1990, Raizman et al. 2013). Wild reindeer cover up to 16 km per day during summer (Reimers et al. 2013)
- Humans are genetically designed to walk; hunter-gatherers walk around 6-12 km/day (Marlowe 2005, Pontzer 2012)
- Compared with quadrupedal mammals of similar body mass human walking is relatively economical of metabolic energy, but human running is expensive (*Steudel-Numbers 2003, Alexander 2004*)

Walking for transport

☺ Walking is gaining interest for economic, environmental and public health reasons.

☺ The context of renewed interest for urban lifestyles with a strong proximity component (since the mid-2000s in Europe and North America) is favourable to walking.

☹ Walking tends to be lumped together with other modes under headings such as *mobilité douce*, non-motorised transport or sustainable transport…

☹ For a long time walking has not been considered as a transport mode in its own right (Ravalet 2012).

Making the case for urban walking

1. Humans are made for walking
2. Walking is less prevalent now than at any other time in history
3. Walking is good for health, including mental health
4. Lack of walking is fuelling the global epidemic of overweight and obesity
5. The global rise of non-communicable diseases is linked to the lack of walking
6. Walking is socially inclusive
7. Walking is the perfect companion to public transport / mass transit
8. Walking is sustainable and cheap

A couple of definitions…

We coined the term "frequent walkers" to describe people who walk over 5 kilometres on most days of the week, which takes at least one hour at a fast pace

N.B. This research refers to walking in public space, it is not concerned with walking inside buildings or facilities (campuses, shopping centres/malls)

Walking is politically desirable

Walking is promoted in several policy settings, often with little coordination between sectors:

- climate change (CO_2 emissions)
- environment (air pollution, noise)
- transport (congestion)
- health (road accidents, cardiovascular, etc.)

The case for urban walking

Frequent walkers may constitute a pioneer population with potential to initiate change towards sustainable and healthy transportation at population level.

Walking is politically desirable

The case for urban walking

Frequent walkers may constitute a pioneer population with potential to initiate change towards sustainable and healthy transportation at population level.

Walking is politically desirable

This project seeks to understand:

- **how and why people become frequent walkers**
- **how they integrate walking into their schedules**
- **what they perceive as facilitators or hindrances to frequent walking.**

OVERARCHING RESEARCH QUESTION:

Can frequent walkers help bring about a healthy and sustainable transportation system, based on walking?

PRIOR HYPOTHESES

H_1: MOTIVATION. Integrating an hour or so of walking into a modern day is difficult, which is why it is rare and requires strong motivation.

H_2: SKILLS. Frequent walkers have advanced navigational skills enabling them to plan and improvise complex routines in time and space.

H_3: WALKABILITY. Frequent walkers use areas which do not always correspond to traditional walkability criteria.

OVERARCHING RESEARCH QUESTION:

Can frequent walkers help bring about a healthy and sustainable transportation system, based on walking?

1. Quantitative phase
2. Qualitative phase
3. Spatial phase
4. Health phase

METHODOLOGY

A trans-disciplinary study using mixed methods…

“Frequent walkers”: a transdisciplinary project using mixed methods

- **Quantitative phase**
- Qualitative phase
- Spatial phase
- Health phase

} We use available high-quality data representative of the mobility behaviour of the general population of Switzerland over a single reference day (one day per person)

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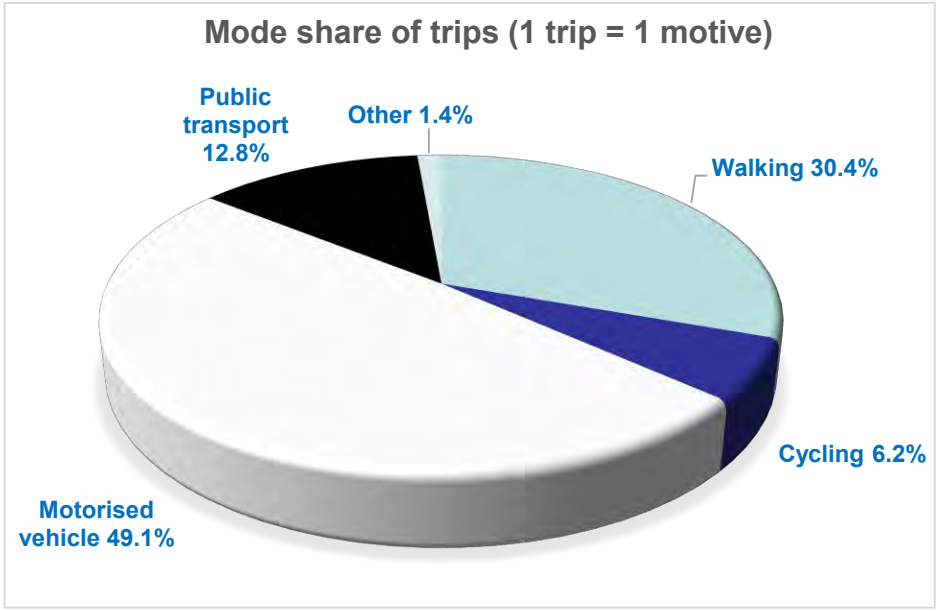
Swiss transport micro-survey 2010 (MRMT2010)

Data	Observations	Variables
Households / Ménages / Haushalte	59’971	99
Target people / Personnes-cibles / Zielpersonen	62’868	214
Home trips / Boucles / Ausgänge	85’436	36
Trips / Déplacements / Wege	211’359	87
Stages / Etapes / Etappen	310’193	116
Routes / Routen	285’529	4
Segments / Segmente	10’064’058	2

