<u>PCT Essentials</u>

The PCT is a nationwide (England and Wales) web-based tool for estimating cycling potential and corresponding health and CO_2 benefits, down to the street level.

The PCT covers travel behaviour data for commuting and travel to school. Cycle commuting data is based on the 2011 Census and cycle to school based on the 2011 school cycling Census. These represent the most up-to-date sources of publicly available, official origin-destination data on cycling levels available at high geographic resolution nationwide. Other trip purposes and more recent data are not currently available nationwide at the geographic resolution required for the PCT.

The PCT can be thought of as i) the map user interface on www.pct.bike , ii) the data downloads that can be analysed in GIS software or statistical software, iii) the code base that can be used to develop new scenarios.

The PCT is an open source tool, meaning the source code is transparent and in the public domain for others to learn from and build-on. The PCT code is available at https://github.com/npct/. There is also a 'pct' R package.[1]

The online interface can serve many needs, including gaining insight into the network of routes where cycling potential is highest and quantifying the benefits of cycling uptake**.** However, we recommend that intermediate and advanced users download data on zones, routes and route networks for in-house analysis (citing Lovelace et al. 2017). **There are both regional and national data download files, which are available from tabs alongside the map interface on www.pct.bike.**

The PCT allows users to visualise results at area level (MSOA or LSOA[2]), top N flows between those areas (as straight lines or along routes), and aggregated on the route network. The route network layer accounts for all trips (not just the top N, which will only be a small proportion of the total flows). **Thus if you want to highlight where the top cycling potential is across an area, we recommend using the route network layers.**

As the Census data only tells us approximate start and end point the PCT provides route based estimates using the Cycle Streets routing algorithm.

Scenarios

The PCT presents both baseline data and how cycling would change under different scenarios. More information on the scenarios is available in two academic papers (Lovelace et al., 2017; Goodman et al., 2019) and in a blog post on the 'Go Cambridge' scenario which was added in 2019.

In all the PCT scenarios (apart from gender equity) cycling potential is calculated using a function based on **trip distance** (people are more likely to cycle a shorter trip than a longer trip) **and hilliness** (people are less likely to cycle a trip involving hills). These functions, and further details, are available in our published papers (see references at end of this text), and subsequently updated in the User Manual C1. Underlying the PCT is a detailed model of the English and Welsh population that allows sophisticated individual level calculations of uptake and benefit.

[1] See https://cran.r-project.org/package=pct for the PCT package, which was developed for advanced training courses and is targeted at R users who want quick access to the data underlying the PCT.

[2] MSOA = middle layer super output area, average population 7500. LSOA = lower layer super output area, average population 1650

To give an example. In the “Go Dutch” scenario we look at each trip in e.g. Sheffield and estimate how likely a Dutch person would be to cycle that trip, using the formula we calculated with Dutch data. For example, we estimate that a 2km, 1% average gradient trip has an 46% probability of being cycled in the Netherlands. So, in the Go Dutch we would assign this 46% probability to all 2km 1% average gradient trips in Sheffield. Note that because Sheffield is hillier than the Netherlands, even when everyone in Sheffield is assigned the same *propensity* to cycle as in the Netherlands, the population mode share of cycling is much lower in the Sheffield Go Dutch scenario (12%) than is actually observed for commute trips in the Netherlands (25%).

In the “Near Market” scenario we also account for age, gender and other factors that affect the likelihood of cycling.

As our scenarios are of cycling potential we do not estimate the impact of specific schemes or interventions.

People and trips

The PCT presents results are person not trips based. We present numbers of people travelling to work or school in different ways, based on their ‘usual main mode’ of travel. For example, the number of commuters cycling to work in different scenarios. This is in line with the input data we are using from the Census (for commuting) and the National School Census (for school travel).

For each person who cycles to work/school, we use National Travel Survey data to estimate the typical number of commuting trips per cyclist per week. Cycle commuters on average make fewer than 10 cycle trips per week as, for example, some people work part-time, take time off during holidays, or sometimes use other modes. We use these estimates of numbers of trips for calculating physical activity benefits and carbon savings. Users wanting to convert our estimates of numbers of people to numbers of trips can refer to these numbers in Manual C1 Appendix 5 (commuting) and manual C1 section 4iii (school). Average values are 5 cycle commuter trips per cycle commuter in a typical week, 2.3 for primary school children, and 5.1 for secondary school children.

Health benefits

Health benefits are calculated based on changes in physical activity from additional cycling. We also subtract any walking trips now cycled. When calculating how much physical activity a trip takes we include trip distance, speed, and hilliness. For ebikes we assume faster speed and lower physical activity per mile, but that on average people are more likely to cycle a longer trip. When converting physical activity to health benefits we allow for each person’s gender and age. The calculation is a more advanced version of that in DfT Transport Appraisal Guidance (TAG) and has similarities to the WHO HEAT approach.

Key references

Lovelace, R., Goodman, A., Aldred, R., Berkoff, N., Abbas, A., Woodcock, J., 2017.The Propensity to Cycle Tool: An open source online system for sustainable transport planning. Journal of Transport and Land Use. 10:1, 505–528, [DOI: 10.5198/jtlu.2016.862](https://doi.org/10.5198/jtlu.2016.862).

Goodman, A., Fridman Rojas, I., Woodcock, J., Aldred, R., Berkoff, N., Morgan, M., Abbas, A., Lovelace, R., 2019.Scenarios of cycling to school in England, and associated health and carbon impacts: Application of the ‘Propensity to Cycle Tool’. Journal of Transport & Health. 12, 263-278, [DOI: 10.1016/j.jth.2019.01.008](https://doi.org/10.1016/j.jth.2019.01.008).

User Manual C1: PCT methods for the commuting layer (English)

User Manual C2: PCT methods for the schools layer (English)