

Positive association of walking with the use of public transport in Switzerland

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CONTEXT: increased interest for walking

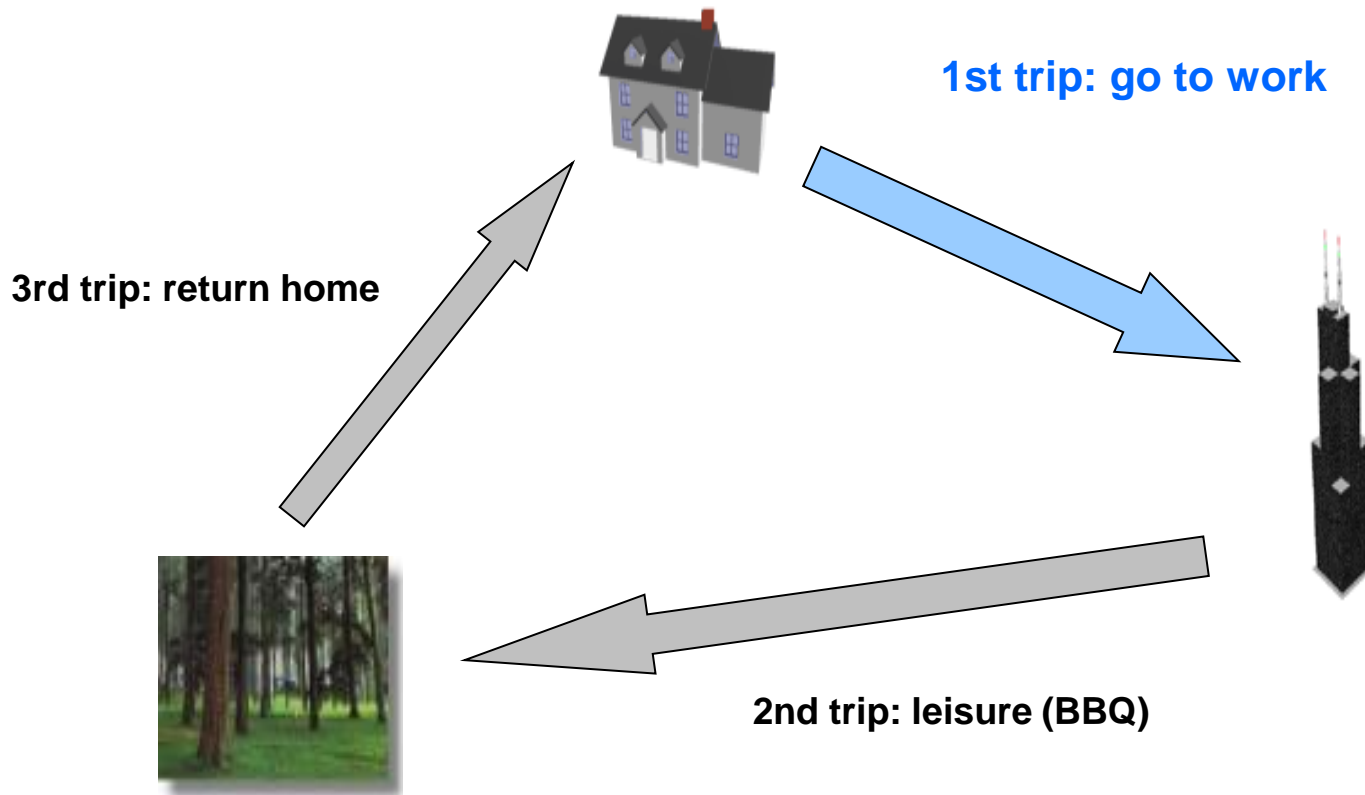
- ☺ Link between lack of daily physical activity and the current global epidemic of overweight, obesity and type 2 diabetes (*Booth & Hawley 2015*)
- ☺ Increased urbanisation, interest for urban lifestyles & proximity which may be favourable to walking
- ☺ Data challenges: walking is lumped together with other modes under headings such as *mobilité douce, Langsamverkehr...*
- ☺ Humans are genetically designed to walk. Hunter-gatherers walk around 6-12 km/day (Marlowe 2005, Pontzer 2012)
- ☺ Walking among domestic cows: 7-10 km per day (Rouda et al. 1990, Raizman et al. 2013), wild reindeer up to 16 km per day during summer (Reimers et al. 2013)
- ☺ Compared with quadrupedal mammals of similar body mass, human walking is economical of metabolic energy, but human running is expensive (*Steudel-Numbers 2003, Alexander 2004*)