Together, the *trips* form a *home trip* which begins and ends at home



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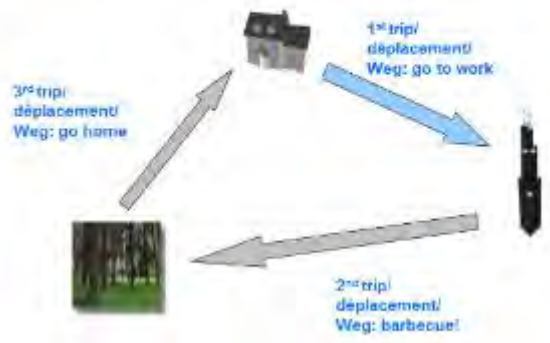
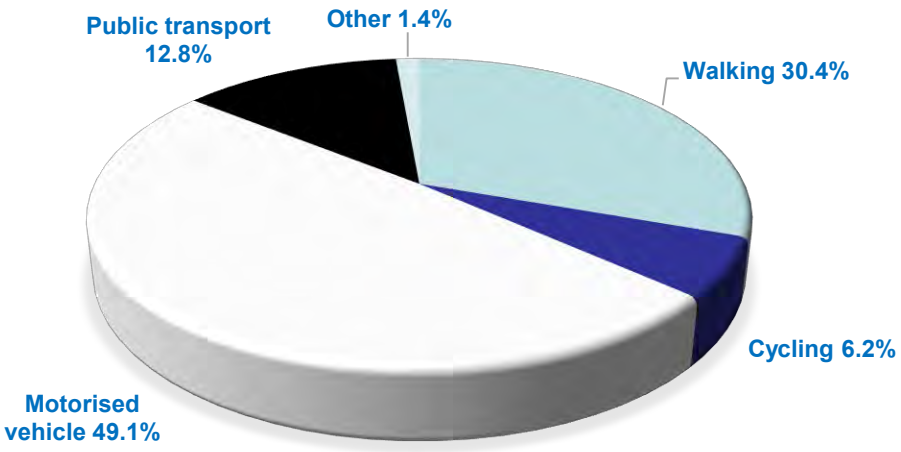
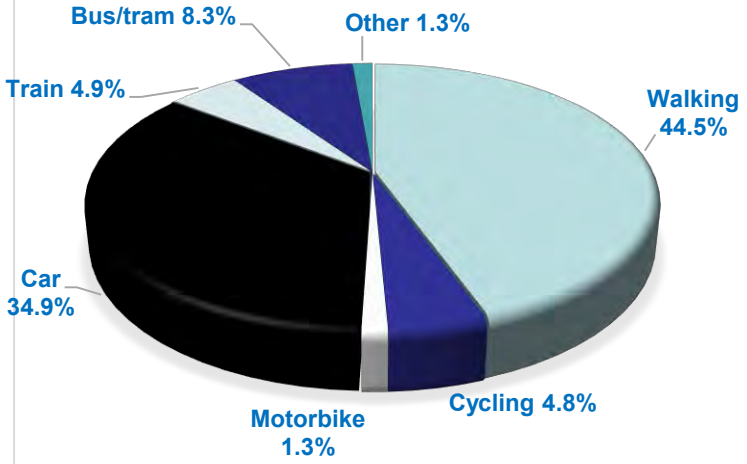


Trips are subdivided into stages *(étapes / Etappen)* each with a single transport mode

Mode share of trips (1 trip = 1 motive)



Mode share by single-mode stage



Distances covered in trips (Wege, déplacements) in 2010

The average walking trip is 900 metres long

On foot	Cycling	Motorbike	Car as a driver	Car as a passenger	Train	Bus/tram	Other
.90	3.25	8.88	13.79	17.93	29.78	3.74	146.37

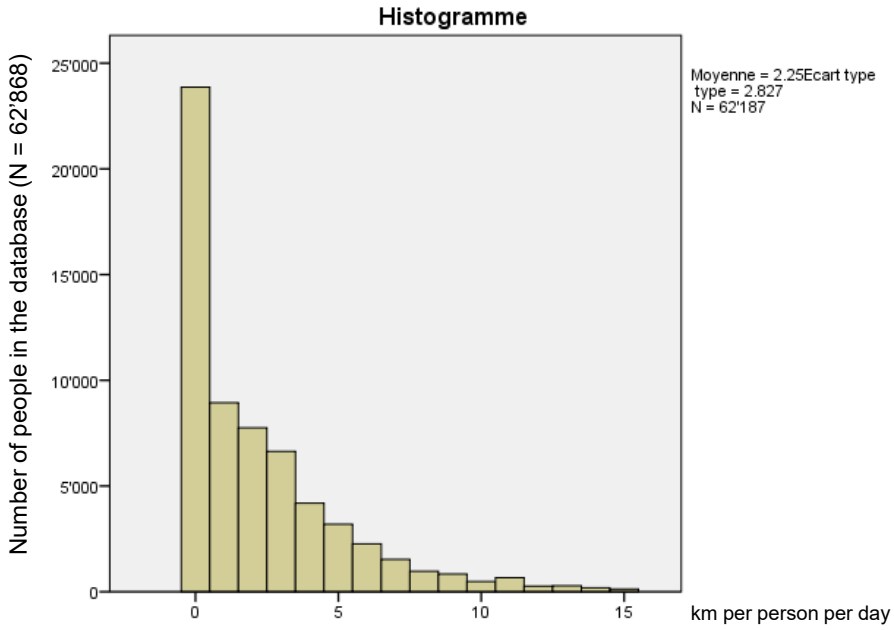
If we look at <u>walking trips</u>:

The average walking trip is 900 metres long
but the median walking trip is only 430 metres long.

-> this means there is a skewed distribution with many short trips and a low number of very long trips

	N	Min	Max	Mean	SD	Median	Skewness	Kurtosis
Walking trip distance in km	143'330	.030	60.00	**0.902**	1.70	**0.430**	7.39	104.4

The distribution of walking per person and per day is also skewed, with many people not walking at all on the reference day!



Key:

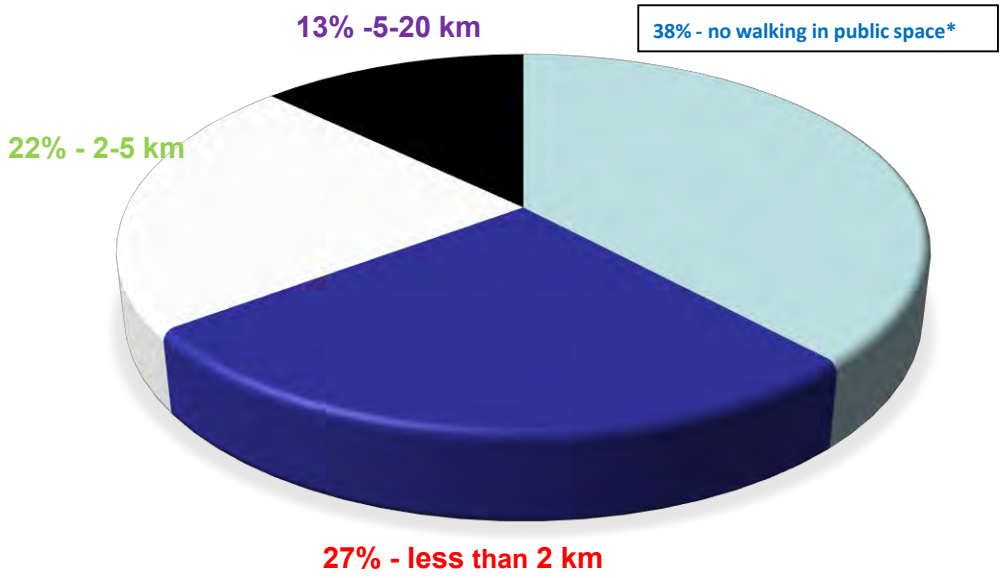
0: people with no walking on the reference day
1: people with > 0 but < 1 km of walking on the reference day
2: people with between 1 and 2 km of walking on the reference day
etc.

