‘Safety in numbers’ What comes first – safety or numbers?

Jan Garrard
School of Health and Social Development
Deakin University

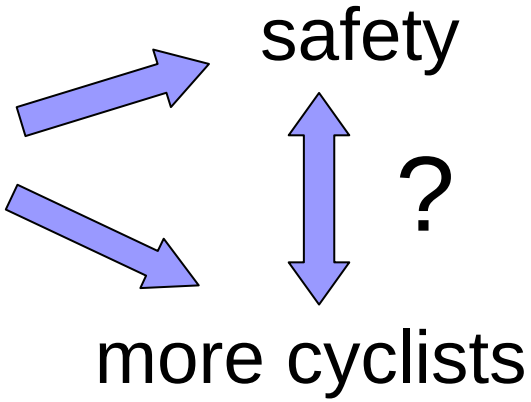
The ‘safety in numbers’ theory

- As the number of cyclists increases, injury rates decrease
- The decline in injury rates in *caused* by the increase in cyclists
- Proposed mechanisms:
  - Drivers’ increased awareness of cyclists (eg reduced ‘look but don’t see’)
  - Drivers more likely to be or know people who cycle (the ‘sympathy vote’)
- Policy implications:
  - increasing the number of people cycling is an effective strategy for improving the safety of people who cycle

Possible relationships between safety and numbers

- More cyclists → safety
- Safety → more cyclists

- Cycling-friendly environment



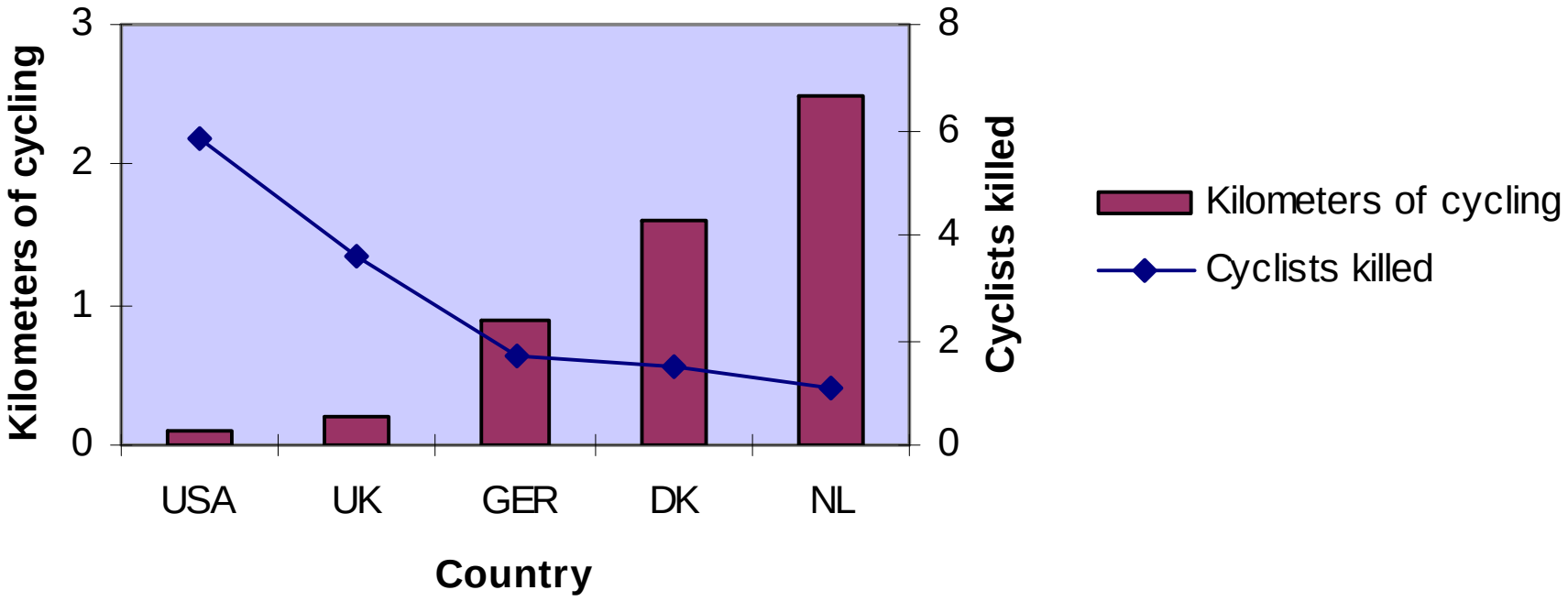
Assessing the safety/numbers relationship

- Conduct a ‘safety in numbers’ experiment (how?)
- In the absence of experimental evidence:
  - Is the association strong, consistent and graded (ie ‘dose-response’)?
  - Is there a plausible mechanism?
  - Is the temporal relationship correct? (ie do cycling numbers precede improved safety?)