Swiss transport micro-survey

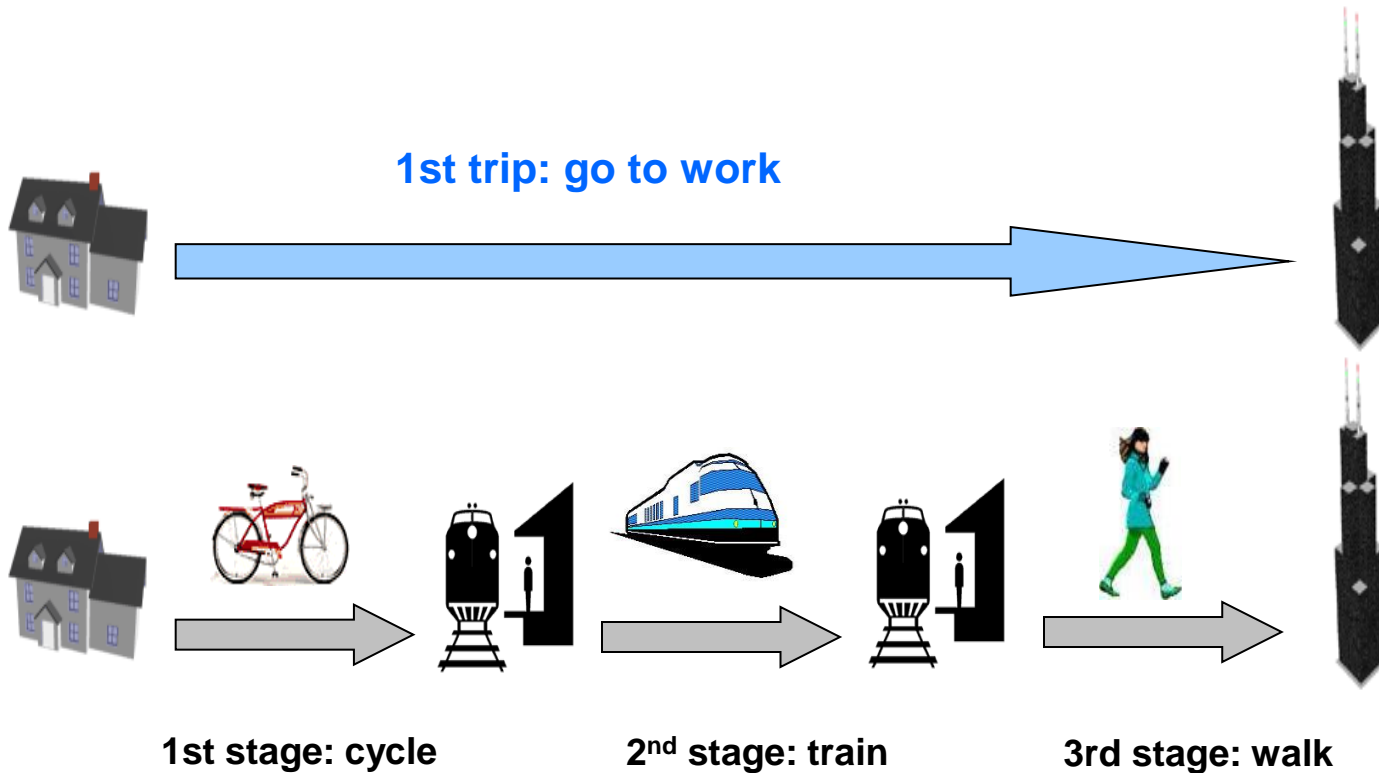
Data	Nombre d'observations	Variables
Households / Ménages / Haushalte	59'971	99
Target people / Personnes-cibles / Zielpersonen	62'868	214
Home trips / Boucles / Ausgänge	85'436	36
Trips / Déplacements / Wege	211'359	87
Stages / Etapes / Etappen	310'193	116
Routes / Routen	285'529	4
Segments / Segmente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

Several trips to form a home trip

Each trip has a destination and motive



**Each trip is subdivided into stages
(*Etappen, étapes*). Each stage is associated
with a single transport mode.**



Basic transport data for Switzerland

- ❖ Each resident of Switzerland covered **around 37 km** on the reference day (without counting trips abroad)
- ❖ This corresponds to a travel time of **83 minutes**
- ❖ Men cover 11 km more per day than women.
- ❖ People living in households with a monthly income over CHF 14'000 cover distances **2.5 times** greater than people living in households with incomes under CHF 2000.

IMPORTANT:

- ❖ Trips < 25 metres are not taken into account
- ❖ Trips within buildings or facilities are not taken into account
- ❖ Running and skiing (!) are taken into account, but do not amount to substantial numbers of trips in the database.

Mode share (% of trips) for walking in the 5 largest conurbations in Switzerland

Conurbation (Agglo)	Mode share (men)	Mode share (women)	Mode share (average)
Zürich	28%	33%	30%
Genève	34%	40%	37%
Basel	29%	35%	32%
Bern	29%	34%	32%
Lausanne	28%	34%	31%
Average 5 agglos	30%	35%	32%

What do the walking trips look like?

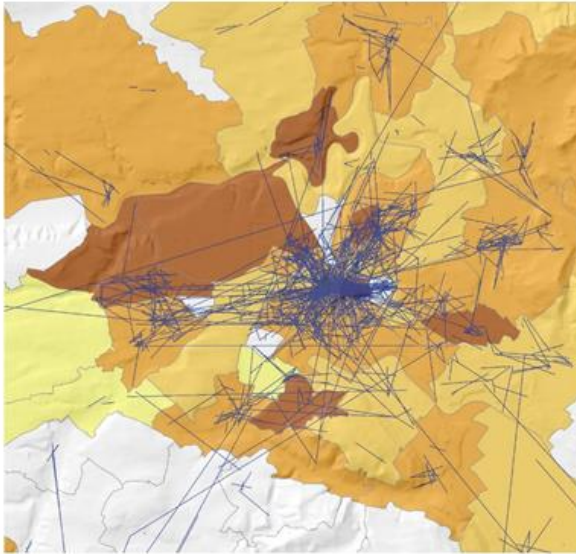
- Average distance: 710 mètres
 - As the crow flies: 420 mètres
 - Average time: 12 minutes
 - Therefore average speed: 3.5 km/h
- > a bit on the low side when looking with health promotion glasses!

Where do these people walk? (for 5 cities)

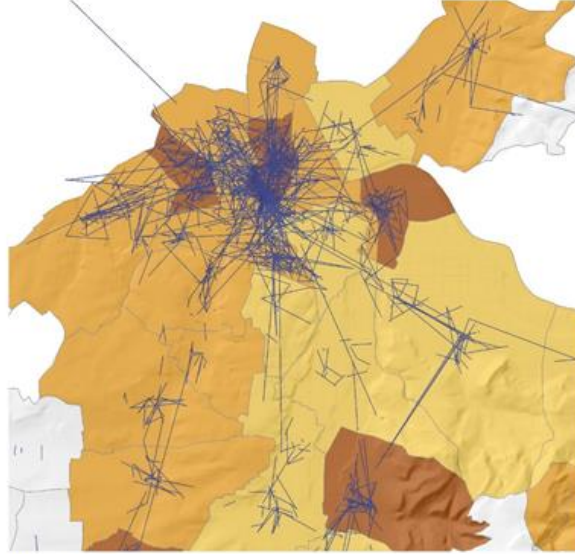
- Mapping shows very different patterns between cities
- The concentration of walking is strongest in Geneva, but this is also the conurbation with the most fragmentation
- In other cities, walking seems less concentrated in the city centre and more diffuse in its pattern.

