PASTA
PHYSICAL ACTIVITY THROUGH SUSTAINABLE TRANSPORT APPROACHES

Active mobility and health: Insights from the PASTA Project

According to the PASTA survey, over 40% of car and public transport trips are less than 5km. Shifting such short trips to active mobility, such as walking and cycling, is a promising strategy to increase health enhancing physical activity.

What makes people walk and bike?

Framing the issue

Active mobility depends on many things. The PASTA conceptual framework provides a first-of-its-kind effort to systematically combine behavioral concepts, structural features and a large number of determinants identified in the literature as part of a single, comprehensive framework to illustrate factors influencing walking and cycling. The framework served as guidance for data collection and analysis in PASTA.

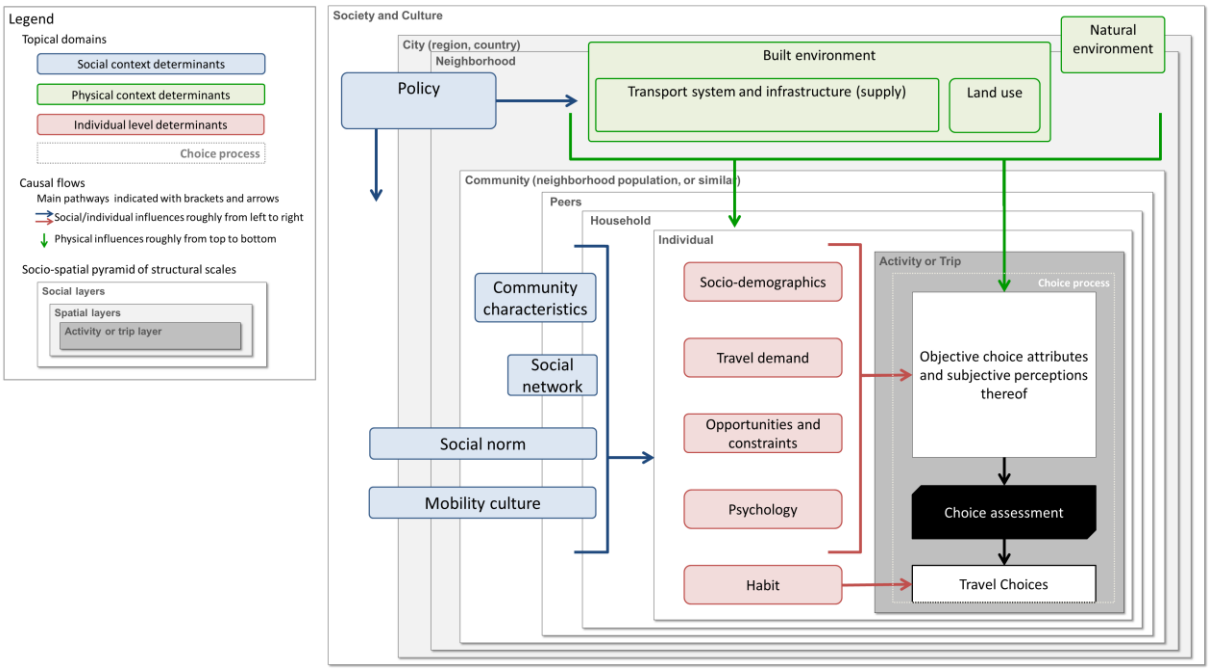


Figure 1: PASTA conceptual framework for walking and cycling behaviour

The framework has been published in Götschi, T., de Nazelle, A., Brand, C., Gerike, R., & PASTA Consortium. (2017). Towards a Comprehensive Conceptual Framework of Active Travel Behavior: a Review and Synthesis of Published Frameworks. Current Environmental Health Reports, 1-10.

This project has received funding from the European Union's Seventh Framework Programme for research; technological development and demonstration under grant agreement no 602624-2.

Collecting the data - a longitudinal online survey of 10,000 Europeans

The PASTA survey is one of the largest studies of its kind studying travel behavior, physical activity and associated crash risks in Europeans. It took place from November 2014 to January 2017 in seven cities: Antwerp, Barcelona, London, Örebro, Rome, Wien, Zürich.