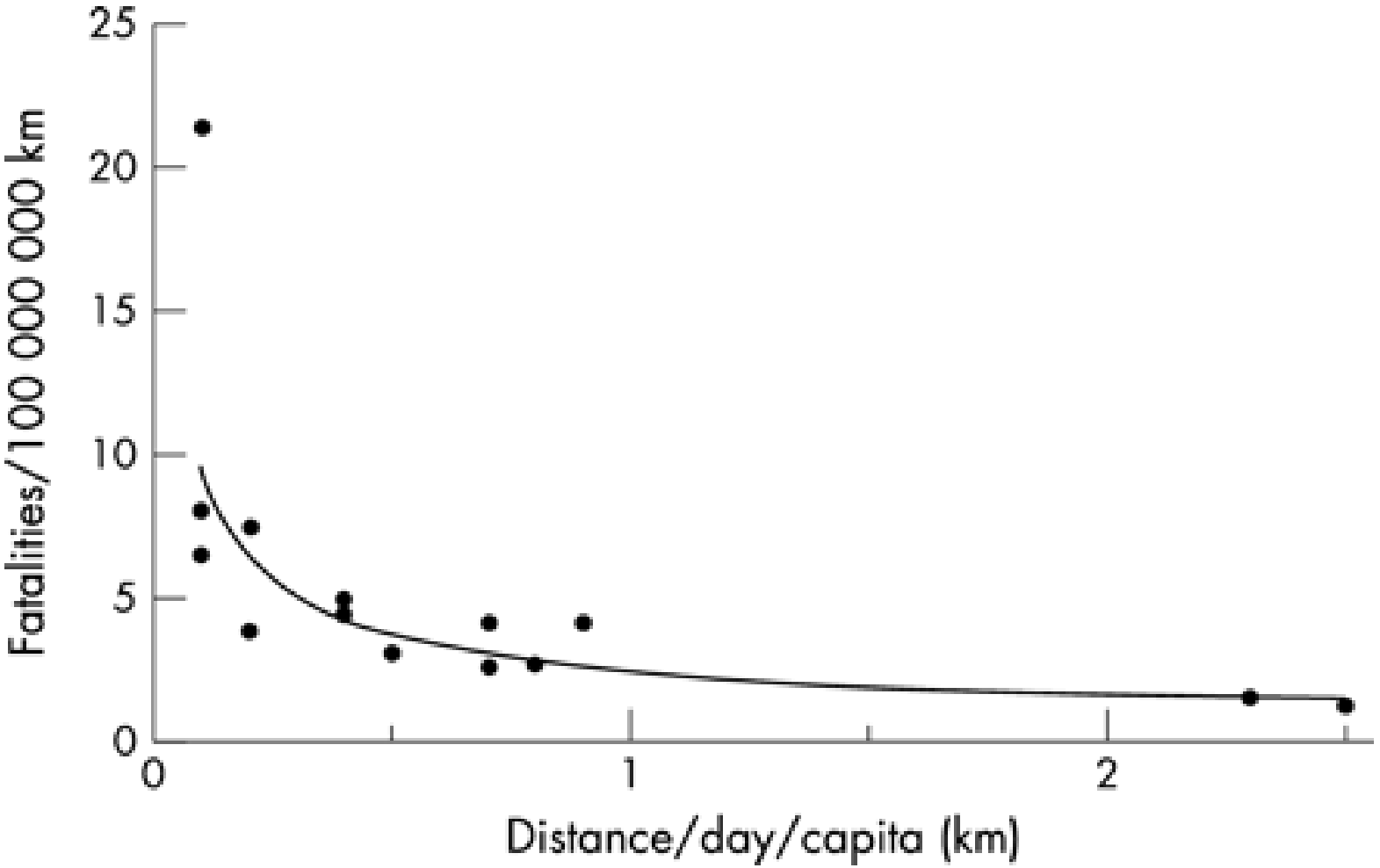
Is the safety/numbers association strong, consistent and graded?

- Largely based on four published studies:
  - Jacobsen (2003)
  - Pucher and Dijkstra (2003)
  - Robinson (2005)
  - Pucher and Buehler (2008)
- Comparative geographical analyses across cities, states and/or countries
- Time series analyses within countries