Map credits: S. Munafò et al., EPFL (next slides)

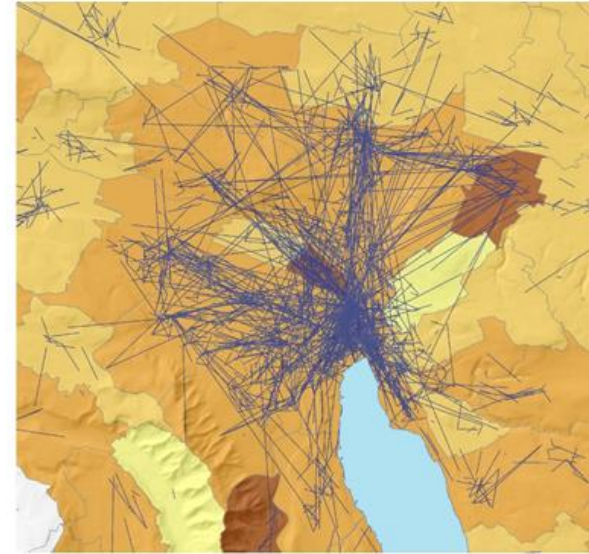
Berne



Bâle

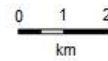


Zurich



Part modale de la marche
(en % des déplacements ayant leur destination dans le périmètre)

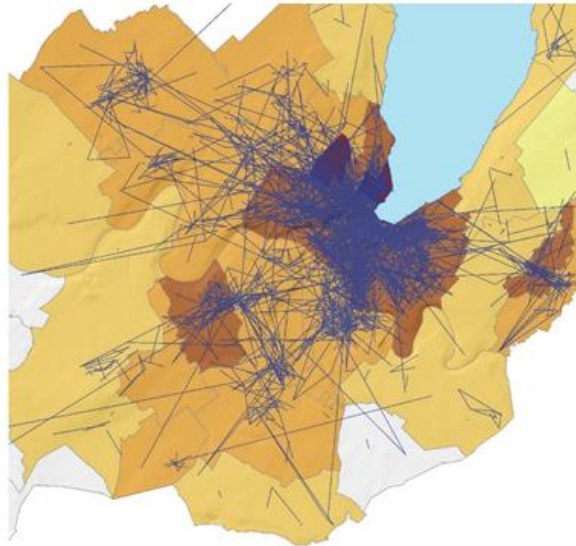
- 4.4-16.5
- 16.6-28.5
- 28.6-40.6
- 40.7-52.6
- 52.7-64.7



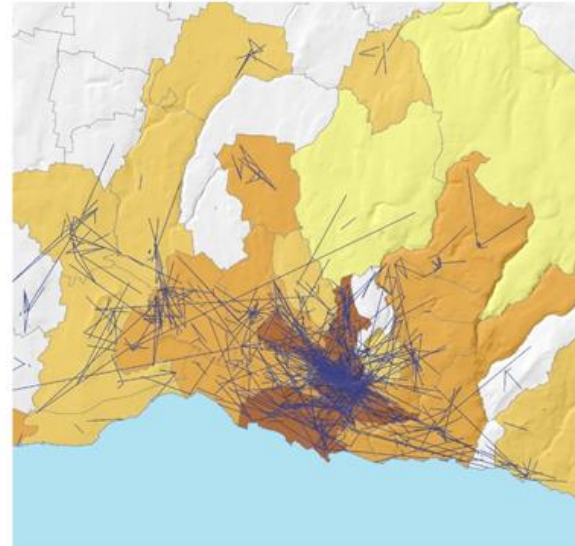
— itinéraires des déplacements réalisés à pied (vol d'oiseau)