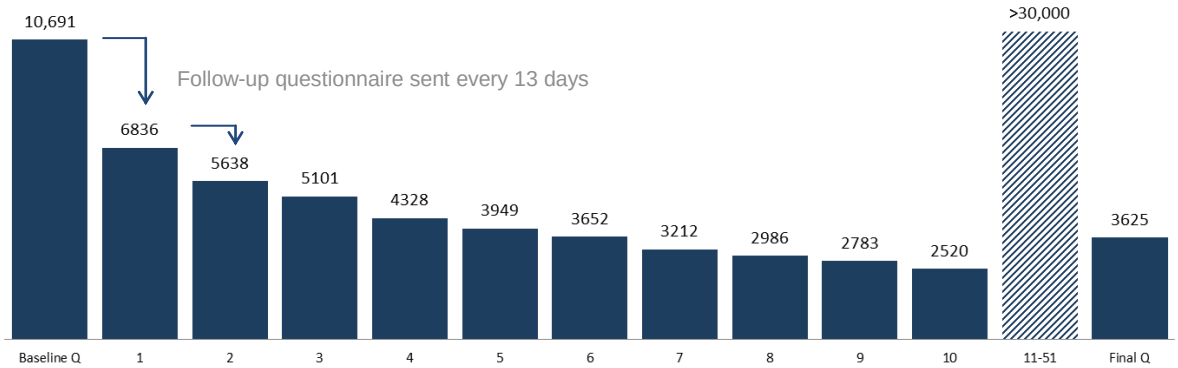
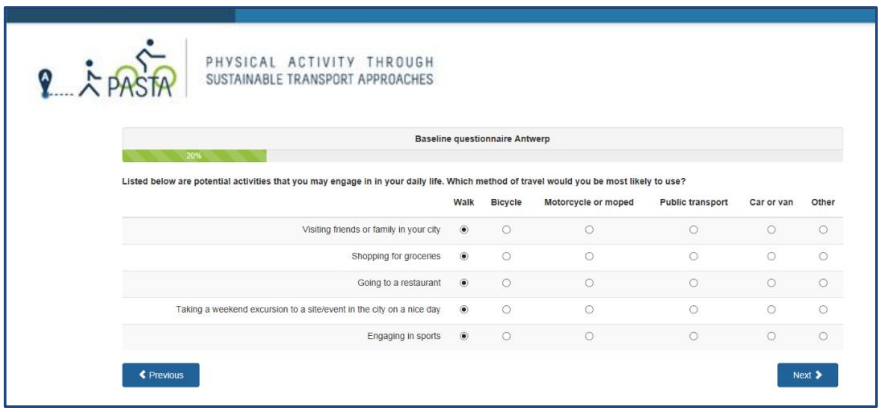


Figure 2: The number of completed questionnaires.

- >10,000 volunteers completed a baseline questionnaire and multiple bi-weekly follow-up questionnaires;
- 54% female and 46% male participants, average age 41 years
- >80,000 questionnaires were completed in total;
- >13,500 trip diaries entered, representing more than 46,000 trips

Multifaceted recruitment strategy:

- A large portfolio of opportunistic recruitment strategies was used to direct people to the PASTA website.
- Combination of strategies was tailored by each city to the local context.
- Most participants were reached through workplaces (21.5%), outreach promotion (20.8%), and social media (17.4%)
- Participants could volunteer for additional studies focussing on air pollution exposure, or phone-based tracking of travel behavior.
- Active mobility users and subjects exposed to selected active mobility promotion measures were oversampled.



The study protocol has been published in Dons E, et al. Physical Activity through Sustainable Transport Approaches (PASTA): Protocol for a multi-centre, longitudinal study. *BMC Public Health* 2015; **15**(1): 1126.