Histogram showing the distribution of walking per person and per day in the resident population of Switzerland (MRMT 2010)

Creating groups based on transport behaviour

Transport behaviour on the reference day	Number of respondents in MRMT 2010	Approx. number in population of Switzerland	Percent
Stayed at home	7252	907’800	11.5
Cycled without walking	2495	312’328	4.0
Used car or motorbike with no walking in public space	14120	1’767’566	22.5
Small walkers < 2 km	16702	2’090’789	26.6
Medium walkers 2-5 km	14016	1’754’593	22.3
Potential frequent walkers 5-20 km	8018	1’003’740	12.8
Outliers (walk >20km)	266	33’315	0.4
Total	62868	7’870’131	100.0

DISTANCE WALKED ON AN AVERAGE DAY



* Walking trips <25 metres are not included in the data, nor are trips of any lengths carried out within buildings or premises such as campuses, shopping malls, etc.

“Frequent walkers”: a transdisciplinary project using mixed methods

- Quantitative phase
- **Qualitative phase**
- **Spatial phase**
- **Health phase**

A convenience sample of 74 participants was recruited for these empirical phases, using partnerships, newspaper ads, direct contacts, “snowballing”, etc.

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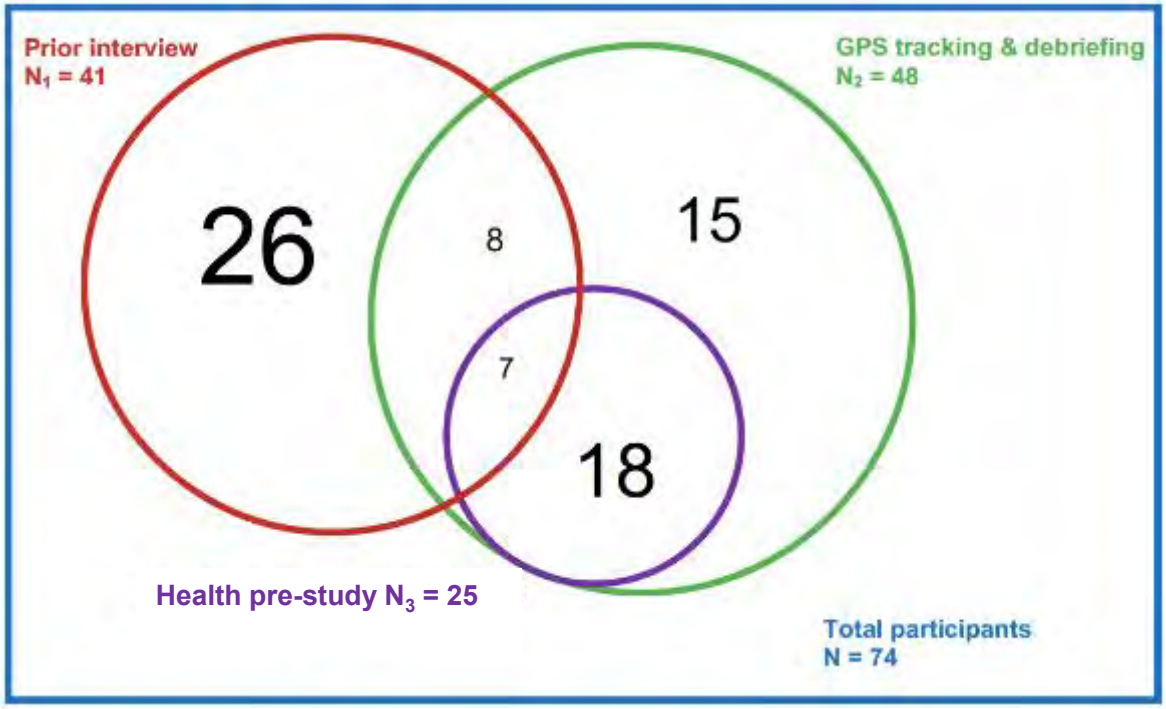
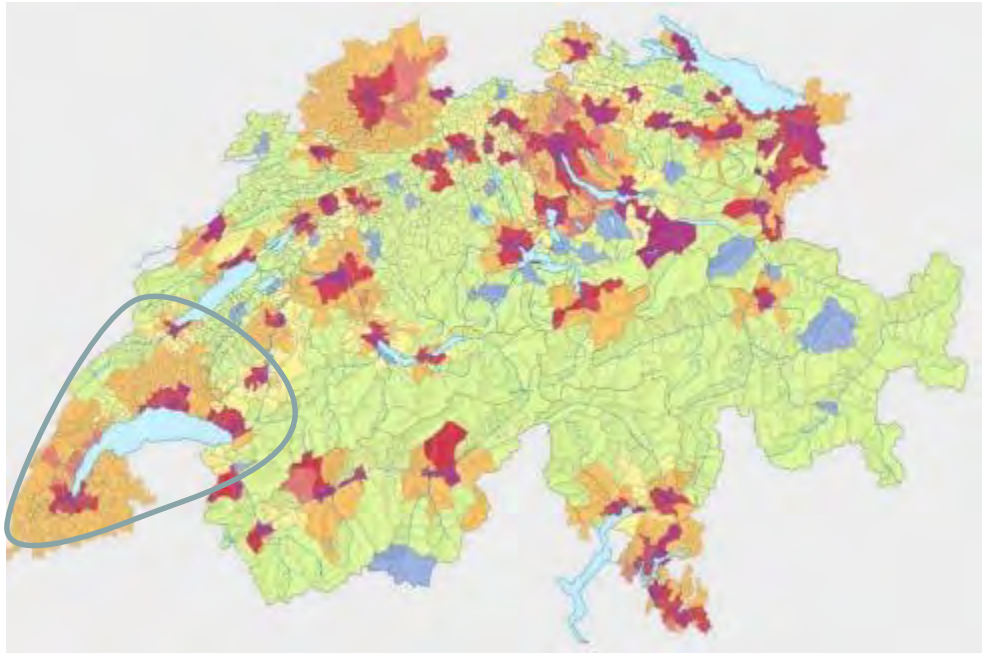
“Frequent walkers”: recruitment of study participants (N=74)



Experimental set-up showing the status of the 74 study participants
The Prior interview category corresponds to the Qualitative phase.
The Health pre-study corresponds to information that can be found in the Appendix of the written thesis (results not presented today)