Walking in 5 Swiss conurbations

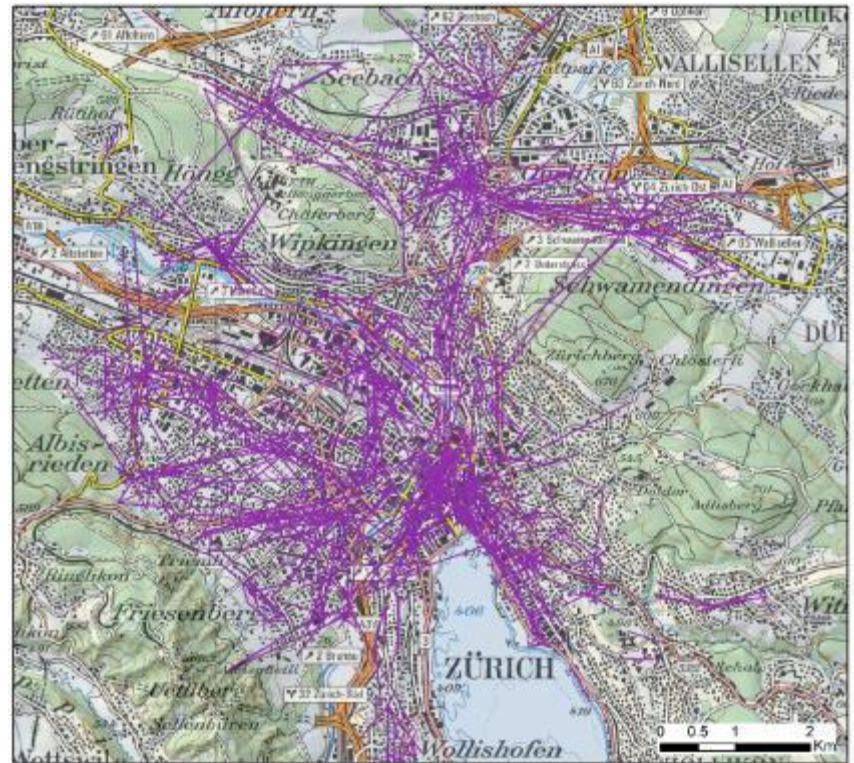
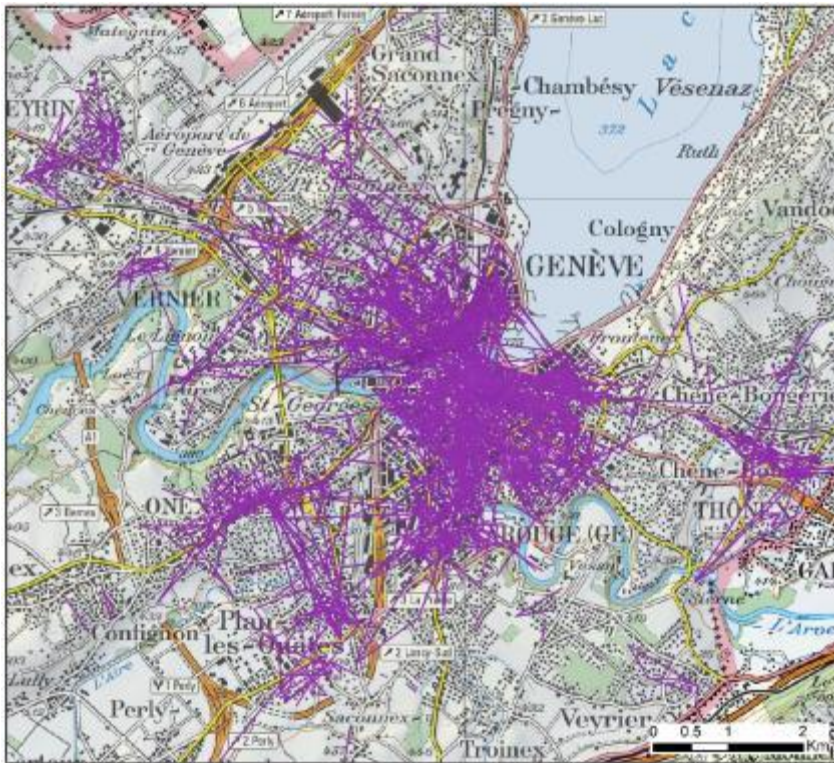
Genève



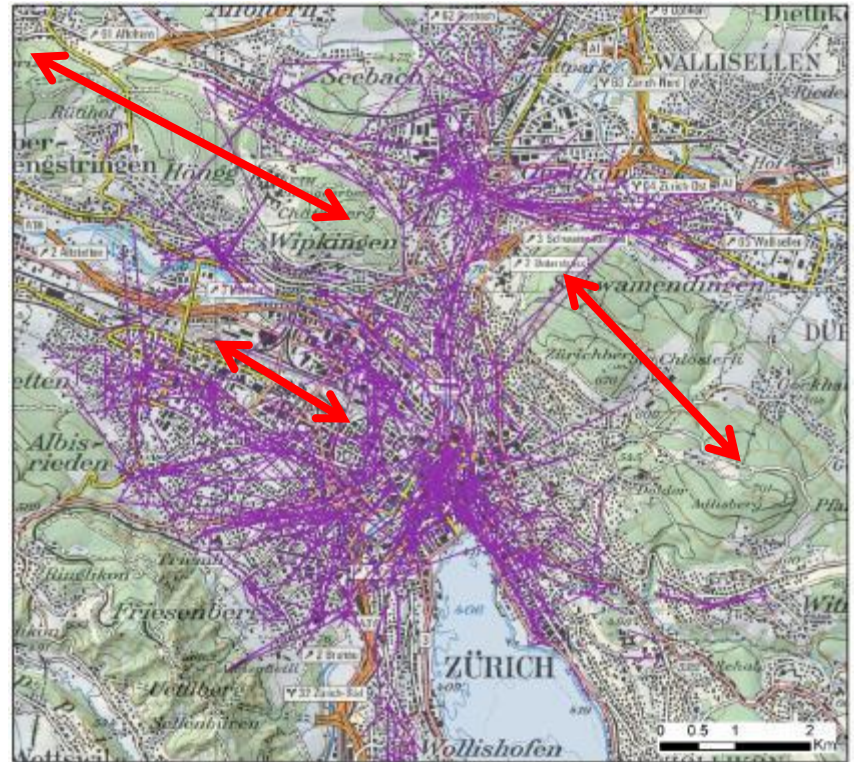
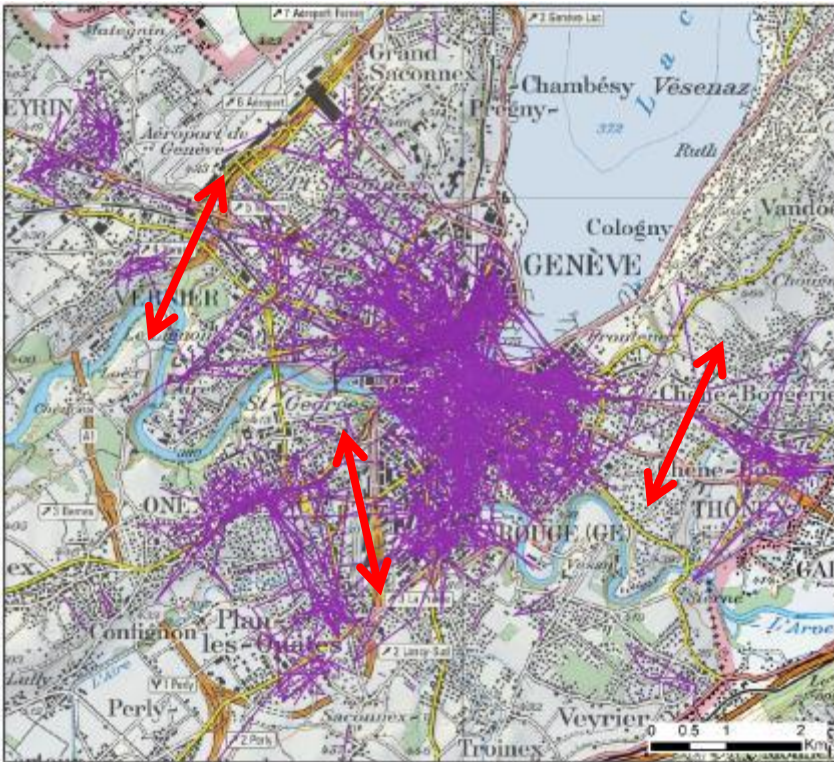
Lausanne