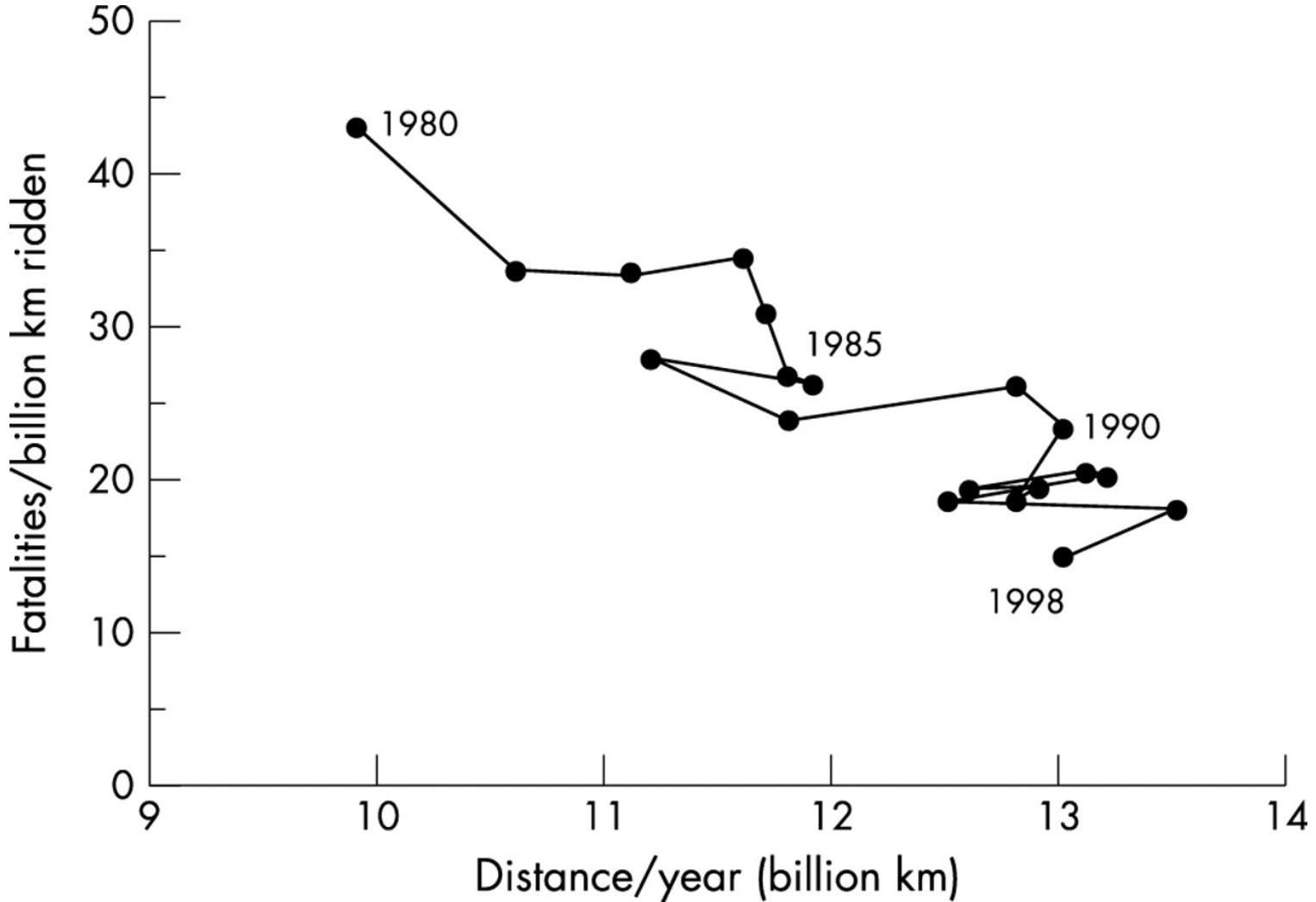
Kilometres cycled per inhabitant per day, cyclists killed per 100 million km cycled (USA, UK, GER, DK, NL) (2004–2005) (Pucher and Buehler 2008)



