



## SAFETY IN NUMBERS

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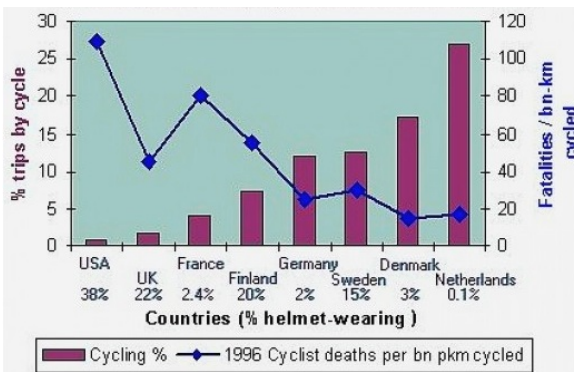
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- Countries with the lowest levels of cycle use have the poorest cyclist safety records.
- The Netherlands has witnessed a 45% increase in cycling and a 58% decrease in fatalities between 1980 - 2005
- London saw a 91% increase in cycling since 1990 and a 33% fall in cycling casualties between 1994 and 1998

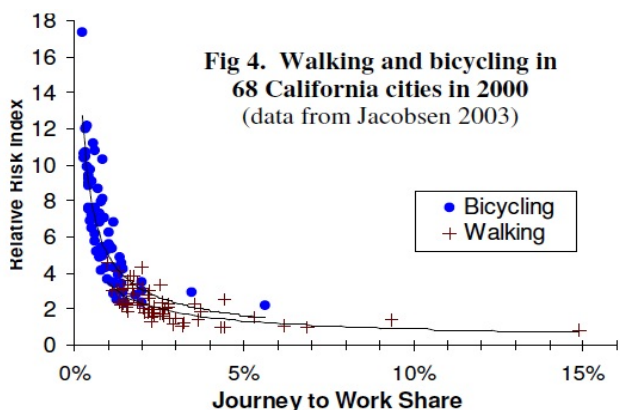
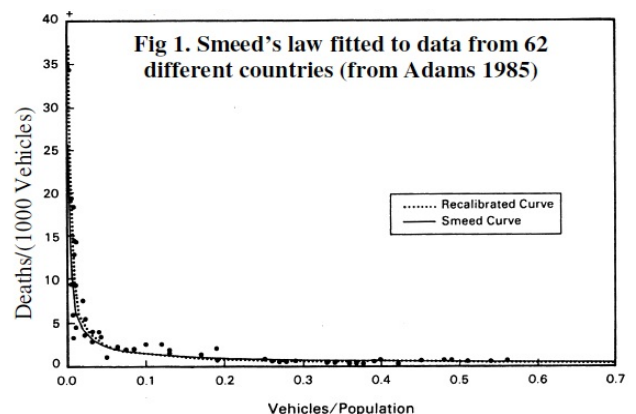
#### Safety in numbers

Cycle mode share v fatality rate and helmet-wearing rate



### SMEED'S LAW

The concept of 'Safety in Numbers' is not new. It was first demonstrated in 1949 by Smeed<sup>1</sup> with regard to motor vehicle use when data from 62 countries showed that road fatalities per vehicle were lower in countries with more driving. The relationship - an exponential curve - has become known as Smeed's Law and has stood the test of time well, being verified in examinations of data across 42 years in the UK<sup>2</sup> and 110 years in Australia<sup>3</sup>. As can be seen in the below graph of Walking and Cycling in California, it can be just as easily adapted to cycling figures which show a perfect 'Smeed curve'



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### GLOBAL STUDY

Jacobsen<sup>4</sup> examined population level data from 68 cities in California USA, 47 towns in Denmark and 14 European countries, to compare the amount of cycling and walking and the injuries occurring in collisions with motor vehicles.

