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Route choice habits: an underestimated issue in cycling policies

Main results of a qualitative study based on a GPS tracking method with 30 urban cyclists

Michael Flamm,
Independent urban mobility expert,
MICODA Sàrl

Julie Barbey Horvath,
Coordinator of the Bicycle and Pedestrian Master Plan,
Direction Générale des Transports, Canton de Genève

MICODA Sàrl
Ch. de la Redoute, 32
CH-1260 Nyon

www.micoda.ch

Goals of the qualitative study

- Conduct a qualitative study about the travel behaviour of cyclists in Geneva, in order to get complementary insights in addition to the biennial cyclists counting campaigns

- Verify the feasibility of using GPS tracking data to conduct qualitative interviews about individual route choice behaviour (survey method developed at the Urban Sociology Laboratory of EPFL)

- Get a better insight into cyclists' route choice strategies, a research topic which has yet only scarcely been investigated from a qualitative point of view.
  In order to improve cycling policies, several questions arise:
  - What are the main selection criteria which influence route choice?
  - Are cyclists willing to make detours in order to travel on dedicated cycling facilities?
  - Do cyclists make efforts to optimize their travel route habits?
  - Do they use cycling maps or other supplied orientation helps ?
  - How can we best fulfil the needs of less experienced cyclists?

Some details about the survey design (I)

The participants were recruited in two phases :

- A mailing to members of « Pro Velo Genève » generated around 60 candidatures (February 2013)
- This allowed to conduct 20 case studies with rather experienced cyclists
- Later on, starting in may 2013, a snowball search and targeted mailings (university students, cycling training participants, etc.) allowed to include less experienced cyclists in the survey sample
- Survey participation was voluntary and no reward was paid

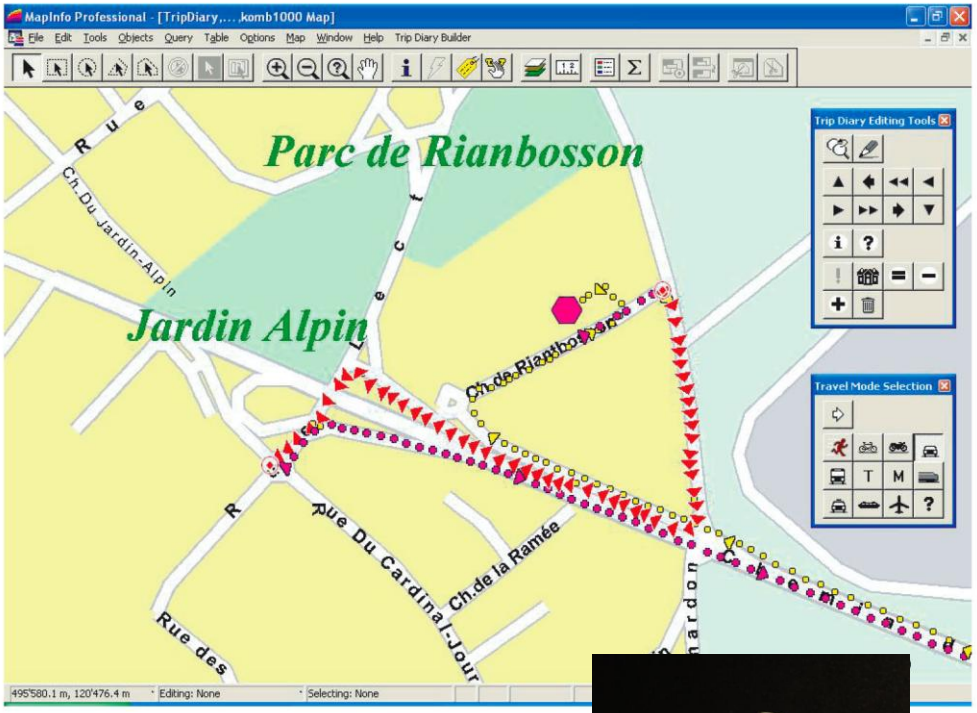
The recruiting procedure allowed to set up a very diversified survey sample :

- 30 participants drafted from a base of 80 candidatures (!)
- Gender: 17 men / 13 women
- Cycling experience: Poor = 9 / Intermediate = 9 / Good = 12
- Age: well-balanced sample including persons from 19 to 60 years
- Cycle types: 19 city bikes / 9 electric bikes / 2 lay tricycles

