Road Safety Factsheet

June 2020

Do higher cycling rates mean more cyclist fatalities?

In 2018*, 99 pedal cyclists were killed, 4,106 seriously injured and 13,345 slightly injured in Great Britain.[1] Although car occupants account for the greatest number of casualties each year, this is unsurprising as cars account for 80% of traffic on Britain's roads. By looking at casualty rates in terms of the number of casualties per mile travelled, pedal cyclists fall into the 'vulnerable road users' category, along with pedestrians and motorcyclists, who have much higher casualty rates per mile travelled than other road users.[2]

It might be assumed that if the number of pedal cyclists on the road rise, the number of cyclist casualties will rise too. However, research has revealed a 'safety in numbers' argument that suggests that this may not be the case.

Safety in Numbers

The safety in numbers approach states that in a mixed traffic environment, the balance of different types of road users can affect the relative risk of injury to individuals,[3] suggesting that if more people cycle; the roads will become less risky for cyclists.

The concept of safety in numbers is not new. It was first demonstrated by Smeed in 1949 with regard to motor vehicles. Smeed argued that data from 62 countries indicated that the number of road fatalities per vehicle was lower in countries with more driving.[4]

This concept is now also being applied to cycling. Research by Jacobsen (2003) suggests that when more cyclists are on the road, there are fewer collisions, with data indicating that this is the case in The Netherlands, California and Denmark.[5]

The safety in numbers argument is based on the belief that if there are more cyclists on the road, drivers will modify their behaviour by taking more notice of cyclists and anticipating their actions. However, it has been noted that this does suggest that drivers are to blame. Other reasons for the reduced risk of injury to cyclists when more people are cycling could include drivers being more likely to be a cyclist themselves, having a greater awareness and understanding of how their driving could affect other road users and cyclists in particular and that higher rates of cycling lead to a strong political emphasis on making the roads safer to cycle on.[3]

The level of motor vehicle traffic is an underpinning cause of injury on the roads, with studies finding that traffic volume is predictive of the number of cyclist injuries.[6,7] Therefore, reducing traffic volume has the potential to improve cycle safety and road safety in general.

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A study of traffic volumes and cyclist injuries on the Island of Montreal[8] between the start of 1999 and the end of 2003 found a relationship between traffic volume and the number of all injuries and specifically that an increase of 1,000 vehicles a day was associated with a 5% increase in cyclist injuries.

Another study[9] found that slightly more walking and cycling accompanied by the same decrease in car use was broadly safety neutral, but that a large shift from driving to walking or cycling could reduce accidents. An example of this model is presented below.

Table 1: the relative number of accidents predicted at different levels of traffic volume

Annual average daily traffic			**Relative number of accidents**
Motor vehicles	**Pedestrians**	**Cyclists**	
2000	200	100	1
5000	200	100	2.4
10,000	200	100	4.72
20,000	200	100	9.33
30,000	200	100	13.95

Table 2: the relative change in the number of accidents following a reduction in motor vehicles by 25% with a corresponding increase in walking/cycling

Annual average daily traffic			**Relative change in the number of accidents**
Motor vehicles	**Pedestrians**	**Cyclists**	
1500	530	270	0.842
3750	1030	520	0.882
7500	1860	940	0.918
15,000	3530	1770	0.957
22,500	5200	2600	0.981

Table 3: the relative change in the number of accidents following a reduction in motor vehicles by 50% with a corresponding increase in walking/cycling

Annual average daily traffic			**Relative change in the number of accidents**
Motor vehicles	**Pedestrians**	**Cyclists**	
1000	870	430	0.621
2500	1870	930	0.662
5000	3530	1770	0.697
10,000	6870	3430	0.734
15,000	10200	5100	0.757

Stipdonk and Reurings[9] suggested that replacing 10% of car trips shorter than 7.5km by bicycle would be safety neutral.

Cycling Levels

Broadly speaking, some European countries have much higher levels of cycling than the UK despite the government's commitment to increase cycling levels,[10] but lower cyclist fatality rates, suggesting that cycling in these countries is much safer than in the UK. Countries such as The Netherlands, Sweden and Denmark have positive cycling cultures, supported by policies that promote cycling and give cyclist safety a very high priority.

