Factors associated with perceived cycling safety of intersections, road segments and home-to-school routes of adolescents in Flanders

Sien Benoit, Nico Van de Weghe and Delfien Van Dyck

Keywords: Perceived cycling safety, Adolescents, Intersections, Road segments, Routes

Cycling is with a share of 30 % the most commonly used transport mode for adolescents' home-to-school travel in Flanders, and bicycle usage has even been slightly increasing in the last years. Unfortunately, the number of cycling accidents has also been increasing. Research and policies mostly focus on these accident data, considered as a measure for objective cycling safety, although these data are often not representative for true cycling safety. Moreover, it seems paradoxical to delay the implementation of interventions until one or more accidents occur. Data on perceived cycling safety can complement objective data, but such data are often not available at the level of intersections and road segments, because local governments do not have the tools and finances.

That is why we collected data on perceived cycling safety and related subjective factors along home-to-school routes of adolescents using our online platform, called the Bike Barometer (https://fietsbarometer.ugent.be/home). This is part of a citizen science project for secondary schools in Flanders, in which adolescents digitalize their home-to-school route, and evaluate road segments and intersections along it in terms of cycling safety. They do this by giving a score from 0 (very unsafe) to 10 (very safe). In addition, they provide data about reasons for (un)safety of roads and intersections (e.g. their perception of traffic volume, traffic speed, lighting, hindrance of motorized traffic or hindrance of cyclists), their travel behavior (e.g. aspects determining their route, wearing safety gear), and personal characteristics (e.g. age, gender). The data collection took place between September 2020 and April 2021, and after exploring the data with descriptive statistics, we analyzed which subjective factors were associated with the perceived safety scores of intersections, road segments and complete home-to-school cycling routes using multilevel linear regression analyses.

Data of 1916 adolescents from 180 classes in 35 different schools remained for data analysis after data cleaning. Their average age was 15.9 years (SD = 1.7 years), and 50 % were girls. About 4000 intersections and 2400 km of road segments were rated regarding safety and additional aspects. Our first results showed that perceived safety at intersections was mainly associated with adolescents' perceptions of safety to cross the intersection, safety of the cycling infrastructure, traffic volume and how often they were cut off their path while cycling. Their perception of the road condition and lighting at intersections had significant, but weaker associations with their safety perception. For segments, perceived safety was most related with adolescents' perception of the distance at which cars drove next to them, safety of the cycling infrastructure, and traffic volume. When zooming out to the complete routes, a linear mixed model indicated that adolescents' overall safety feeling was significantly higher when they consciously chose their route because the cycling infrastructure was better, there was less traffic, or the route was the most beautiful one.

Besides these subjective aspects, we will investigate the effect of objective factors, such as infrastructure type and maximum speed limits, on perceived cycling safety along adolescents' home-to-school routes. These outcomes provide useful information for policymakers who want to look further than objective accident data, and who want to adjust intersections and road segments so that people feel safe when cycling along them.