Some details about the survey design (II)

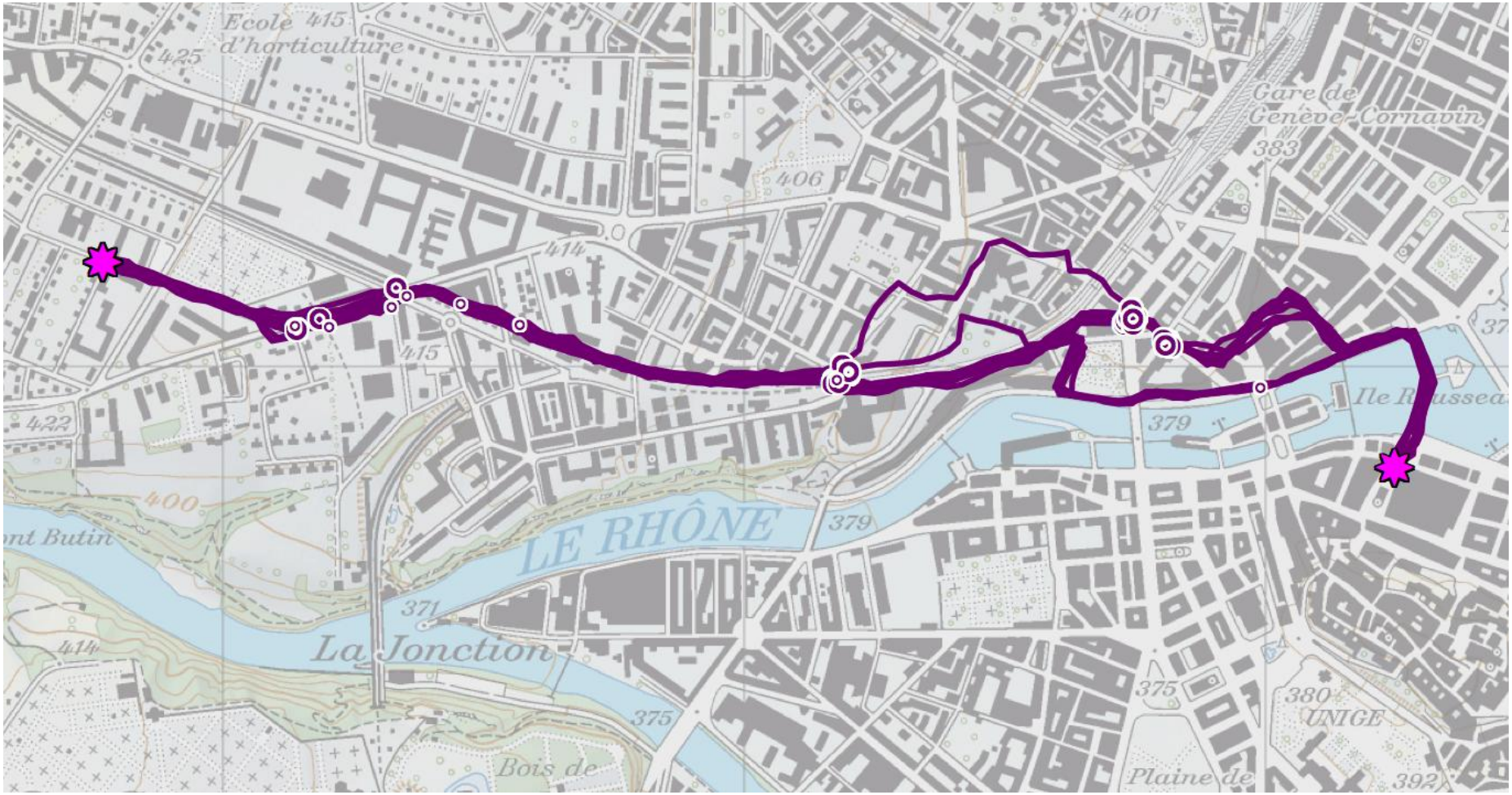
Survey steps of case studies :

1. Short telephone interview for recruiting and selection process
2. First interview, with handing out of GPS tracker (ca. 30 min.)
3. Recording of daily travel throughout 10 days
4. Second interview (75 - 120 min.), to get detailed explanations about the recorded trips, the route choice and the personal experience of cycling (a GPS data display software served as memory aid)
5. Later on: Exhaustive interview analysis and trip data cleansing (deletion of non cyclist trips, data anonymising, coding of trip types, etc.)