- It was found across all the data sets that motorists are less likely to hit bicyclists and pedestrians when there are more people bicycling or walking.
- So if cycling gets safer the more cyclists there are on the road it is unlikely that the reason for this is that cyclists are becoming more cautious when their numbers are larger.
- It appears that motorists adjust their behaviour in the presence of people cycling. There is then an urgent need for further exploration of the human factors controlling motorist behaviour.
- Therefore, not only are policies that increase the numbers of people walking and cycling a good way to improve safety, but laws should be revised to reflect the premise that the number of collisions with vulnerable road users is determined largely by motorist behaviour.

### AUSTRALIAN STUDY

Robinson<sup>5</sup> used three data sets from Australia,

- 1985-86 - The mean per capita distance cycled in Western Australia was double that in New South Wales and the risk of fatality 35% less
- 1982 - 1989 - In Western Australia cycling almost doubled. During the same period, the number of cyclists admitted to hospital fell by 48% and reported fatal and serious injuries went down by 33%.

However

- 1990's - the amount of cycling in Australia was greatly reduced following the passage of helmet laws. Pedestrian deaths and serious head injuries (DSHI) in Victoria fell by 74% due to road safety campaigns that ought also to have benefited cyclists. But the cycle helmet law introduced during the same period caused cycle use to fall by about 30% while DSHI for cyclists fell by only 57%, much less than for pedestrians. Thus despite, or because of, the helmet law, the risk of injury per cyclist relative to pedestrians increased as cycling numbers fell.





### CYCLING IN SWEDEN AND WALKING IN CANADA

In Malmö, Sweden, Ekman<sup>6</sup> compared cyclist volumes against serious cycling crashes at 95 intersections.

- The larger number of cyclists the lower the number of accidents

Leden study examined changes in numbers of bicyclists and collisions between motorists and bicyclists in response to changes in physical configuration at intersections between bicycle paths and roadways in Gothenburg, Sweden<sup>7</sup>.

- The total number of collisions increased with the 0.4 power of the increasing use of the intersections by bicyclists. In other words the amount of accidents increased at a lower rate than the increase in the number of cyclists, therefore each individual cyclist was safer.
- Leden also examined police reported injuries to people walking at some 300 signalized intersections in Hamilton, Ontario, Canada<sup>8</sup>. The number of collisions increased with the 0.32 to 0.67 power with increasing numbers of pedestrians. That is, where there were greater numbers of pedestrians, fewer pedestrians were involved in crashes.

### FOOTNOTES

- <sup>1</sup> Smeed RJ. Some statistical aspects of road safety research. J R Stat Soc A 1949
- <sup>2</sup> Adams J. Smeed's law, seatbelts and the Emperor's new clothes. In: Evans L, Schwing RC, editors. Human Behavior and Traffic Safety. New York (NY): Plenum; 1985
- <sup>3</sup> Knott JW. Road traffic accidents in New South Wales, 1881-1991. Aust Econ Hist Rev 1994
- <sup>4</sup> Jacobsen PL. [Safety in numbers: more walkers and bicyclists, safer walking and bicycling](#). Injury Prevention, 2003;9:205-209
- <sup>5</sup> Robinson DL. [Safety in numbers in Australia: more walkers and bicyclists, safer walking and bicycling](#). Health Promotion Journal of Australia, 2005;16:47-51
- <sup>6</sup> Ekman L. On the treatment of flow in traffic safety analysis—a non-parametric approach applied on vulnerable road users. Bulletin 136. Lund, Sweden: Institutionen för Trafikteknik, Lunds Tekniska Högskola, 1996
- <sup>7</sup> Leden L, Garder P, Pulkkinen U. [An expert judgment model applied to estimating the safety effect of a bicycle facility](#). Accident Analysis & Prevention, 2000 Jul
- <sup>8</sup> Leden L. [Pedestrian risk decrease with pedestrian flow. A case study based on data from signalised intersections in Hamilton, Ontario](#). Accident Analysis & Prevention, 2002;

### PHOTO (COVER)

<http://www.flickr.com/photos/18844496@N00/2615536578/>

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