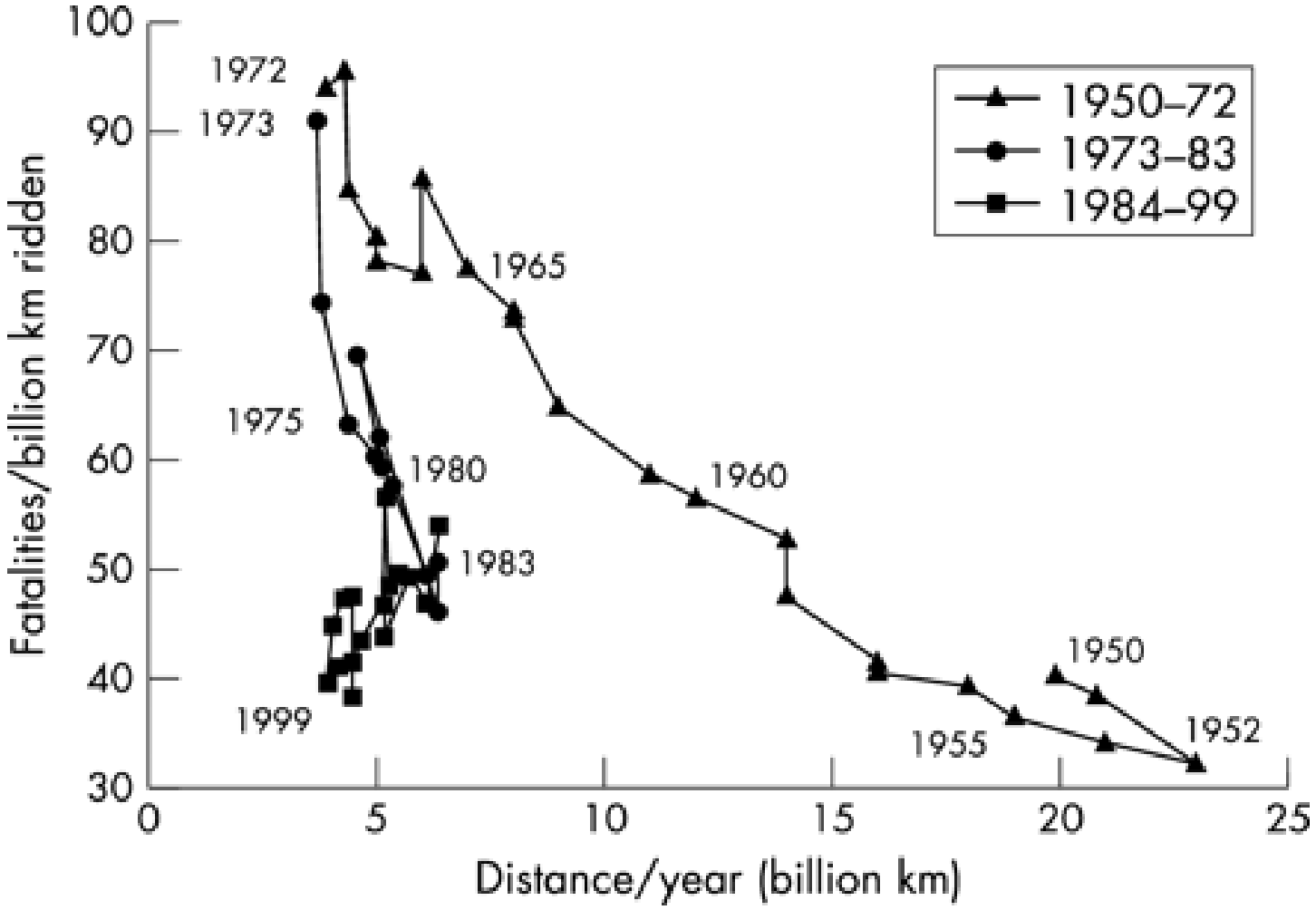
Cycling fatality rates,14 European countries,1998 (Jacobsen 2003)



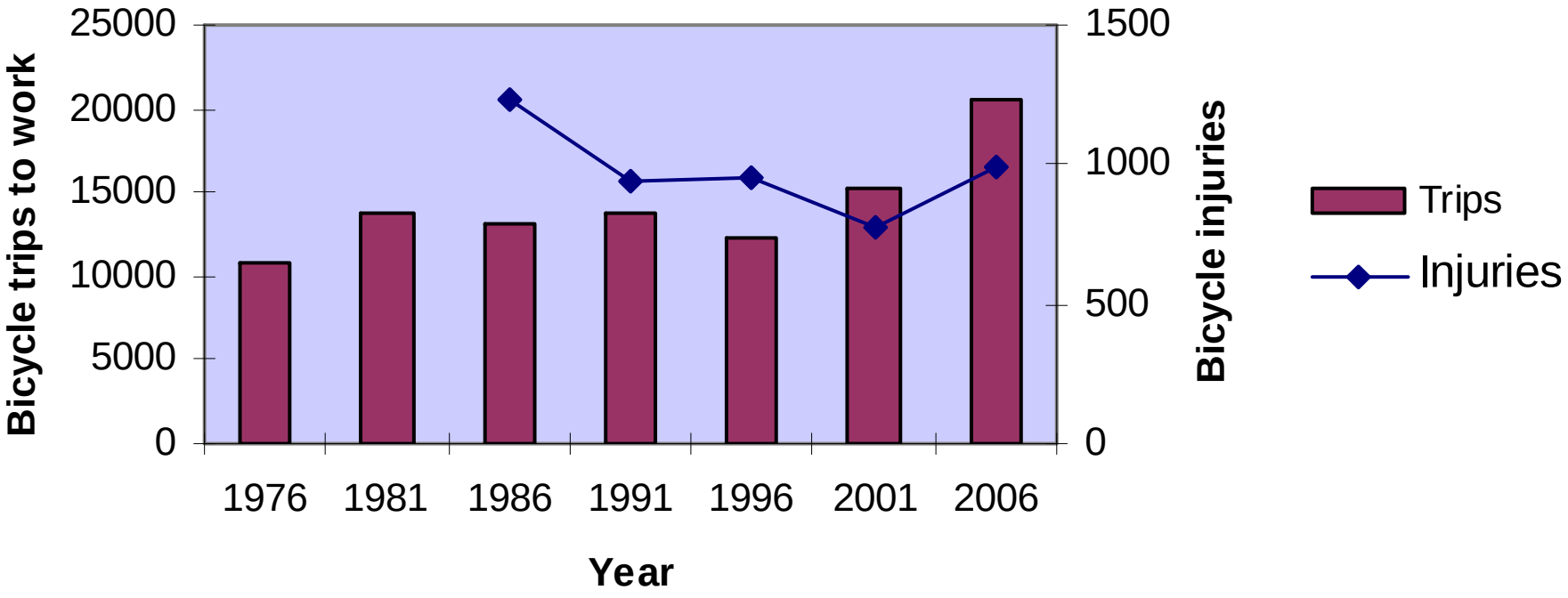
Cycling fatality rates in the Netherlands, 1980–98 (Jacobsen 2003)