Some details about the survey design (III)

Cleansed trip data for about 1‘000 cycle trips,
with trip type differentiation (daily travel vs. leisure trips)



Individual attitudes to the bicycle

In general, individual attitudes of urban cyclists are convergent with regard to several aspects :

- The image that interviewed cyclists have about the bicycle is predominated by the characteristic triplet « FREEDOM – RAPIDITY – PRACTICALITY ».
- In general, cycling is considered as being « THE IDEAL TRANSPORT MODE » for travelling in the city, so much so that the most experienced cyclists often prefer to brave unfavourable weather conditions instead of switching to another travel mode.
- Cyclists rather view themselves as “augmented pedestrians” and not so much as “vehicle drivers” (their official status in traffic rules). The « NIMBLENESS » which comes with the bicycle allows to travel very finely in the urban network and, in particular, to flexibly share spaces with pedestrians.

One difference of opinion is noticeable : less experienced cyclists put forward that cycling in a city is (somewhat) « DANGEROUS »

- By means of accumulated practice and experience, cyclists get a better understanding of risk situations which are encountered in urban traffic and thereafter tend to relativize their initial apprehensions.
  This evolving process can be facilitated by a cycling training participation.

The main determining factors of route choice (I)

The survey has revealed an impressive abundance of route choice criteria :

Sporty route (enjoying cycling effort)

The fastest

Avoiding pedestrian shared spaces

Route with less stops (free flow)

Away from motorised traffic

Smooth road surface

Well-known route

Attractive surroundings

Avoiding roadworks

Avoiding steep slopes

The safest

The main determining factors of route choice (II)

In addition, route choice criteria depend on contextual factors : (some cyclists adapt their preferences day by day according to...)

- Time constraints (need to be punctual ≠ absence of time constraint)
- Momentary feelings (tiredness, wish to unwind from a stressful day, etc.)
- Traffic conditions (peak hour ≠ periods with reduced traffic)
- Weather and daylight conditions (windy ≠ calm, day ≠ night, etc.)
- Wish to vary travel routes (return trip ≠ outward trip ≠ last days' trips)
- Random factors (traffic light phases, etc.)

Two basic preference rationalities : rapidity and safety

- « Rapidity oriented » cyclists primarily aim at minimizing travel time & distance or the number of stops at crossroads; they also tend to favour streets with a smooth surface, in order to be able to maintain a good travelling speed
- « Safety oriented » cyclists choose itineraries on which they feel at ease on the whole length of the route, even if it implies to make significant detours in order to avoid cycling black spots
- That said, quite a few cyclists display intermediary attitudes with regard to those two ideal profiles, by adapting their route preferences depending on the context

Main characteristics of « rapidity oriented » cyclists

« Rapidity oriented » cyclists almost exclusively put forward efficiency related criteria to explain their route choices, that is primarily by minimizing the travelled distance and/or the travel time :

- In our survey sample, two distinct efficiency focused strategies have emerged : experienced cyclists often prefer to travel on side streets in order to avoid stops at crossroads with traffic lights, whereas less experienced cyclists tend to favour main streets (usually, main streets allow to cycle at higher speeds and to reduce the number of bifurcations)
- Generally, « rapidity oriented » cyclists do not hesitate to ride on reserved public transport lanes (bus and tram lanes), if it allows them to save time
- On the other hand, they tend to avoid shared spaces when a lot of pedestrians are present, because it implies to reduce speed
- Apart from reserved cycleways, cycling facilities do not much influence the route choice (cycling facilities rather are considered as a “nice to have” feature)

Main characteristics of « safety oriented » cyclists

For « safety oriented » cyclists, the subjective feeling of riding safely prevails over travel efficiency (even though minimizing distances and travel times remains a secondary goal) :

- The route choice results from a subtle adjustment between two goals :
  (1) avoid places that are considered « too dangerous » and
  (2) follow route sections that allow to cycle away from motorised traffic.
  Significant detours are accepted in order to find a route satisfying those two conditions.
- Two distinct safety focused strategies have been observed : the most experienced cyclists tend to favour side streets with reduced speed or moderate traffic (even without cycling facility), whereas less experienced cyclists prefer routes providing the most continuous cycling facilities (because cycle lanes serve as a reassuring “guided trail” through urban traffic).
- In general, good quality cycling facilities strongly influence the route choice.
- Often, « safety oriented » cyclists apprehend tram tracks, leading them to prefer itineraries which avoid rail crossings or even simply to ride along rails.