Focus on Geneva and Zurich
Walking trips < 3km
All purposes



Barriers to walking

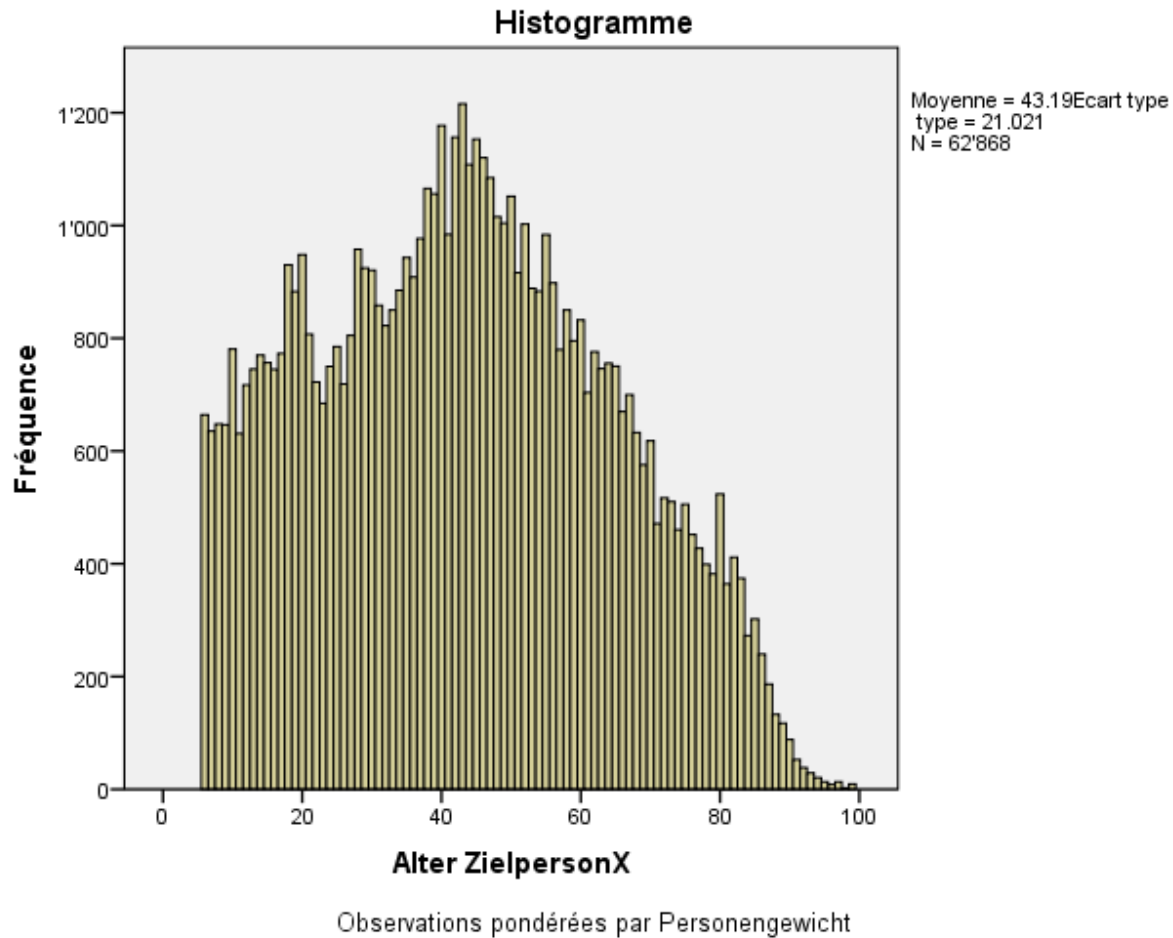


**Wait, we are not finished
yet!**

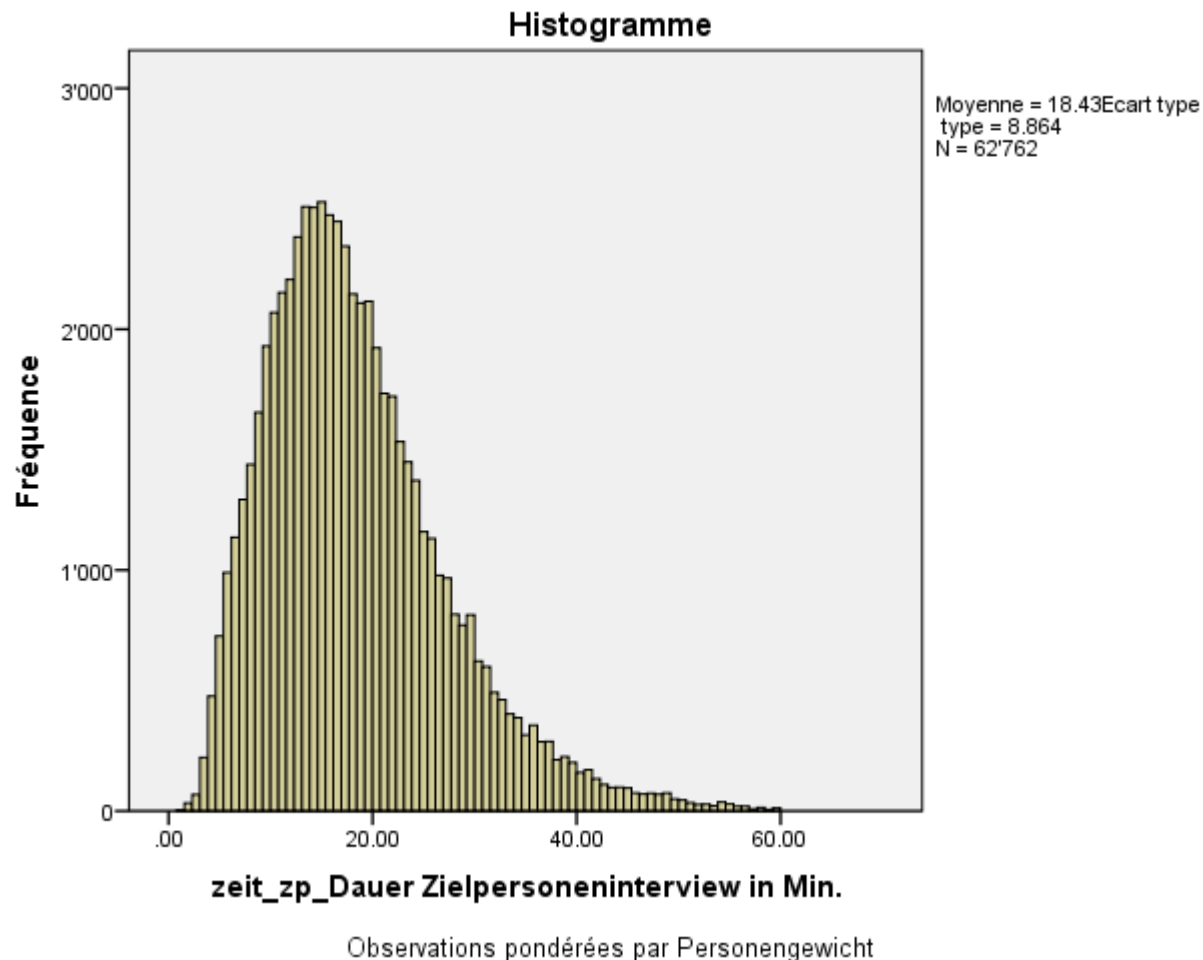