Study area: the Geneva-Lausanne conurbations



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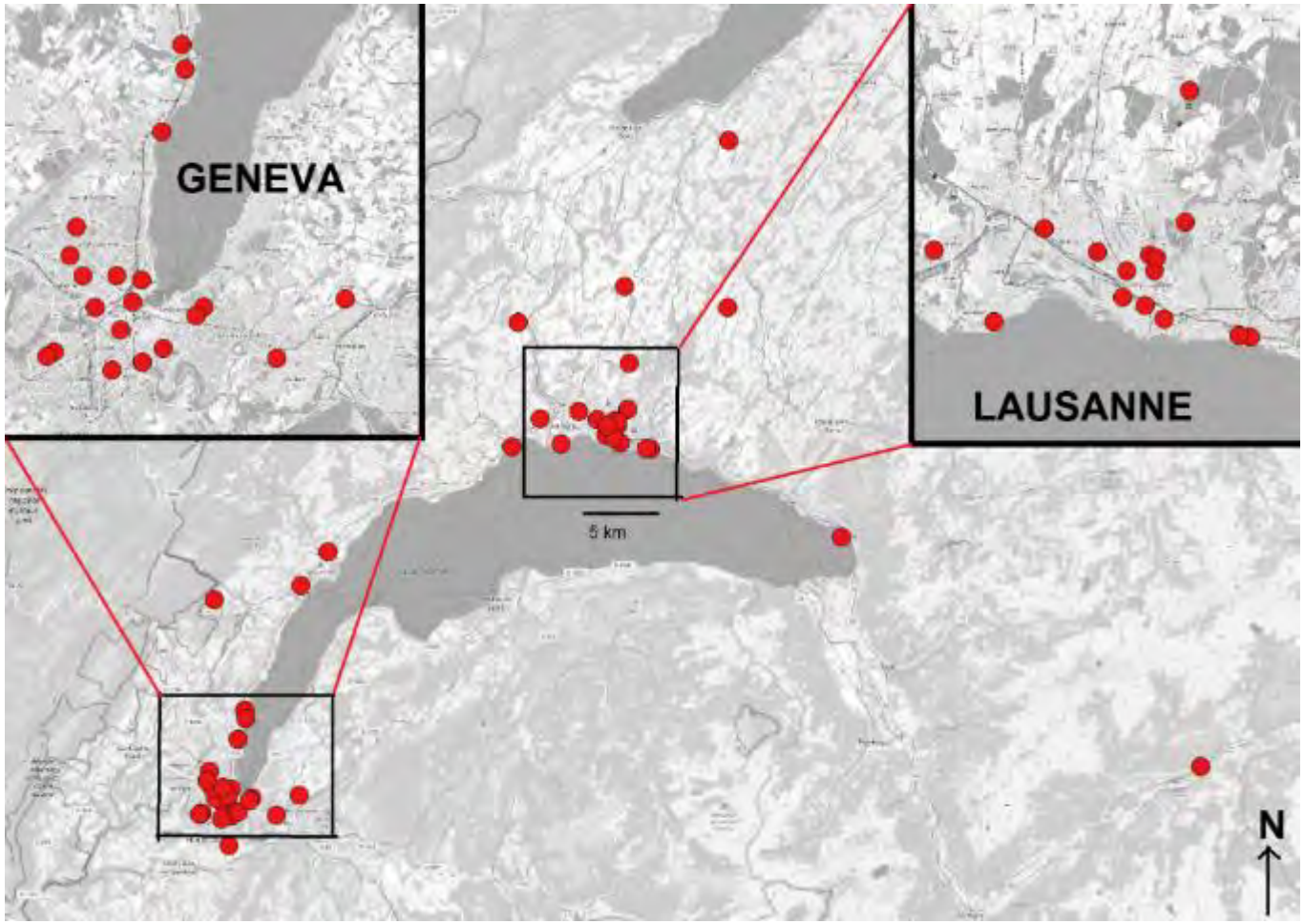
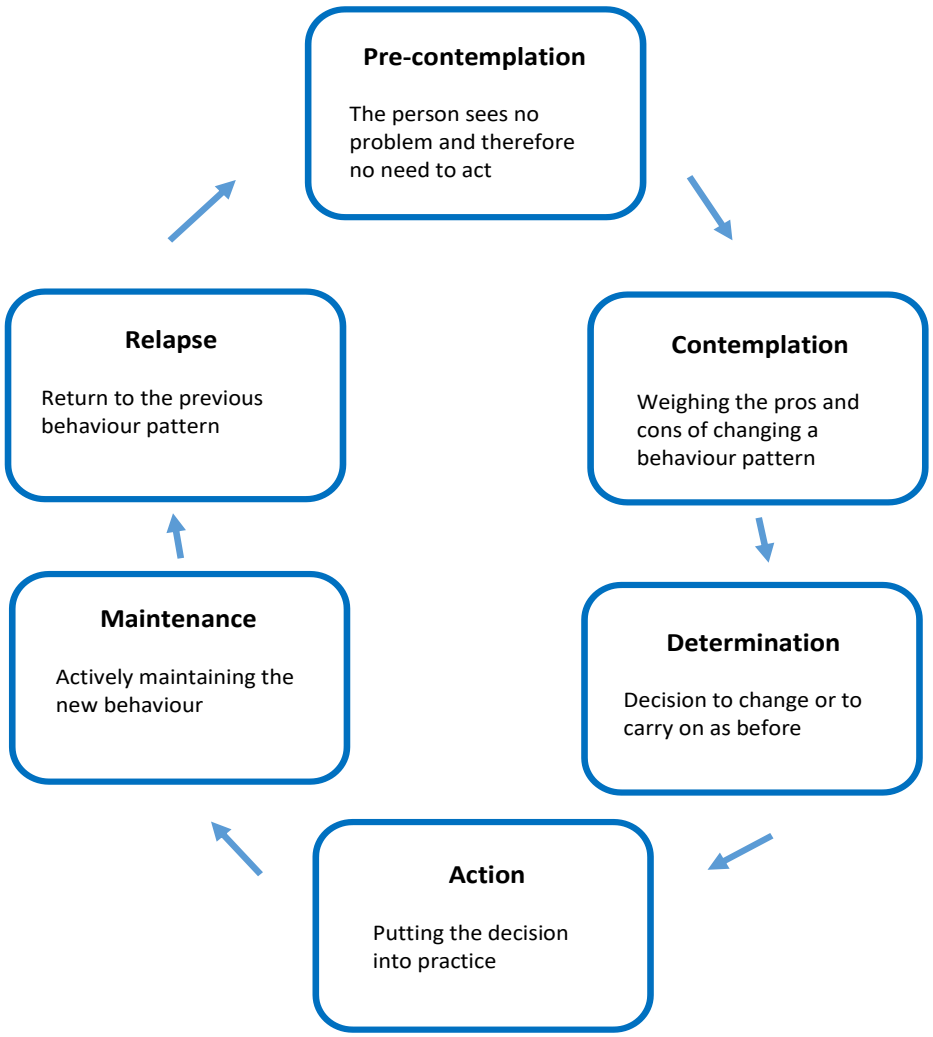


