



Report no. 2020-R-02-SEN

How do we move in the safest way?

Research into the way we move and road safety



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Pelssers, B. (2020) Comment se déplacer de la manière la plus sûre ? – Comparaison des modes de déplacement en fonction des risques encourus par les utilisateurs, Bruxelles, Belgique : Institut Vias – Centre de Connaissance Sécurité routière

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Summary

In this study, risks on the road were calculated for various forms of transport: walking, cycling, Powered Two-Wheelers (PTW), car driver and passenger, and bus user (e.g. MIVB, De Lijn, TEC). A distinction was also made between the various age categories: 6–14, 15–17, 18–24, 25–44, 45–64, 65–74 and 75+. The results provide the answers to questions such as: Is it safer to drive 10 kilometres by car than to ride 10 kilometres on a bike? Which is more dangerous: walking for 10 minutes or driving in a car for 10 minutes? Who is more likely to die in a bicycle accident: an elderly person (75+) or a child (6-14)? Which means of transport is the most dangerous? And which is the safest?

All risks of becoming a casualty in an accident were looked in relation to the risk of becoming a casualty for all car drivers and all in relation to the risk of dying in a road accident. So, we are talking about relatively deadly risks of becoming a casualty. The risks of becoming a casualty were calculated based on different exposure measurements, specifically per kilometre, per minute and per journey.

The risk of becoming a casualty per kilometre is the main exposure measurement. So, for example, we compared the danger of sustaining a fatal injury when cycling 5 kilometres with the danger of being fatally injured when driving 5 kilometres in a car. Awareness of these risks is particularly interesting if a person is considering making a change in their means of transport, because it provides an insight into the effect on road safety when part of a journey is made using a different means of transport.

The risk of becoming a casualty per minute is an interesting measurement of exposure because it provides an insight into how risky it is for different types of road users to be in traffic. In a certain sense, estimating the risk of becoming a casualty per kilometre results in the paradox that the fastest road users are exposed for less time to the risk of being injured, because they spend much less time on the road to cover the same distance than a slow road user. The risk of becoming a casualty per minute attempts to correct this phenomenon.

The risk of becoming a casualty per journey is particularly interesting if it is assumed that switching to active means of transport would not change the typical length of a journey on foot or by bike – for example with combinations of active means of transport by bus.

The risk figures were calculated based on a *modal split* (Figure I), which is expressed as the number of kilometres travelled, the number of minutes spent on the road or the number of journeys made, and the number of people killed on the road (*deaths in 30 days*) per method of transport. The data for the modal split comes from the MONITOR project, a recent survey looking at the travelling habits of Belgians (Derauw et al., 2019). The data for fatal road accident casualties comes from Statbel - Belgium Statistics and refers to the period from 1st January 2012 to 31st December 2018.