Cycling fatality rates, United Kingdom, 1950–99 (Jacobsen 2003)

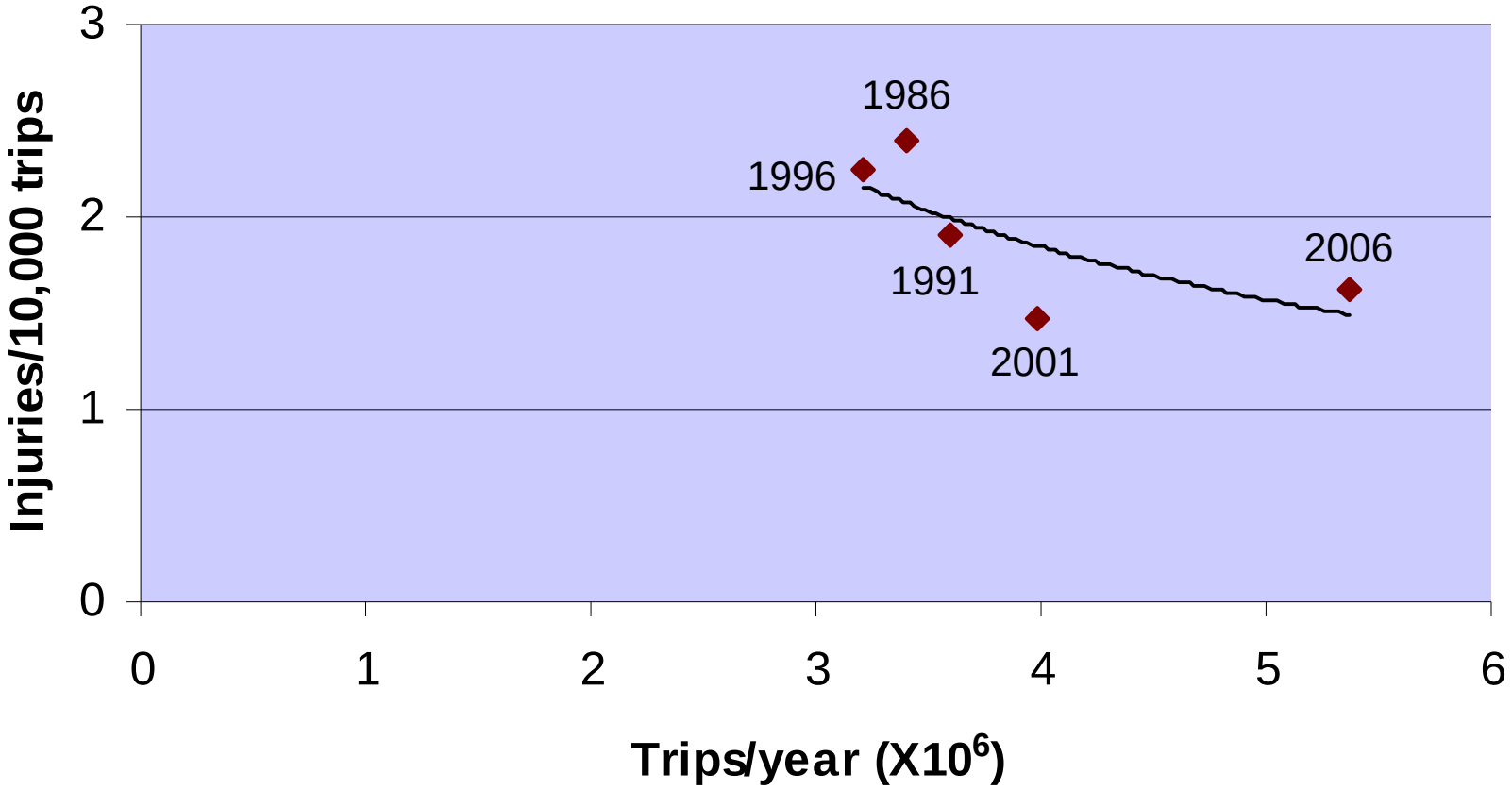


Bicycle trips to work and bicycle injuries, Melbourne (MSD)
(ABS Census, VicRoads Crash Stats)