Map of the study area with insets for Geneva and Lausanne. Dots represent study participants in the spatial GPS phase

Qualitative results: overarching themes

- Most walking is related to commuting or leisure, or both.
- Pleasure, well-being and health (in a wide definition) is the key motivators.
- Time- and space-management strategies: getting up earlier in the morning; using alternative routes – a direct route in the morning, a scenic route in the evening…
- Almost all participants used public transport and/or motorised vehicles on a daily basis.
- Total transport time: more than twice the population average (> 2 hours).
- No trace of an informal community of frequent walkers was found.
- Several participants said they tend to switch off while walking, operating in a socially closed mode while remaining receptive to noise, smells, sunlight, the view, or fresh wind.
- Altogether, individual values rather than collective values emerged from the analysis.



The trans-theoretical model (after Prochaska & DiClemente)

Heading	Items	Comments
Motivation	Well-being Pleasure Conversion process Not walking for the environment	The "conversion" and Action phases are related to the trans-theoretical model (Prochaska & DiClemente, 1983). Concern with the environment is prevalent in the sample but hardly ever mentioned as a motivator.
Environmental themes	Walkability Built & natural environment Choice of residential area	Our sample is interested in its surroundings, especially buildings (façades) and views over the lake. Walkability does not explain walking in our sample: the relationship is neither straightforward nor strong.
Types of walking	Choice of routes / morning vs. evening Walking for transport Walking for leisure / Walking the dog Routines An alternative to sport Integrating sport and other activities Nordic walking Walking inside buildings No walking for no reason Days without walking	Nordic walking and dog walking are entry points into frequent walking for some participants. The establishment of walking routines is critical to establishing frequent walking behaviour. Routines often include variations in routes, e.g. a direct route in the morning and a scenic one in the evening (or the other way round).

Heading	Items	Comments
Skills	Motility Multimodality Skills specific to walking	**Our frequent walkers are multimodal and display complex skills in navigating the urban environment.** **They are not always aware of the skills that they have.**
Accessories	Pedometers Mobile phones Shoes, clothing, equipment	
Obstacles	Physical obstacles Long traffic lights Narrow or missing avements (sidewalks) **Cigarette smoke** Personal safety Air pollution **Conflicts with other users** Traffic noise	**The systematic mention of tobacco smoke (over half of our sample mentioned it) was unexpected.** **Conflicts with other road users were very rare and usually not serious.** **But this may change in the future!**
Facilitators	Policies in favour of walking Positive evaluation of urban settings Green spaces	
Relations to other modes	Walking and cycling Walking and cars Walking and buses	
Individual and social aspects	**Walking as an internal activity** They don't know each other Social interactions Outsiders express surprise **Converting others**	**The internal and individualistic experience of walking is a hallmark of our sample. The "openness" often described in the literature on walking rarely extends to passers-by.** **At present, our frequent walkers have no desire to convert others.**

Pleasure, a key motivator for walking!

- Kevin 1165: “What I have discovered little by little is **the simple, silly pleasure of walking, it’s that simple**. Just move yourself along. It’s a natural rhythm, because running is much harder for me, it requires more motivation.“

- Georgina 5290. “More than anything, I think **it’s a way of doing something enjoyable**. In fact, it’s linked to this idea of living **in a beautiful area** and, yes, it’s a way of being active.”

- Kathleen 8194. “**I enjoy walking, it’s a moment that I have just to myself**, usually. (…) **I really enjoy walking in the city**. Since I live in Lausanne, quite close to the city centre, I find that accessibility on foot is fantastic – so I make the most of it!”

Recollections of the conversion process

- Graham 4964. “My entrance into the world of walkers was a present that I received from my brother 3 years ago: a pedometer, with an app on my mobile phone. (…) **Ever since I was given that thing (a *fitbit*) I really changed behaviour. I changed behaviour in the sense that I seize every opportunity in my timetable or schedule to do some walking.”**

- Frank 6415. "Around 5-6 years ago, **I stopped cycling because I found it too stressful. Afterwards, I did walking and public transport and now since several months ago I hardly take public transport anymore**, and I didn't renew my public transport pass. Because… well, I walk everywhere.”

- Keisha 5389. “**There is a progressive realisation, then suddenly a breaking point (*rupture*)** where I say to myself: let’s go! And there, as far as walking is concerned, **I don’t think there is any looking back**.”

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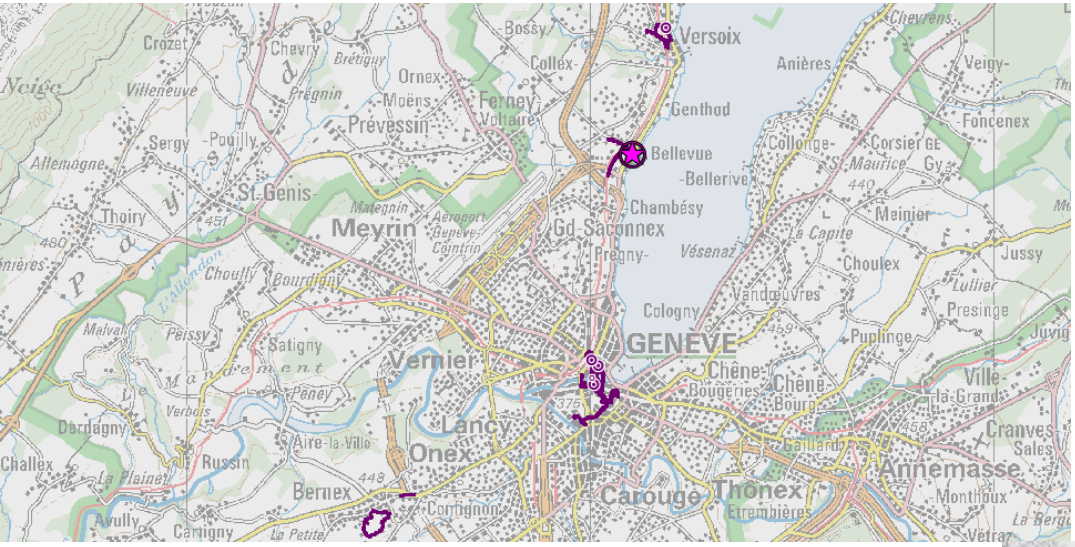
“Frequent walkers”: a transdisciplinary project using mixed methods