<http://laurenharrisonart.tumblr.com/post/11629203299/no-walking>

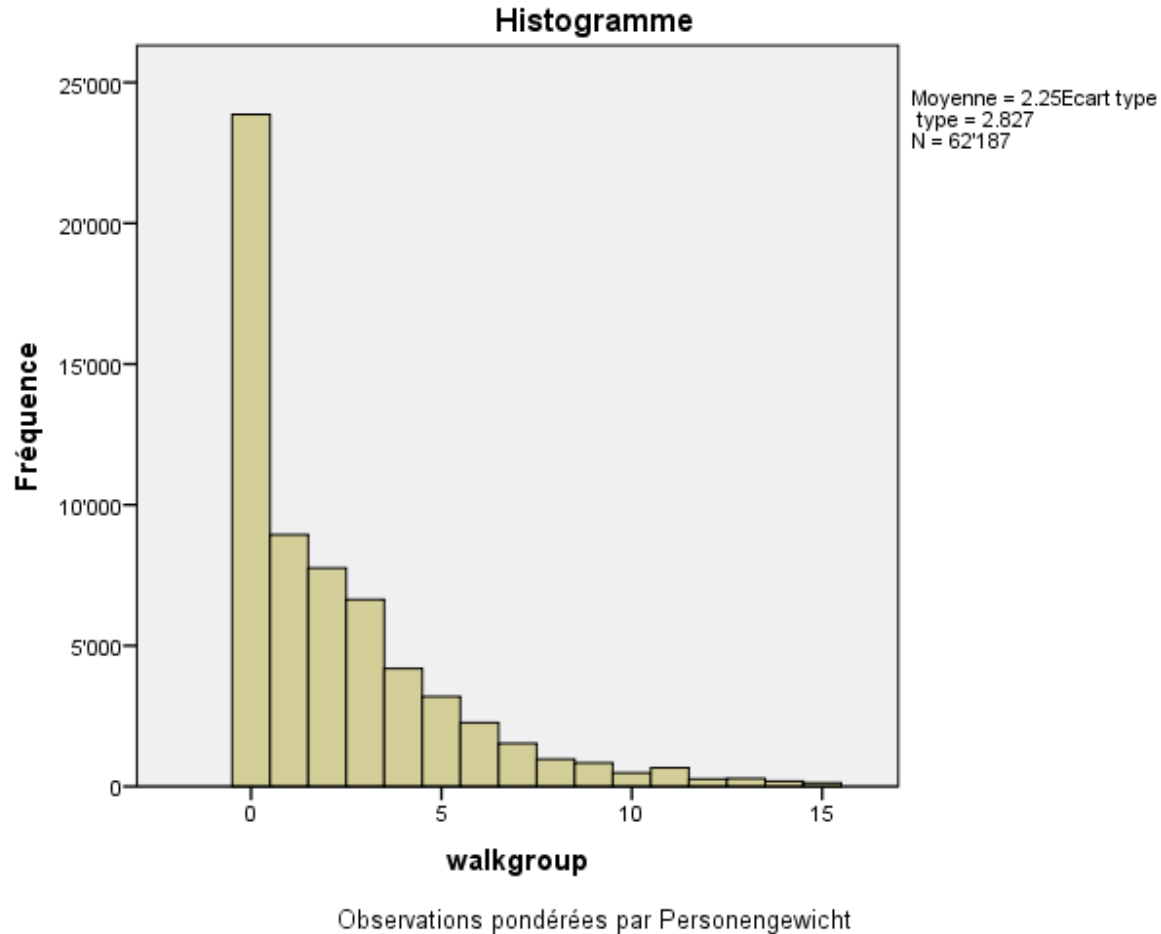
Is the distribution of walking similar to the distribution of the age of the people in the survey?