Cyclist injuries, 15+ year-olds, metropolitan Melbourne, 1986-2006

(ABS Census, VicRoads)



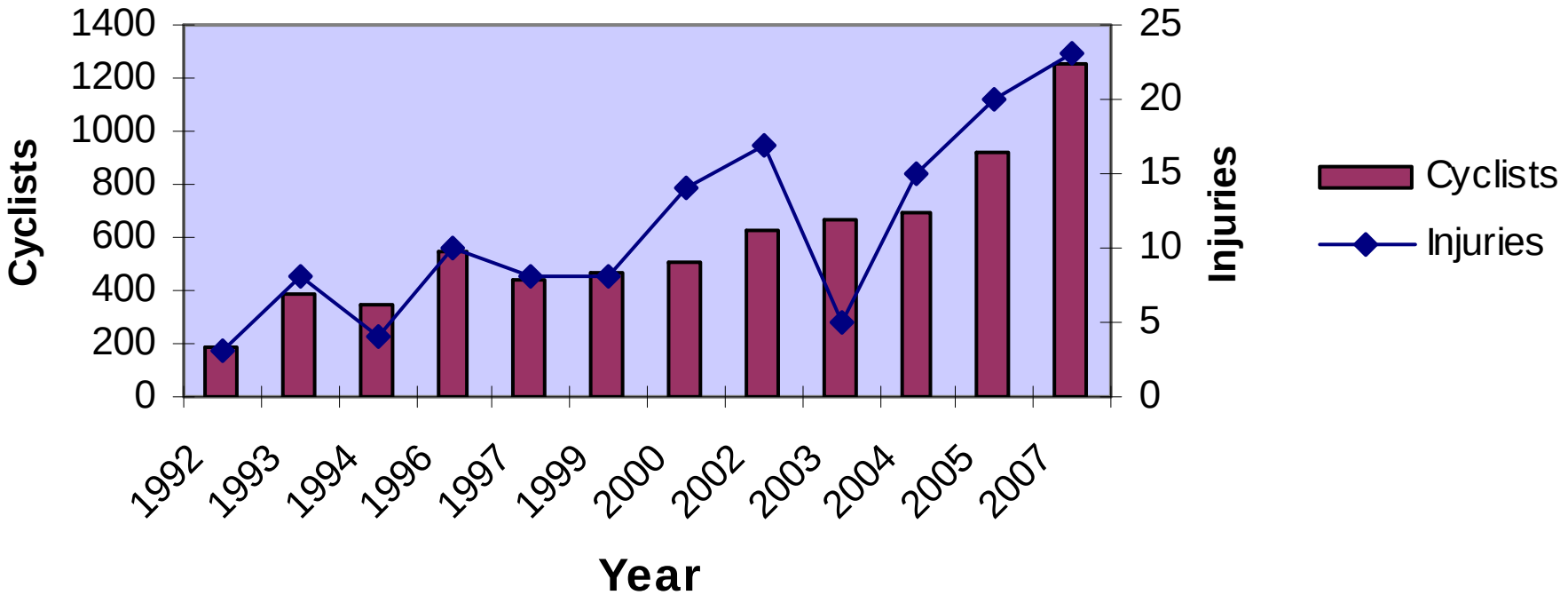
Is the association confounded by improvements in traffic safety and bicycle infrastructure?

- 1986-2006 - introduction of major road safety initiatives led to reductions in casualty crashes for most classes of road users
- Impact on cyclist injuries?
  - St Kilda Rd, Melbourne (3.8km) – cyclist counts and injuries, 1992-2007
  - No changes in cycling infrastructure (on-road bike lane), speed limit (60km/hr), and little change in traffic volume and speed


