

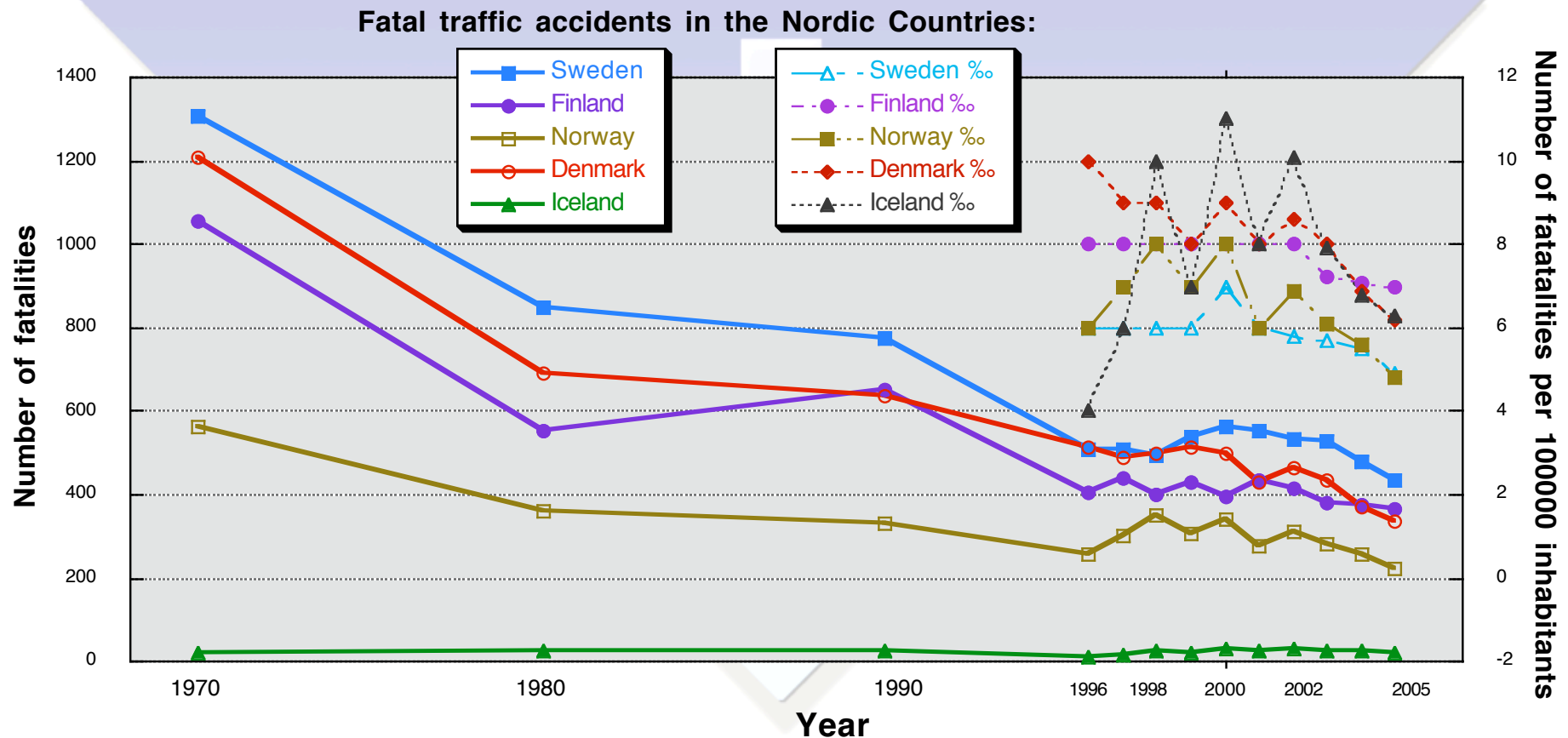


**Children's traffic safety
in Iceland:
Accidents and
education**