- Quantitative phase
- Qualitative phase
- **Spatial phase II: 37 frequent walkers were recruited, equipped with GPS trackers/ recorders and followed for 8-12 days**
- Health phase

RESULTS

- In the GPS phase, the sample was 54% female
- Average age: 48 years (SD: 14 years).
- Average walking time 1.13 hours = 1 hour and 20 minutes
- Average walking distance: 5 km per day, with wide disparities
- Average tracking time: 12 days, of which 11 days of usable data
- Mean walking speed: 4.6 km/h
- Around 55 km of walking per person over 10.9 days of tracking
- Total walking time over this period was on average 11 hours, of which only 2.3% of time was engaged in pausing

WALKING PATTERNS



Isolated bouts of walking, connected by public transport, over an 8-day period around Geneva

Continuous, generalised walking patterns in Geneva, over 8.5 days of GPS tracking

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Towards a typology of frequent walkers

Based on the analysis of the GPS tracking information, and of information from the prior interviews when available, we drew up a tentative typology:

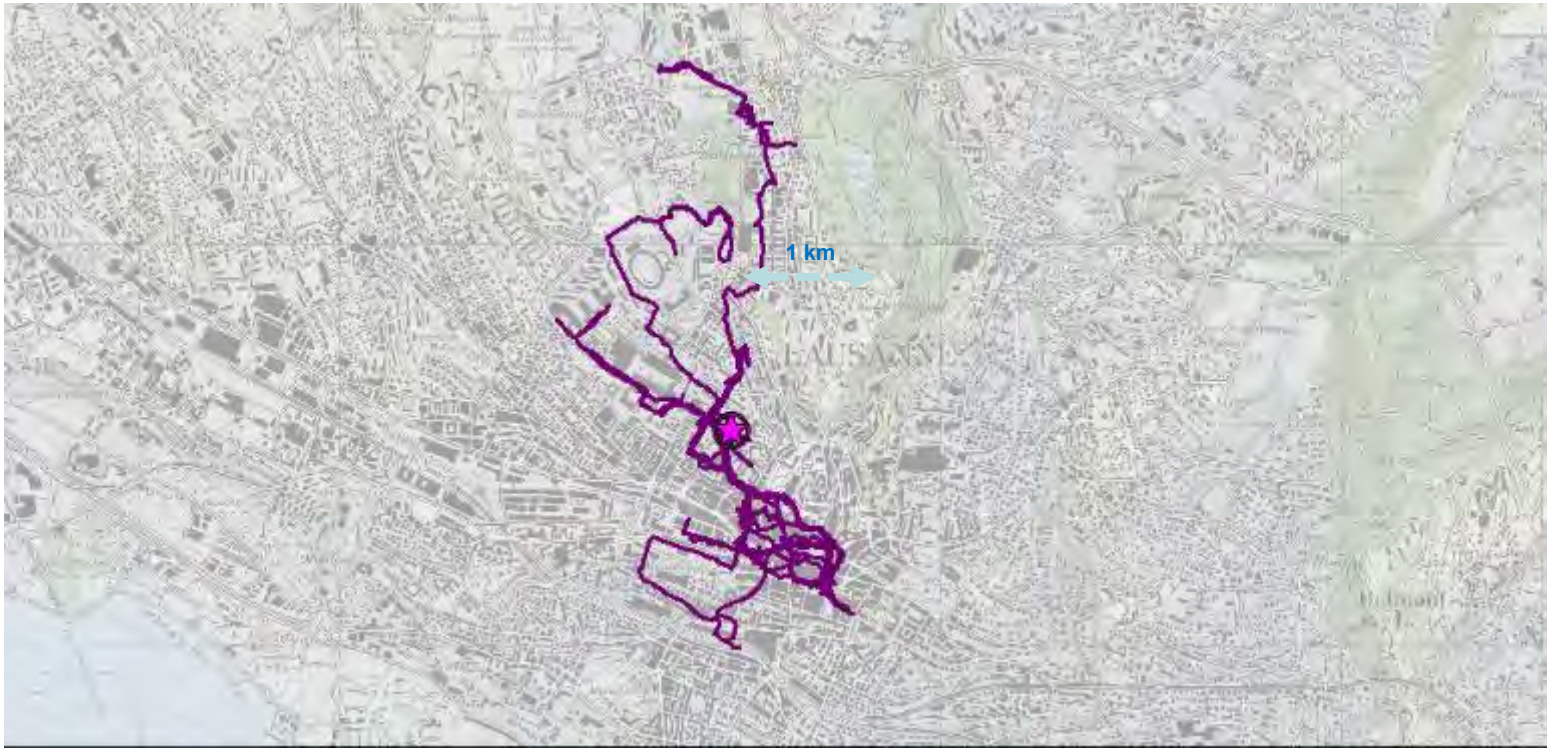
- Local urban walkers (continuous walking patterns)
- Super-walkers (continuous walking patterns)
- Walking commuters (discontinuous walking patterns)
- Other discontinuous walkers
- Leisure walkers
- Composite profiles (combinations of the above)

Selected case studies

Keisha 5389. Her conversion to frequent walking was recent and linked to a pedometer (first manual, then an app). She strives to do her 10'000 steps per day, even stepping out of doors after her children are in bed in order to fulfil this goal. She is selling her cars one after the other (she had three) and has changed jobs in order to be more physically active. She lives in a leafy suburb east of Lausanne and frequently walks into town (around 4 km). She averages 1.5 hours of walking per day and can be described as a **super-walker.**

Daisy 5136 is unemployed and lives near Lausanne with her children. She spends her time travelling between Morges and Lausanne by train, and in a complex set of activities within the two towns, where she walks a lot. She is an example of a **bi-local walker**, with a tight network of walking routes in two towns joined together by train rides. It is interesting to note that such an arrangement does not require "commuting".