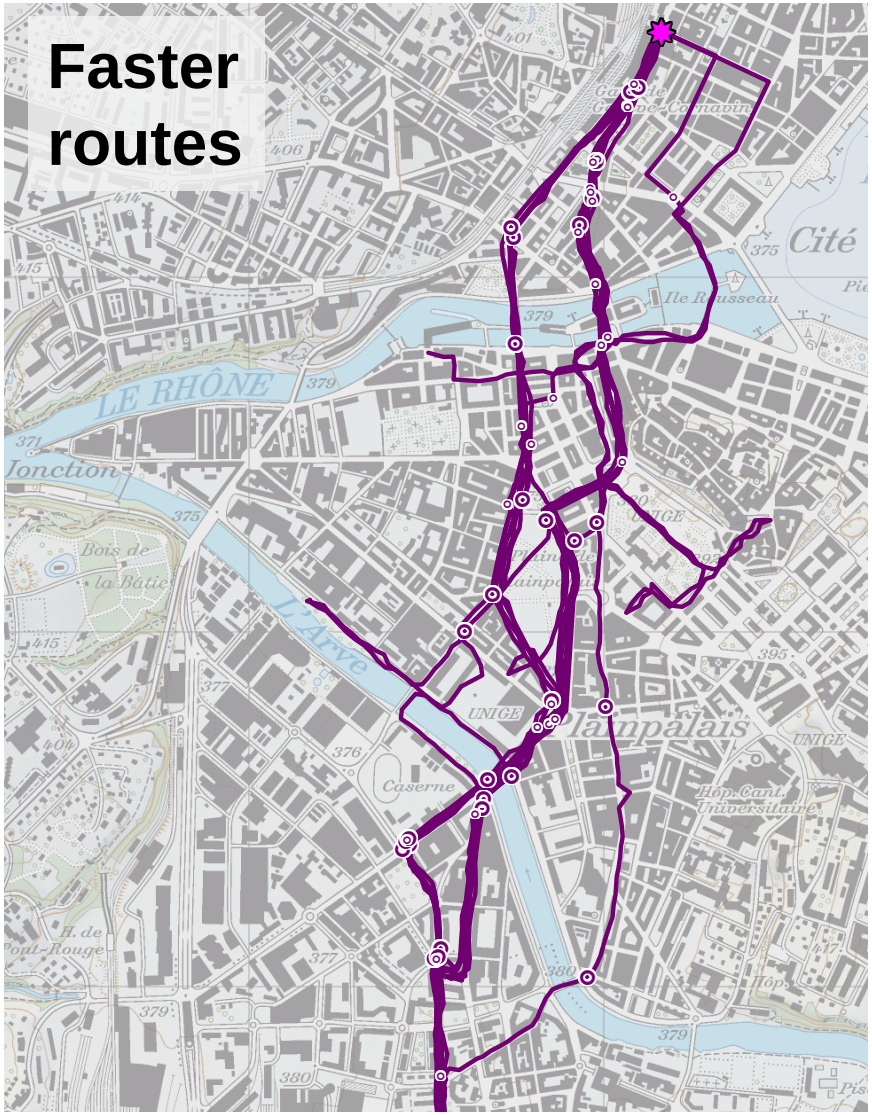
Two basic, but non exclusive preference rationalities

