The turning point in the number of traffic fatalities: two hypotheses about changes in underlying trends

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Two hypotheses about the turning point

- Hypothesis 1 (due to Oppe):
  - There never was any real turning point
  - Long-term trends were the same before-and-after

- Hypothesis 2:
  - The underlying trends changed from before to after the turning point
  - In particular, fatality rate declined at a faster rate

- Which are the trends we are talking about?
  - Annual traffic growth
  - Annual decline in fatality rate (fatalities per billion vehicle kilometre)
How can we determine the stability of trends?

- Fit functions to determine trends before turning point
- Predict number of fatalities after turning point based on trends before turning point
- If predictions are accurate, trends before the turning point continued after the turning point
- Conclusion: trends were stable
- If predictions are not accurate, trends before the turning point did not continue after it
- Conclusion: trends were not stable
- Further conclusion: turning point could not have been predicted based on trends before it occurred
Percent annual growth in traffic volume in Norway and two models describing long-term development

Fatality rate in Norway 1952-2013 and two models describing long-term development
Study of six countries

- Denmark (1950-2012)
- Great Britain (1949-2011)
- Netherlands (1948-2010)
- Norway (1952-2013)
- Sweden (1950-2012)
- United States (1948-2012)

These countries were selected because:
- They have all experienced a turning point around 1970
- They have data on vehicle kilometres going back to about 1950
Annual number of traffic fatalities in Great Britain 1949-2011 and two models describing long-term development

Model fitted to data for 1949-1966 (solid line)
Model extrapolated to 1967-2011 (solid line)
Model fitted to data for 1949-2011 (dashed line)

Number of traffic fatalities in the Netherlands 1948-2010 and two models describing long-term development

Model fitted to data for 1948-1972 (solid line)
Model extrapolated to 1973-2010 (solid line)
Model fitted to data for 1948-2010 (dashed line)
Concluding comments

- The turning point in the number of traffic fatalities is common to most highly motorised countries.
- In theory, a turning point could occur even if the long-term trends determining the number of fatalities remain unchanged.
- For the countries included in this study, there is stronger evidence for a change in trends than for stable trends.
- The most important contributing factor is a slowdown of traffic growth.
- The decline in fatality rates has increased in some countries, but not all.