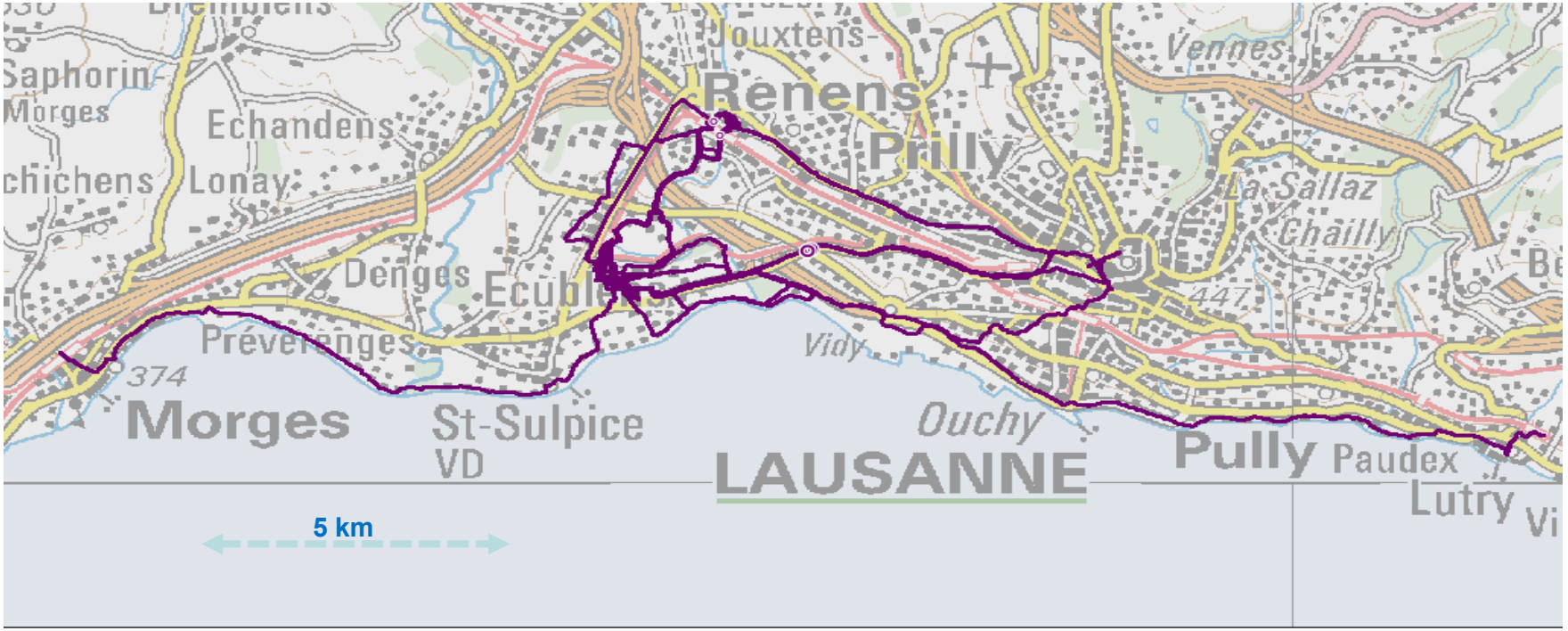
Edmund 5864 lives with his family in the rolling countryside north of Lausanne. All his travel is by car and almost all his walking is related to walking a dog. He is a **leisure walker** whose walking is disconnected from his personal transportation system. The disconnect is not complete, however, because he deliberately parks his car at a distance from his workplace in Lausanne. He counts his steps and believes his walking is split roughly 50/50 between transport and leisure.



Tamara's continuous, localised walking (11 days of GPS tracking data), mostly in central Lausanne.

She is a local, urban walker.

She has young children, and lives and works within a relatively narrow radius. She moved from a smaller town into central Lausanne 8 years ago, to achieve a proximity lifestyle based on walking with very little car or bus use. Our GPS tracking shows that she walks slightly less than one hour per day in public space, due to her centres of interest lying so close to each other.



William's continuous, generalised walking around Lausanne – the sure sign of a super-walker! (9 days of tracking)

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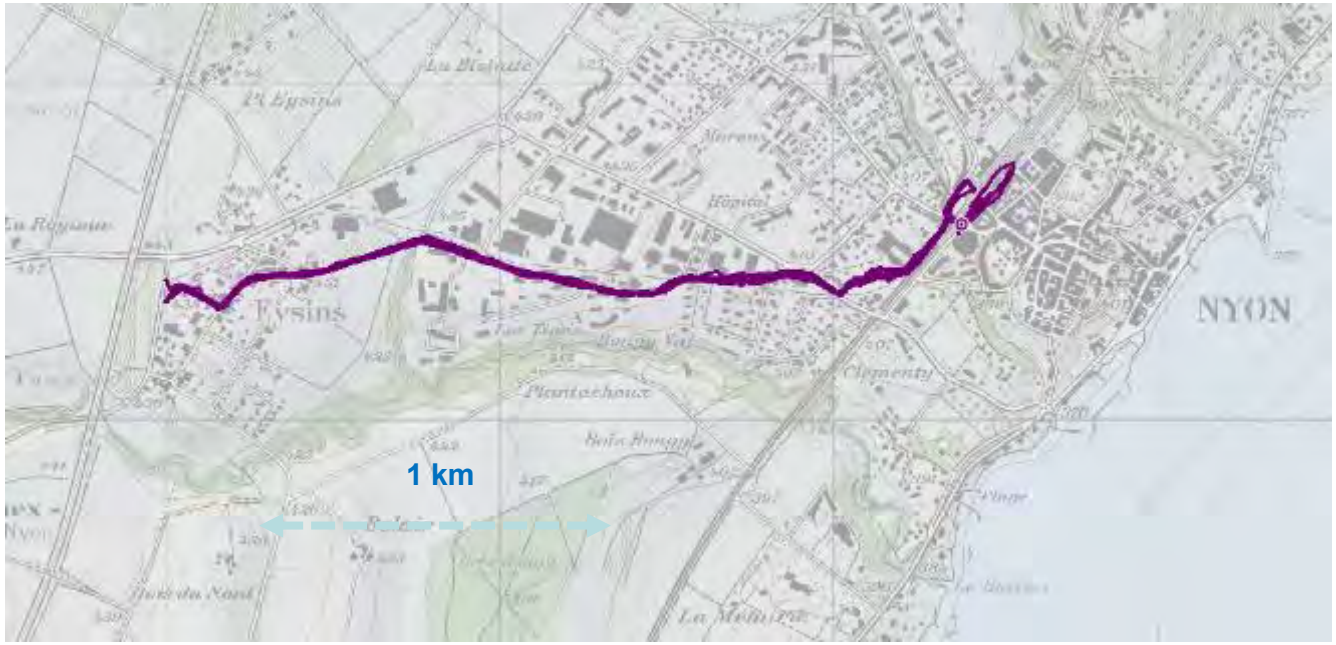


Richard’s regular walking commute into the centre of Nyon, to take the train 4-5 times per week
(here we see exactly the same path, taken several times over 11 days of GPS tracking)

Between Lausanne main station and the city centre…
Which would you prefer? (what did the frequent walkers prefer?)