2P

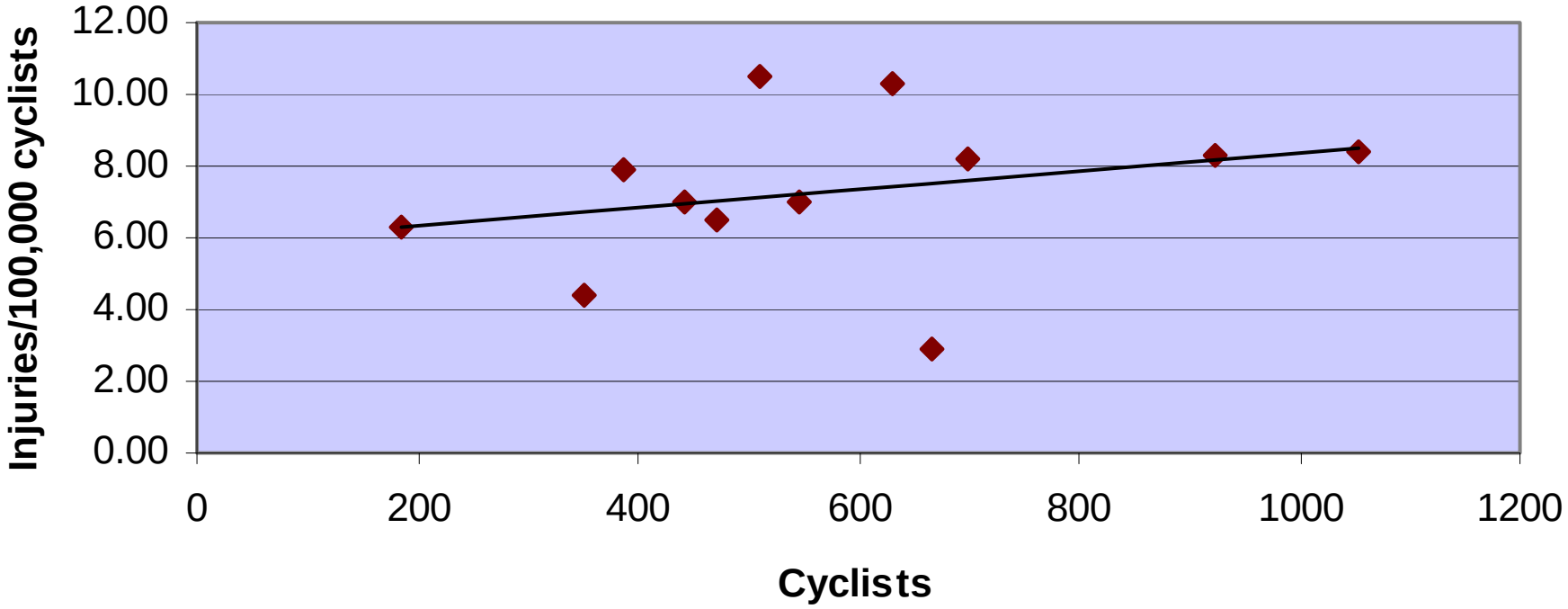
St Kilda Road, Melbourne, cyclists, 7.00-9.00am, 1992-2007

(Bicycle Victoria, VicRoads)



St Kilda Road, Melbourne, injury rate by cyclists, 7.00-9.00am, 1992-2007

(Bicycle Victoria, VicRoads)

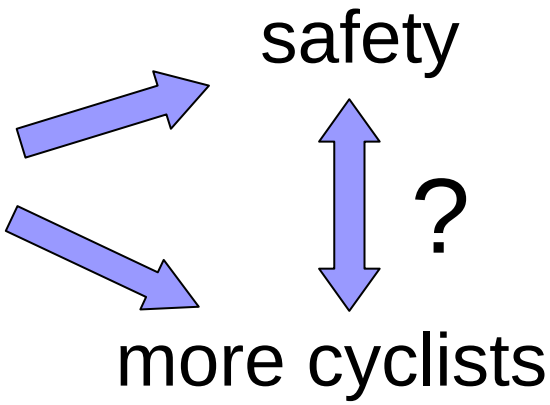


Summary of findings

- Safety in numbers association occurs in some, but not all, situations
- Strongest and most consistent in European countries with high rates of cycling
- No studies have controlled for cycling infrastructure or driver/cyclist safety measures
- In one Melbourne location (St Kilda Rd) where cycling numbers increased while cycling infrastructure and speed limit were constant, injury rates did not decrease as predicted
- No evidence that increased cycling *precedes* injury rate reductions