Data suggests that in Copenhagen, between 1995 and 2006, an increase in cycling by 44% was associated with a 60% drop in the number of cyclists killed or seriously injured on the roads. This was also the case in The Netherlands, as between 1980 and 2005, although cycling increased by 45%, cycling fatalities decreased by 58%.[3]

However, while plausible, these are not the only potential explanations. Higher cycling cities and countries might have better cycling infrastructure and policies, which may keep cyclists safer than in places with less cycling where there may be less pressure to improve infrastructure.[11]

Research has also indicated that if cycling doubled, there would be a decrease of a third in the risk of cycling, as countries in the EU with high cycling rates have lower levels of risk faced by the cyclist. For example, in Denmark, where people typically cycle over 900km per year, the risk posed to cyclists is far lower than in Portugal where barely 30km is cycled by each person annually.[12]

A recent study by Ursachi and Owen (2016)[3] has demonstrated that the safety in numbers approach can be seen in Britain, too. Datasets including the last 5 years average cycling casualties based on residence, the proportion of residents who cycle for any length for utility purposes and the population number for each local authority

district were used to calculate a 'utility cycling percentage' to assess cycling risk based on exposure. The data was then used to explore the relationships between cycling exposure, risk levels and cycling levels.

The findings of the study were very encouraging, and were in line with previous evidence. In all cases, the relationship between cycling levels and cycling risk was negative, suggesting that these factors influence each other in the opposite direction. This means that more cycling leads to lower levels of cycling risk. The research also indicated that in towns and cities that currently face high cycling risk and have low numbers of people cycling, the potential for risk reductions is greatest, and for areas with existing high cycling levels, the effect would still be moderate, meaning a further increase in cycling will have an additional benefit to risk rates. If these findings are correlated with the other economic and health benefits cycling creates, it can be concluded that cycling is beneficial to all cities at all levels.[3]

How Can We Improve Safety?

Fear of road traffic is a major deterrent to cycling, despite the health, environmental and other benefits of cycling, with 64% of people in Britain believing that it is 'too dangerous' for them to cycle on the roads.[13] A YouGov survey commissioned by RoSPA indicated that 36% of people would like to cycle more than they currently do. Their main concerns focussed around safety, with 39% of UK adults saying that they would cycle more often if the roads were made safer for cyclists.[14]

Improving the safety of cycling will reduce the number of cyclist casualties and encourage and enable people to cycle more often, despite the safety in numbers hypothesis. An increase in cycling provision will help people who would like to cycle, but have been deterred from doing so because they do not think that it is safe enough.

An American study of why and how cyclists choose their routes analysed 1500 cycling trips and found that the two most important factors influencing cyclists' road choice were avoiding streets with high levels of traffic and minimising total distance travelled. Being able to ride in a cycle lane was rated third.[15] Safer infrastructures for cyclists include:

- **Routes where cyclists are completely separated from motor traffic**
- **Shared routes**

  These are set away from the road and are designed for the use of cyclists and pedestrians. They can have a white line that segregates cyclists and pedestrians or they may be left open for the two to mix. However, whilst these routes can reduce conflict between motor vehicles and cyclists, they increase the number of interactions between cyclists and pedestrians, which can sometimes, but not always, cause problems.

- **Shared space**

In shared space areas, the distinction between space allocated to motor vehicles and the space allocated to pedestrians is removed, so that the motor vehicle becomes less dominant. In a shared space, cyclists do not experience the same restrictions as in other pedestrian areas.

- **Cycle lanes**

  Cycle lanes consist of a division of a road marked off with painted lines, designed for use by cyclists. A review suggested that on-road marked bike lanes consistently reduced injuries compared to unmodified roads.[16]

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***Due to changes in severity reporting across some police forces since 2016, newer statistics are not comparable to earlier years. Therefore, the DfT provides both adjusted and unadjusted casualty figures in their statistical data tables. RoSPA uses adjusted figures as the DfT states that they are recommended for "the analysis of trends over time".**