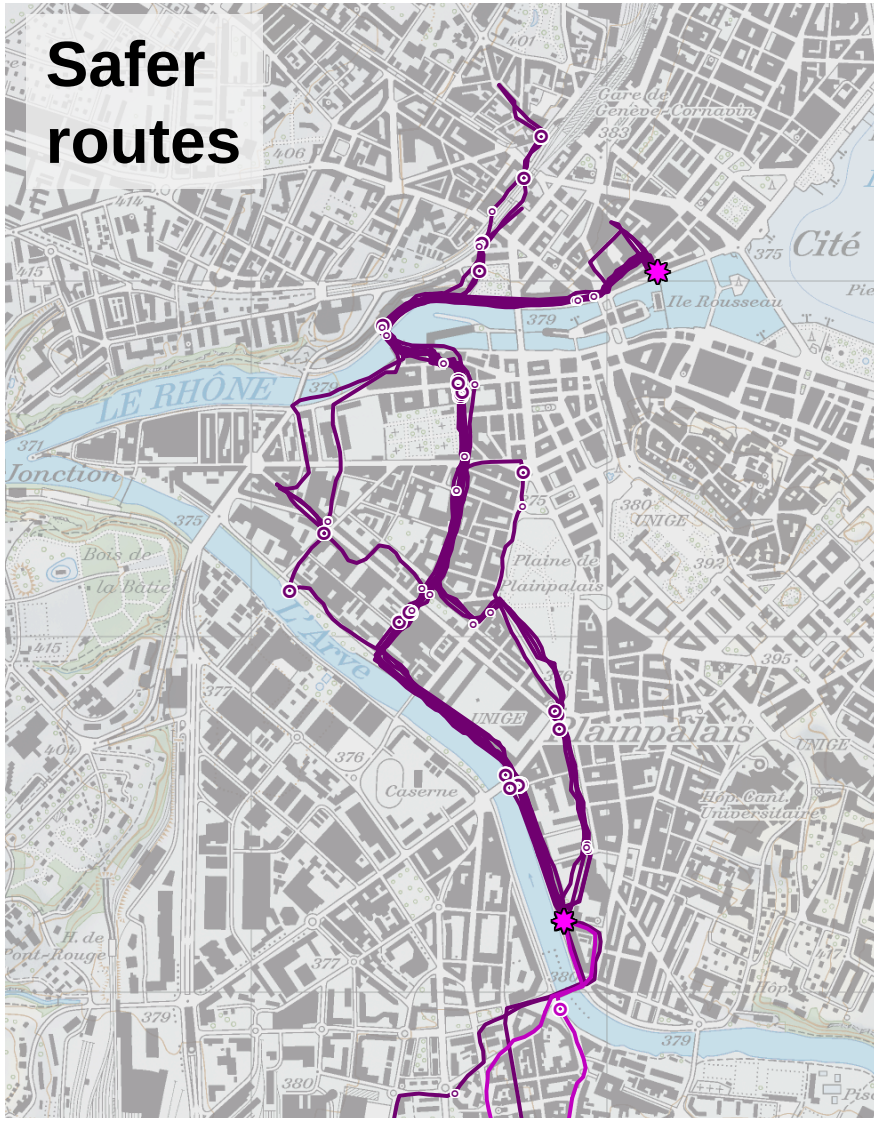
A good number of cyclists develop a route choice strategy combining those two basic preference rationalities (« rapidity » vs. « safety ») and they thus adopt intermediary attitudes in between the two ideal profiles :

- Often, those cyclists favour a « fast » route when they are in a hurry and, otherwise, they prefer an alternate « safer » route.
- Most « rapidity oriented » cyclists admit that they avoid certain roadway sections which are deemed “suicidal”.
- For a given cyclist, the influence level of each basic preference rationality can evolve over time, depending on personal experiences (the gain of confidence building up with daily practice can encourage to follow more direct routes) or following certain life events (for example, a road accident can convince some cyclist to give greater consideration to the safety issue)...

By comparison with those two basic preference rationalities, the « strive for pleasure » is not a significant route choice rationality for daily travel trips. It is rather a secondary choice factor, which sometimes (depending on the context) leads cyclists to favour route alternatives less exposed to the stress, noise and air pollution induced by motorised traffic.

Two examples of cycling route habits





The main determining factors of route choice (III)

In daily mobility, route choice habits play a predominant role :

- Like everyone does, cyclists adopt route choice habits for their daily trips, riding everyday on well known routes that more or less match with their preference criteria

- Indeed, route choice habits offer undeniable benefits :
  (1) Precise and context-adapted knowledge of travel time
  (2) No risk to get lost
  (3) Minimization of the travel planning effort
  (4) Routines strongly reduce the cognitive effort along the way
  (5) Knowledge of higher risk route sections which require increased attention

- Despite the freedom of movement offered by the bicycle, some cyclists content themselves with very rigid route choice habits. The others know a greater number of route variants and they draw from this catalogue of known route sections to set up their daily itineraries in a more or less « improvised » way

Intrinsically, the adoption of habits deters people to experiment a larger number of route variants and consequently, for a good number of cyclists, route optimization potentials remain unexplored

The main determining factors of route choice (IV)

Our study also highlighted that cycling maps and directional signage provided by public authorities only partially fulfil their hoped function.
Indeed :

- Often, cyclists primarily rely on their own spatial knowledge of the city for their route choices and they balk at using route planning helps (maps, route planning software, etc.)
- An indirect evidence of this observation is paradoxical : during the survey, several participants got lost in vaguely known city areas because they did not make the effort to find their way on a map beforehand their non routine trip
- Only the most « safety oriented » cyclists dedicate some time to plan their travel routes
- The others are not very concerned with this matter, partly because they consider that the freedom of movement offered by the bicycle easily allows to manage difficulties encountered on the way, even if it implies to take some liberty with respect to traffic rules (non-respect of traffic lights, riding on the sidewalk, etc.)