Analysing the findings

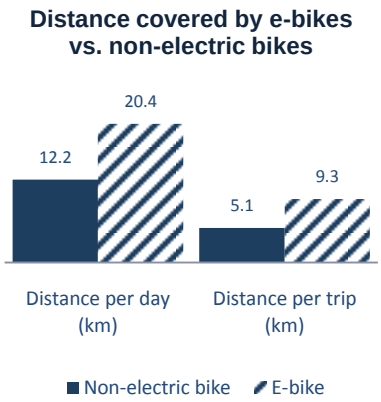
Insights on cycling

Cyclists were a main focus of PASTA research. Of all PASTA participants, 97% know how to ride a bike and 80% have access to a bike. Half of all participants ride their bike at least once in a typical week, 24% never ride a bike. 43,7% of participants reported at least one cycling trip in the trip diaries and can be classified as cyclists. Of these, 85% cycle 30 minutes or more per day. An average bike trip took 27 minutes and was approx. 5 km long. Male cyclists biked on average 50 minutes per day, females approx. 42 minutes.
Regarding cycling as a mode of transport, 77% think that it saves time, 57% find it comfortable, but only 23% consider it safe with regards to the risk of traffic crashes. 92% agree with the statement that cycling for travel offers personal health benefits, and those for whom health is an important criterion when choosing their mode of transport indeed do bike more (approx. +10%). In depth analysis of determinants of cycling is ongoing.

Sources:
Raser E, et al. European Cyclists` Travel Behavior: Differences and Similarities between seven European (PASTA) Cities, *Journal of Transport & Health* 2017; **5**: S28-S30.
Götschi, et al. Determinants of Cycling in 7 European Cities, *Int Conf on Transport & Health, 2017,* Barcelona. Presentation.

What about electric bicycles?

Users of electric bicycles cycle on average further than conventional cyclists: their trips are almost twice as long. Considering shorter travel times (due to higher speeds) but also lower physical intensity (due to electric assist), e-bike users achieve similar levels of physical activity as conventional cyclists, refuting the concern that e-biking may not be as good for health as conventional cycling. More importantly, e-biking helps older people to stay active, and they benefit even more from physical activity.



Source: Ongoing research by the PASTA project team.

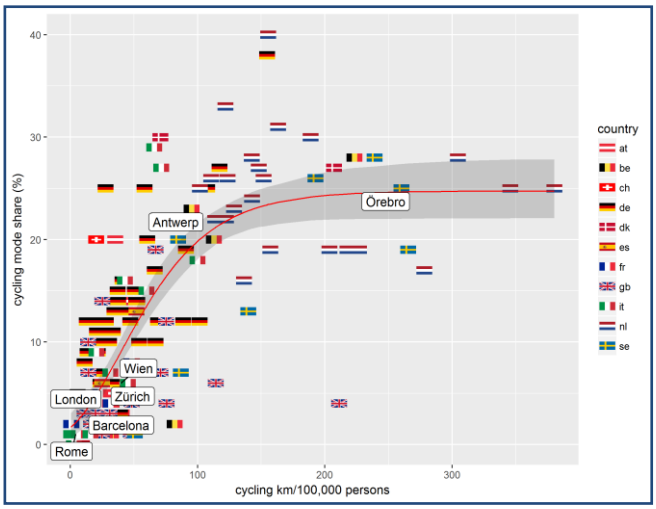
Is active mobility replacing leisure-time physical activity?

People engaging in active mobility (cycling to work) were found to be more physically active overall. This is a key assumption of all calculations of health benefits that has now been validated. Active mobility was found not to replace sport and leisure physical activity.

Source: Laeremans M, et al. Does an Increase in Walking and Cycling Translate into a Higher Overall Physical Activity Level? *Journal of Transport & Health* 2017; **5**: S20.

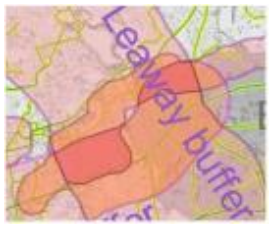
Is expanding the cycling network a good way to increase cycling?

In 167 European cities (including the 7 PASTA cities) we studied the association between the available cycling network and the cycling mode share. Especially in cities with a currently low cycling mode share, expansion of cycling networks may increase the cycling mode share (up to 25%).