Is the distribution of walking similar to that of the duration of the interview?



The distribution of walking is anything but normal!



The histogram shows km by foot per person on the reference day

0: no walking in public space

1: less than 1 km

2: over 1 and less than 2 km

etc.

Distribution of walking on the reference day

Transport behaviour on the reference day	Number of people in MRMT 2010 database	Approximate number of people in Switzerland	Percentage
Stayed at home	7252	907'800	11.5
By car or motorbike with no walking	14120	1'767'566	22.5
Rode a bicycle without walking	2495	312'328	4.0
Modest walkers < 2 km	16702	2'090'789	26.6
Medium walkers 2-5 km	14016	1'754'593	22.3
Substantial walkers 5-20 km	8018	1'003'740	12.8
Possible outliers (walk>20km)	266	33'315	0.4
Total	62868	7'870'131	100.0

Associations between continuous variables that are not normally distributed: non-parametric test

Association between walking and public transport use: POSITIVE, SIGNIFICANT ASSOCIATION (Spearman's Rho = 0.40, $p < 0.001$)

Association between walking and car/motorbike use: NEGATIVE, SIGNIFICANT ASSOCIATION (Spearman's Rho = -0.22, $p < 0.001$)

Association between walking and BMI: NEGATIVE, SIGNIFICANT ASSOCIATION (Spearman's Rho = -0.10, $p < 0.001$)

Association between public transport use and BMI: NEGATIVE, SIGNIFICANT ASSOCIATION (Spearman's Rho = -0.10, $p < 0.001$)

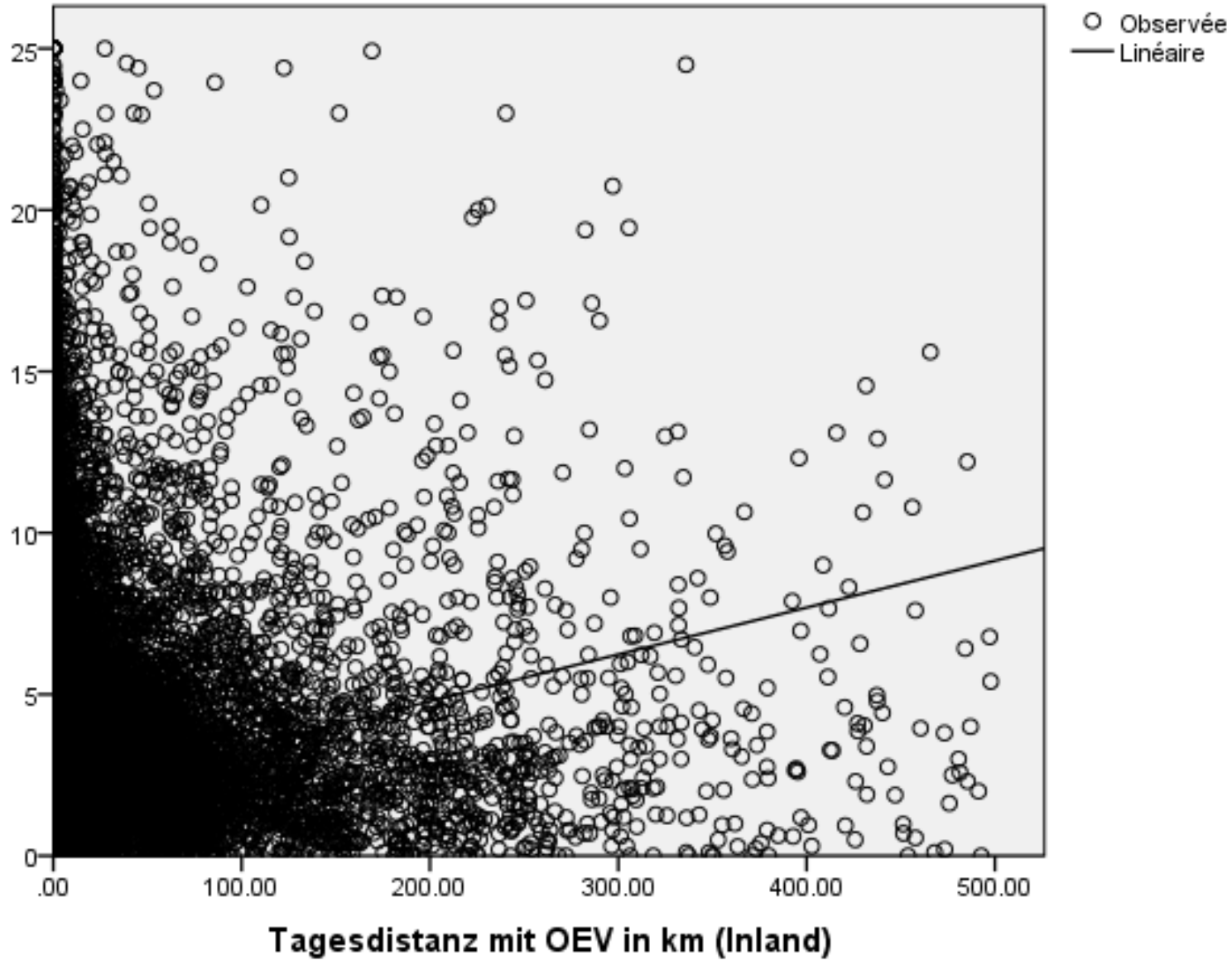
Association between car or motorbike use and BMI: POSITIVE, SIGNIFICANT ASSOCIATION (Spearman's Rho = 0.10, $p < 0.001$)