Evidence for an alternative interpretation

- Cycling-friendly environment



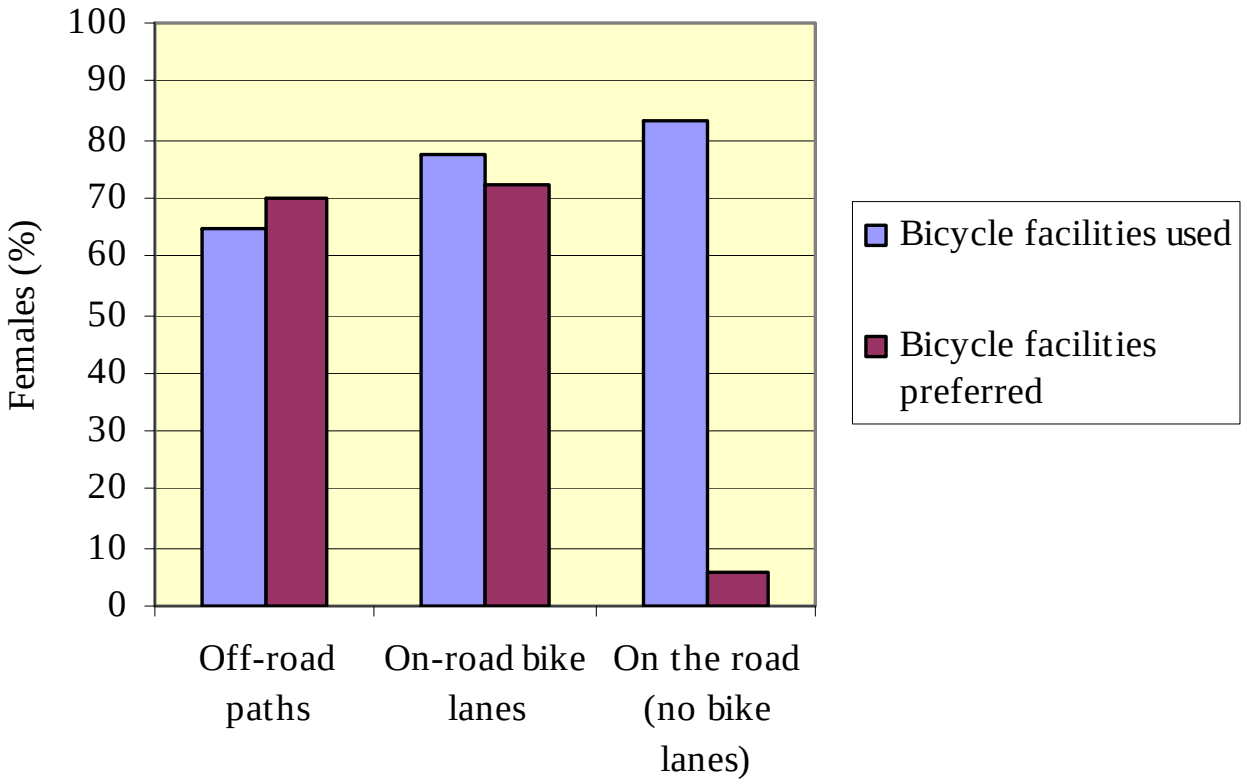
Do cycling infrastructure (visible and invisible) and education improve safety?

- Bicycle paths and lanes reduce casualty crashes with motor vehicles (Pucher 2001)
- Lower speed limits reduce crashes and severity of injury (Archer et al 2007)
- Following introduction of 40km/hr school speed zone in 2003 in Victoria, cycling and pedestrian injuries for children and adolescents (5-18 years) decreased from 71 per year pre-2003 to 50 per year post-2003 (VicRoads 2008)
- Small case-control evaluation of a cycling education program (CARES facility, Sydney Park) found reduced ‘bicycle accidents’ among primary schools students who attended the facility

Does cycling infrastructure (visible and invisible) increase cycling?

- Perceived and actual traffic hazards a key constraint on cycling in low-cycling countries such as Australia (Garrard et al 2006)

Preferred cycling infrastructure, female Victorian cyclists (N = 780) (Garrard et al 2006)



Does cycling infrastructure (visible and invisible) increase cycling? (Cont…)

- “If you build them [bicycle lanes and paths] commuters will use them” (Dill and Carr 2003)
- % female commuter cyclists higher on bicycle paths than roads (Garrard et al 2008)
- Improved infrastructure increases cycling (controlled evaluation) (Wilmink and Hartman 1987)


Source: The Age (2008)

Lessons from countries that have invested in cycling and cycling safety

- Concurrent investments in safety, infrastructure (visible and invisible), cycling promotion and reduced motor vehicle use have lead to:
  - Increased cycling numbers, and
  - Increased cyclist safety

Making cycling irresistible: lessons from the Netherlands, Denmark and Germany (Pucher and Buehler 2008)

- Extensive systems of separate cycling facilities
- Intersection modifications and priority bicycle traffic signals
- Traffic calming of neighbourhoods
- Safe and convenient bike parking
- Coordination and integration of cycling with public transport
- Traffic education and training for cyclists and motorists
- Traffic laws that favour cyclists and pedestrians
- Promotional events
- Taxation, parking and land-use policies that encourage cycling and discourage car use

Conclusions

- Possible independent, causal relationship between cycling numbers and cycling safety, but current evidence is equivocal
- Confounding from bicycle infrastructure and other safety measures is likely
- Hard to go past the lessons of 30 years of successful safe cycling promotion in Europe and Japan
- Substantial, sustained increases in safe cycling require substantial, sustained investment in:
  - infrastructure, road safety policies and enforcement, education (drivers and cyclists) and cycling promotion
- There are no quick fixes!