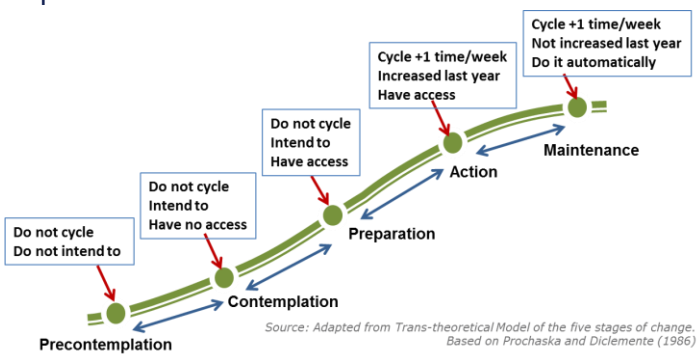


Source: Mueller N, et al. Health impact assessment of cycling network expansions in European cities. under review in *Preventive Medicine.*

Does the built environment have an impact on travel behaviour?



There is evidence to support that changing the built environment has the potential to influence walking and cycling behaviour. In London, one of the PASTA cities, a spatial analysis is being conducted for the post-Olympic regeneration plans in East London. This evaluation will take into account a number of different infrastructure projects and assess how these affect participants' choices to walk or bike. Longitudinal assessments will explore why people take up or increase active mobility usage, using the so-called *stages-of-change* model. The PASTA survey includes a set of specific questions to diagnose each participant stage before and after the interventions take place and thus be able to assess their impact in their attitudes and behaviour.



Is investing in cycling highways worth the money?

Any action, scheme or piece of infrastructure that increases cycling will contribute to better public health. The benefits of the extra physical activity far outweigh the risks of air pollution and accidents. Cycling highways which entice people to cycle longer trips in a dedicated, safe and convenient setting are especially efficient. Cost-benefit ratios indicate that benefits of cycling highways in Flanders (Belgium) are 2 to 14 times higher than the initial investment.

Source: Buekers J, et al. Health impact model for modal shift from car use to cycling or walking in Flanders: Application to two bicycle highways. *Journal of Transport & Health* 2015; **2**(4): 549-562.

Air pollution, physical activity and health

- Aim: study associations between air pollution exposure, physical activity and health as walkers and cyclists may be at higher risk.
- 40 volunteers in Antwerp, Barcelona and London acted as 'mobile labs' for three weeks.

Figure 1a. (above) *PASTA mobile devices* ***1b. (left)*** *Participant with the devices.*

Figure 2a. *Lung function test* ***2b.*** *Retinal imaging.*

A selection of health markers (blood pressure, heart rate variability, width of the retinal blood vessels in the eye, lung function, exhaled NO) were measured at the beginning and end of each week.

Results indicate beneficial effects of physical activity; however the benefits are somewhat reduced by increased exposure to air pollution.

Source: Ongoing research by the PASTA project team

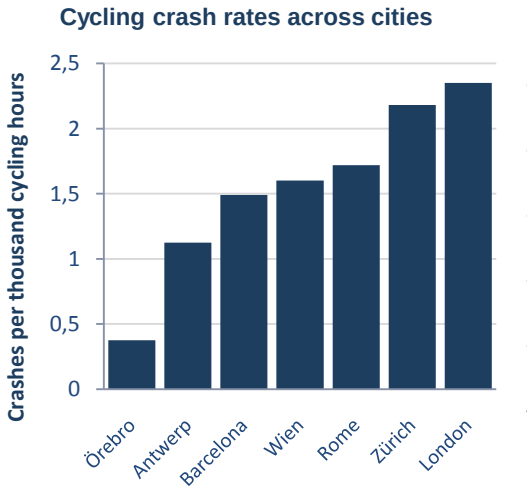
Do you lose weight by walking or cycling?

Cyclists are slimmer than car drivers. On average, regular cyclists weigh 4 kilos less than car drivers. Public transport users are in between car drivers and cyclists. When people stop cycling, their weight increases. Taking up some cycling (a few times per month) lowers weight already.

Source: Dons E, et al. Male Car Drivers Are 4kg Heavier Than Cyclists: Results from a Cross-Sectional Analysis in Seven European Cities. *Journal of Transport & Health* 2017; **5**: S27-S8.

Crash risk of cyclists

In order to better understand the risks of cycling within and across cities, exposure based crash rates are essential. Across the 7 PASTA cities, 4352 participants cycled for 495,225 hours, experiencing 651 collisions or falls. The overall crash rate in the study was 1.37 per 1000 hours of cycling (95% CI 1.25 - 1.49), which varied substantially by city. For example, in London, crash risk of cycling is 5 times higher than in Örebro.



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