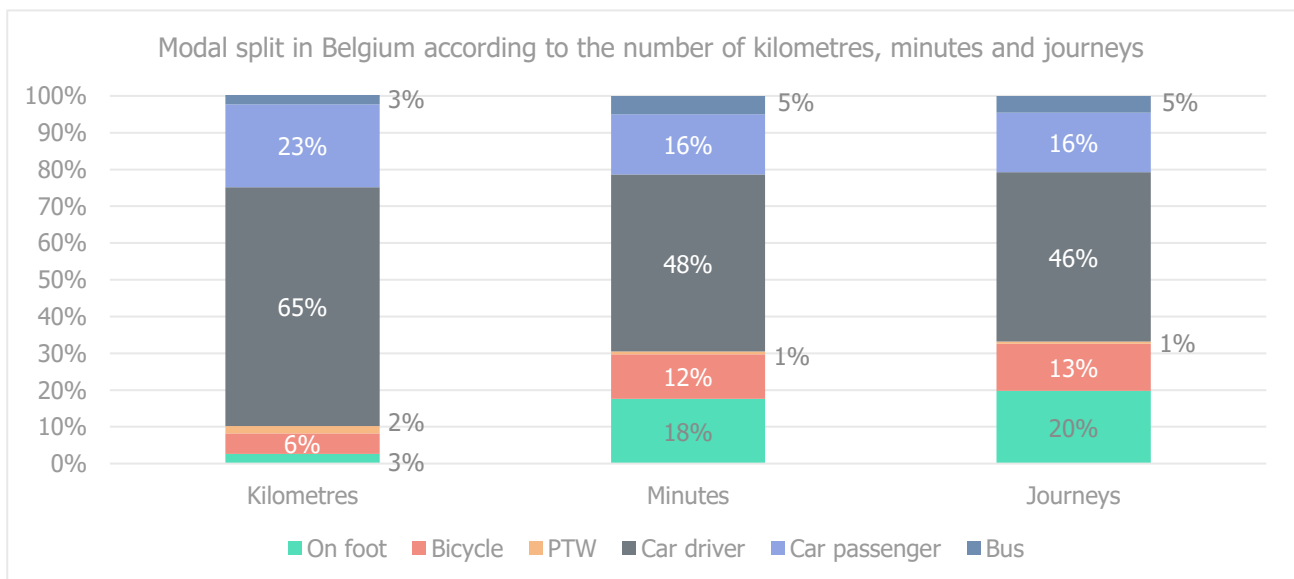


Figure I: Modal split by the number of kilometres travelled, the number of minutes spent travelling and the number of journeys made in Belgium (*Source: Derauw et al., 2019*)

A comparison of the different variants of the modal split shows that travelling on foot or by bicycle only represents 3% and 6% respectively of all kilometres travelled. By contrast, walking and cycling represent 20% and 13% respectively of all journeys made. This shows that most of the journeys made on foot or by bike are fairly limited in distance. Up to a distance of two kilometres, the majority of Belgians either cycle or walk. Once the distance is greater than two kilometres, the car becomes the most preferred means of transport (Derauw et al., 2019). As for PTWs, the number of journeys taken is absolutely minimal, as is the number of kilometres driven.

The fact that the modal split for journeys and minutes is almost identical is due to the fact that the duration of a journey, regardless of the means of transport used, is virtually the same on average.

Table I shows the risk matrix based on the number of kilometres travelled. As a reference group, the risk of becoming a casualty for all car drivers is equal to 1. The risk of becoming a fatal casualty for each group (means of transport, age category and gender) has therefore been related to the risk of becoming a fatal casualty for an average car driver. A number higher than 1 indicates that the risk of becoming a road accident casualty for the group in question is greater than the risk for the average car driver. A number smaller than 1 indicates a smaller risk of becoming a casualty.

Table I: Relative fatal casualty risk per means of transport and per age category based on the number of kilometres travelled (in millions) in Belgium

	On foot	By bicycle	On a PTW	Car driver	Car passenger	By bus
6-17	4.8	2.0	32.5	d.n.a.	0.3	0.0
18-24	5.3	1.0		2.3	1.7	0.0
25-44	4.2	1.1	40.3	0.9	0.7	0.0
45-64	6.5	2.8	14.0	0.7	0.5	0.1
65-74	12.4	8.8	127.6	0.9	0.7	0.2
75+	54.2	16.0		2.1	1.8	0.5
Total	8.4	3.5	27.0	1.0	0.7	0.1

* Total (column) = on foot + bicycle + PTW + car driver + car passenger + bus

The risk for PTWs is particularly high (27.0), which implies that exchanging the car for a moped or motorcycle without accompanying measures would lead to a rise in the number of road deaths. Pedestrians also have a clearly higher risk of becoming traffic casualties per kilometre travelled than car drivers. On average, a kilometre travelled by car is 8 times safer than a kilometre covered on foot.

With regard to cyclists, this study provides a fresh look at the matter compared with a previous report from Vias institute about risks (Martensen, 2014). That particular report discussed the risk of serious injury or death, whereas this one only looks at the risk of dying in a road accident. Whereas the risk of serious injuries for cyclists was found to be significantly higher, the current study shows that this is much less the case for a fatal risk alone (3.5). For young and old cyclists, we are still seeing an increased risk of death in comparison with car drivers, but the factor by which that risk is increased is lower than with pedestrians. The 18-24 age group covers its kilometres by bicycle more safely than a car driver.

When we look at the risk of becoming a casualty per minute and per journey, we can see that the risk for pedestrians and cyclists is much lower. For the older age groups, this risk is virtually exclusively above the risk of the average car driver. This means that when a pedestrian or cyclist walks or cycles for 5 minutes, this is no more dangerous than for someone travelling for 5 minutes by car. But someone who wants to travel the same distance as a car in 5 minutes does run a greater risk.

Bus passengers run the lowest risk (0.1) on the road. From a road safety point of view, switching from the car to travelling by bus is also a positive move. Cycling and walking, combined with taking the bus, can also be considered as safe in comparison with car journeys – given that the risk per journey is no higher for either cyclists or pedestrians than it is for car drivers.

The risks found also show that both young people and the elderly deserve special attention. In the elderly we can see a clear increase for the over-75s when taking most means of transport. It doesn't matter how an older person travels around, the risk will be higher than the average for that particular means of transport.



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