Association between age and BMI: POSITIVE, SIGNIFICANT ASSOCIATION (Spearman's Rho = 0.45, $p < 0.001$)

Variable		BMI	Total walking distance (km)	Tagesdistanz mit MIV in km (Inland)	Tagesdistanz mit OEV in km (Inland)	Alter ZielpersonX
BMI2	Correlation coefficient	1.000	-.095**	.102**	-.095**	.452**
	Sig. (bilatéral)		.000	.000	.000	0.000
	N	18452	18452	18452	18452	18452
Walking distance (km)	Correlation coefficient	-.095**	1.000	-.216**	.402**	-.070**
	Sig. (bilatéral)	.000		0.000	0.000	.000
	N	18452	63598	63598	63598	63598
Tages-distanz MIV in km (Inland)	Correlation coefficient	.102**	-.216**	1.000	-.243**	-.016**
	Sig. (bilatéral)	.000	0.000		0.000	.000
	N	18452	63598	63598	63598	63598
Tages-distanz mit OEV in km (Inland)	Correlation coefficient	-.095**	.402**	-.243**	1.000	-.151**
	Sig. (bilatéral)	.000	0.000	0.000		0.000
	N	18452	63598	63598	63598	63598
Alter Zielperson	Correlation coefficient	.452**	-.070**	-.016**	-.151**	1.000
	Sig. (bilatéral)	0.000	.000	.000	0.000	
	N	18452	63598	63598	63598	63598

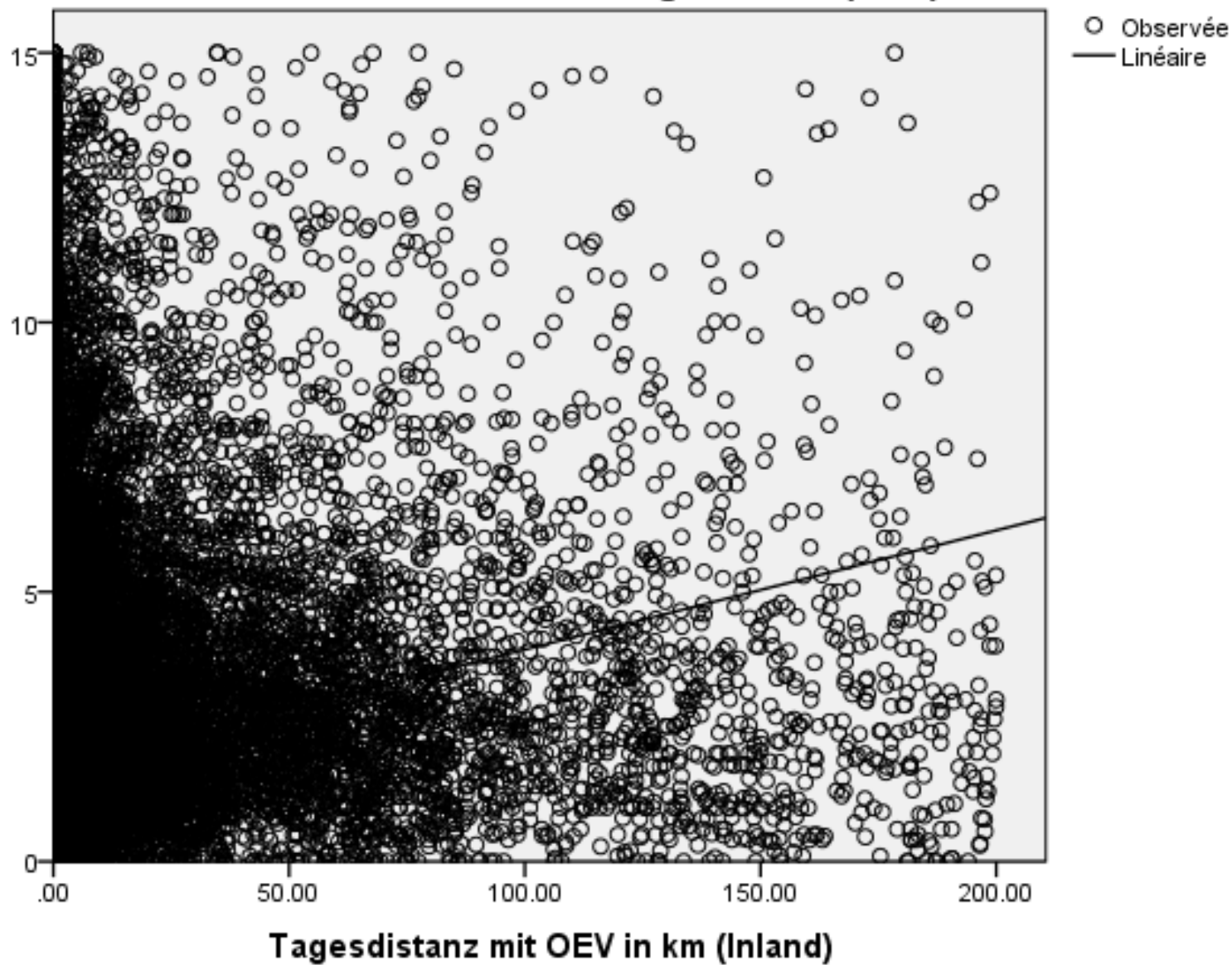
Simple correlations, test: Spearmans' Rho (for non-normal distributions)

Total walking distance (rdist)



Observations pondérées par Personengewicht

Total walking distance (rdist)



Observations pondérées par Personengewicht

CONCLUSION

Public transport use, walking and BMI are interrelated in this population-based study.

Both walking and public transport use are associated with lower BMI.

More work is needed to determine to what extent the lowering of BMI through public transport use may be mediated by walking.

FOR FURTHER DISCUSSION

-> Should the health sector intervene to support policy measures in favour of public transport?

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Thank you for your attention!

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