Other interesting observations (I)

(A) In case of need, the first impulse is to ask some acquaintance for advice

- When they build up new habits (after a move, a change of workplace, etc.), people tend to ask for advice in their social network (parents, friends, colleagues) in order to get cycling route tips and they sometimes adopt those propositions
- Maps are more often used as a help for visualizing route tips than as a primary source of inspiration for route choice
- People who have no experienced cyclist in their social network show more interest in available route planning and counselling services

(B) Roadworks can sometimes trigger alternative route search efforts

- Roadworks which encroach on cycling facilities pre-eminently disrupt route choice habits of « safety oriented » cyclists
- For those cyclists, setting up directional signage for an intended bypass is a useful measure and it can trigger changes in route choice habits
- Other cyclists seem much less prone to adapt their route choice habits (“On a bicycle, one is almost as nimble as a pedestrian and it is thus easy to find an acceptable path through a construction zone...”)

Other interesting observations (II)

(C) Newbie cyclists initially tend to maintain previous route choice habits

- Some former public transport users follow the routes of their usual bus or tram lines (one survey participant even declared to use the local public transport route planner to find directions for new travel destinations, considering that the bus stops along the way were reliable landmarks).
- Former car and motorbike drivers also tend to stick to their previous route choice habits and, when they feel confirmed in their preconceived ideas (« Cycling in a city is rather dangerous ! »), they do not look for alternate routes that are less exposed to motorized traffic.
- Quite often, because of insufficiently reasoned route choices, cyclists “escape” on sidewalks when they feel that riding on the roadway is too risky, thus creating avoidable conflicts with pedestrians.
- For newbie cyclists, making the effort to optimize route choices specifically for the bicycle is not perceived as an obvious necessity. As a consequence, this optimizing process can last several months or even years, or simply be interrupted because the cyclist felt discouraged to continue cycling !

Conclusions for cycling policies

A central finding of our study is that **people tend to neglect the importance of optimizing their cycling routes : in practice, some individuals are not aware that they could follow safer and more pleasant routes, while others prefer to rapidly stick to route choice habits instead of trying and comparing several itinerary variants.**

This finding highlights two important issues for cycling policies, in particular when it comes to promote cycling to newbie cyclists :

- It must be avoided that newbie cyclists put themselves in jeopardy by adopting unsuitable route choice habits or, incidentally, that they create avoidable conflict situations with pedestrians or public transport services.
- Given that route choice significantly influences the individual cycling experience with regard to the perception of dangers, noise and air pollution induced by motorized traffic, encouraging cyclists to optimize their travel routes will help to consolidate sustainable mobility behaviours.

It is thus essential to raise the public awareness about the importance of a sound route choice, by way of dedicated communication campaigns, individual coaching programmes as well as through the provision of reliable route choice aids (maps, directional signage and bicycle navigation systems).

Why is a bicycle navigation system that important ?

An electronic bicycle journey planning and navigation system certainly is a key element for a public awareness campaign, in particular in order to reach younger generation cyclists

- A carefully designed system can guide cyclists on routes with cycling facilities as well as on side streets less exposed to motorized traffic, which are well-liked both by « safety oriented » and « rapidity oriented » cyclists (as we have shown, experienced cyclists often prefer routes through side streets !)
- Ideally, the system should combine smartphone apps (real-time guidance along the way) as well as user-friendly web interface for prior route planning
- The system must fulfil very high quality requirements with regard to its user-friendliness and the reliability of the proposed routes (otherwise cyclists will not take much interest in using the system)
- As cyclists are not ready to pay the real costs of a such a high-quality service, adequate supports by public authorities are indispensable (financing, communication and geographic data provision).
- The importance of a bicycle navigation system is even increased when a bike-sharing scheme is available, in order to safely guide inexperienced users from station to station through unknown city areas.