

## Summary

# A new approach to route guidance for cyclists - a field study with eye trackers and GPS tracking

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*Change of route choice, greater degree of control and better overview. These are the results after the city council of Oslo introduced new principles for bicycle guidance along a route in the western part of the city centre. Through a field experiment with the use of interviews, eye tracking and a GoPro camera, we have investigated the effect of the new system on route choice and traffic safety (distractions). The new system did not create a decrease in the cyclists' attention towards other road users. Qualitative analyses of eye tracking and people's subjective responses, indicated that the measure was an improvement rather than a threat to road safety.*

## Background

Based on a previous TØI report focused on forming a knowledge base for route guidance and signage for cyclists (TØI report 1726/2019), Oslo city council implemented six different measures for cyclist route guidance implemented in the same area in Oslo (between the city centre and Frognerbadet). These six measures are:

- Road markings with a bike symbol and arrow
- Route identity
- Signage with trip times (rather than distance)
- Intersection route map signs, showing how the route continues through intersections.
- Signage leading to the routes
- Street pylons, i.e. detailed information signs showing the full route

This report documents the evaluation of this combination of measures. Additionally, results from other research projects are presented to supplement the evaluation of the area.

## Research method

We conducted a field experiment both before and after the implementation of the new route guidance measures. The participating cyclists in both the before and the after condition were instructed to bike from a set starting point to a given destination without using maps on their mobile phones. This trip was set in the city centre of Oslo, and should, according to online map services, be 2,6 km long and take 13 minutes by bike. In order to assess route choice and what information they attended to and used along the route, the participating cyclists were equipped with both eye tracking glasses and a GoPro-camera (showing GPS points and filming straight ahead).

Upon arriving at the destination point, the cyclists were interviewed about reflections or opinions that were not captured by their commenting underway.

## **Eye tracking**

The analysis shows that too much information is not necessarily for the better, as most cyclists are only able to perceive one piece of information at a time. Qualitative analyses of the eye tracking data in the after study, show that those cyclists who did not follow the signed route still observed (laid eyes on) as many signs and markings as the cyclists who did follow the signed route. There are elements of uncertainty in this analysis, as gazing at the information does not necessarily imply that the information is perceived or understood.

When actively cycling, the street markings were used the most, whereas the street pylons and the signs with detailed maps were not used much. At lower speeds (due to cyclists being uncertain or in an uphill slope), the cyclists were more likely to use the street pylons and map signs.

## **Experience of the new route guidance measures**

The participants experienced the new route guide system as an improvement. Those who participated after the implementation of the new signs and markings, reported feeling a higher degree of control and having a better overview than those who cycled before. Several participants in the after group said that they learned the new principle for route choice during the trip. This illustrates that road users can learn (at least some) new principles for route guidance fairly quickly.

During the interviews, some cyclists said that they choose routes by habit, and ignore the new information. When comparing those who turned the signed (vs. the opposite) direction in the first intersection, the only difference was that none of the cyclists who chose the non-signed route saw the street pylon, whereas most of those who chose the signed route did. However, this was not likely the explanation for their route choice as none of the cyclists appeared to make use of that particular street pylon.

Results from a different survey conducted by YouGov on behalf of Oslo municipality, also indicates that the new signage is experienced as positive. Additionally, some cyclists say that the new signage has made them test new routes, and inspired them to bike more.

## **Time or distance?**

There is limited research on whether cyclists and/or prospective cyclists would prefer the signage to show distances or travel times. With respect to consistency (with the road traffic system), distances might be preferable. However, there are some indications that some road users might like or prefer information about travel times. In the YouGov survey, the majority of the respondents were positive to the travel time information, and among the cyclists participating in the first round of the experiment, two thirds preferred travel times over distances. This question was not included for the second round of cyclists.

Analyses of an earlier survey containing a travel diary, showed that respondents report distances (km) to far lesser degree than durations (minutes). This might indicate that many

have a clearer understanding of the durations of their daily trips than the distances of the trips.

## **Effects on road safety**

We used machine learning to assess whether the new signage and markings made the cyclists less attentive to other road users. The analysis showed no difference in the share of other road users that the cyclists gazed at. Qualitative analyses of the eye tracking data and the interviews also indicated that the new signage measures was an improvement of, rather than a threat to road safety.