GENERAL DISCUSSION

Back to the research question and the working hypotheses…

PRIOR HYPOTHESES

H_1: MOTIVATION. Integrating an hour or so of walking into a modern day is difficult, which is why it is rare and requires strong motivation.

H_2: SKILLS. Frequent walkers have advanced navigational skills enabling them to plan and improvise complex routines in time and space.

H_3: WALKABILITY. Frequent walkers use areas which do not always correspond to traditional walkability criteria.

RESULTS-DRIVEN HYPOTHESES

H_4: SUSTAINABILITY. Frequent walkers vary according to the degree of integration between walking and their personal mobility system, which has implications for sustainability.

H_5: PIONEER EFFECT. Frequent walkers have experience, attitudes and behaviours that can inspire others to become frequent walkers.

OVERARCHING RESEARCH QUESTION:

Can frequent walkers help bring about a healthy and sustainable transportation system, based on walking?

Limitations

- This is an exploratory study, using available datasets and convenience sampling. This is because it is the first take on frequent walkers, a population that was unknown and never described before (to our knowledge).
- The aim was to cover the breadth of the subject, rather than focussing on a particular aspect: this can be done in follow-up projects, by us and/or other groups.
- We operated no *a priori* separation between walking for recreational/leisure or for transport, and there was no control group.
- We do not know if our results are generalizable to other settings or populations. We can only suggest that other research groups carry out similar studies in other cities and urban/suburban areas.

General conclusion I

Our frequent walkers have individualistic rather than collective motivations for walking

- Positive aspect: health and wellbeing are powerful levers to help people achieve behaviour change
- Much of the mobility “revolution” hinges upon people adhering to collective values and norms, such as protecting the environment and seeking to avoid climate change

General conclusion II

Looking towards the future

- Utopia. What would a city with many more frequent walkers look like?
- Next 3 slides: examples from Switzerland (courtesy of Mobilité Piétonne Suisse)

Ramps, handrails, a place to sit and rest (with armrests)…
essential equipment to help senior citizens to remain mobile!

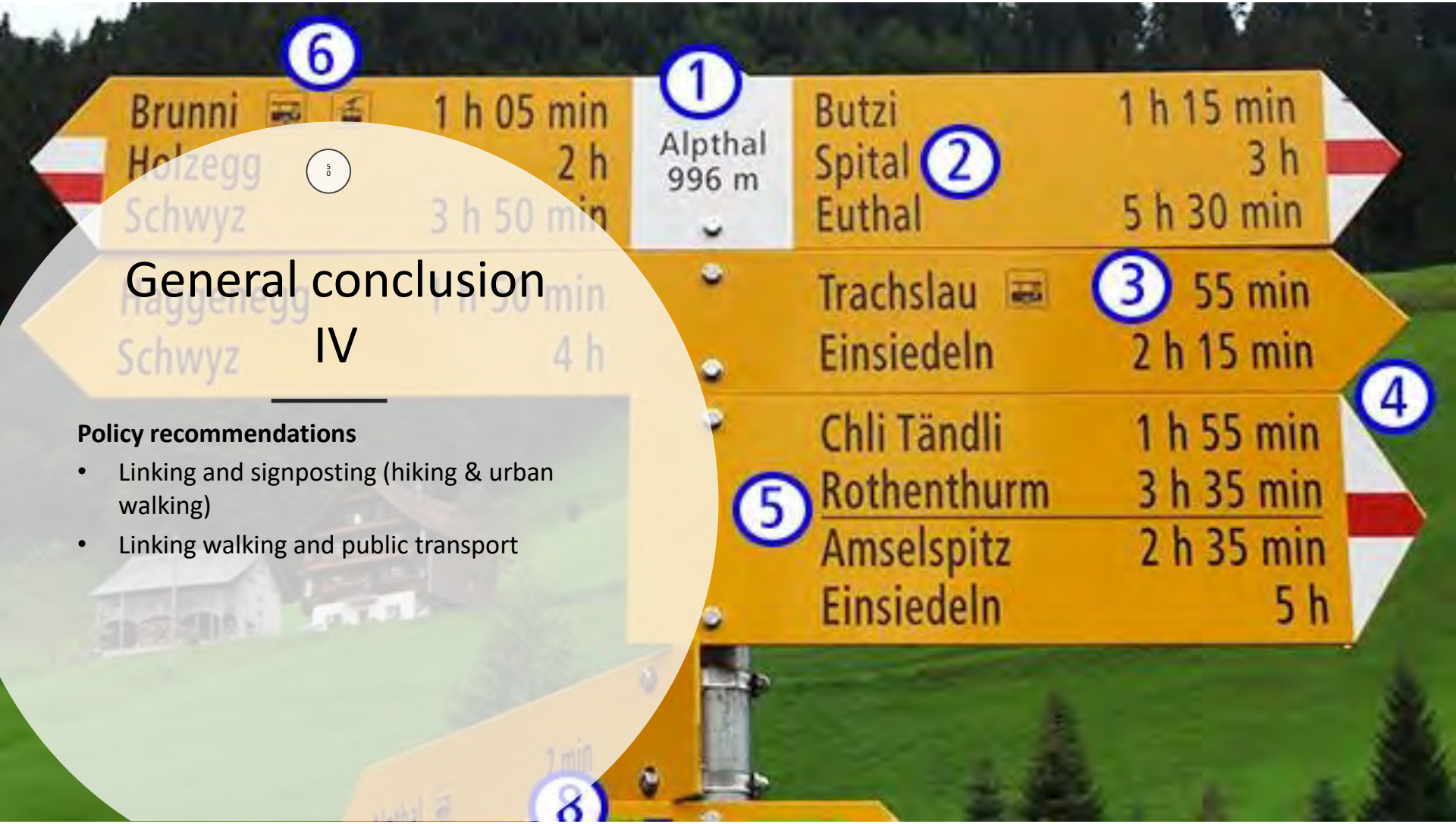
Physical activity & social cohesion: a place to walk, to talk, to play...

A good view may encourage people to walk…
but where's the pavement/sidewalk?

General conclusion III

Looking towards the future

- The urban/rural conundrum



General conclusion IV

Policy recommendations

- Linking and signposting (hiking & urban walking)
- Linking walking and public transport

General conclusion V

Policy recommendations

- Pedometers (library initiative)
- Skills, incentives and advocacy
- Walking highways

General conclusion VI

Research agenda

- Policy packaging
- Health impact assessment
- Ageing and gender
- Cohort and intervention studies

This is the last slide! (unless you really want more)

Looking towards the future

- Utopia. What would a city with many more frequent walkers look like?
- The urban/rural conundrum

Policy recommendations

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- My wife, children and extended family