Valdimar Briem

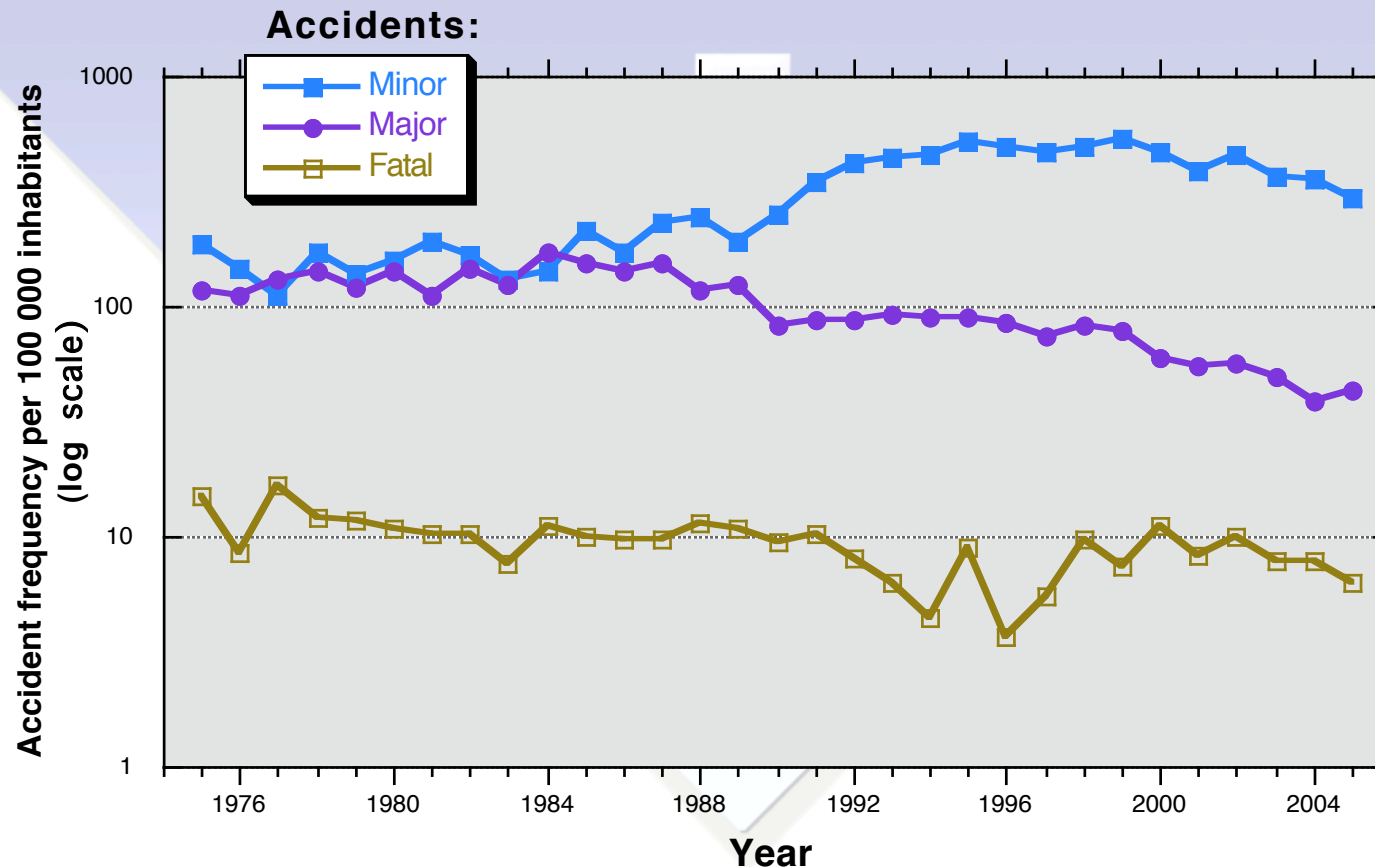


Fatal traffic accidents (all ages): A Nordic comparison



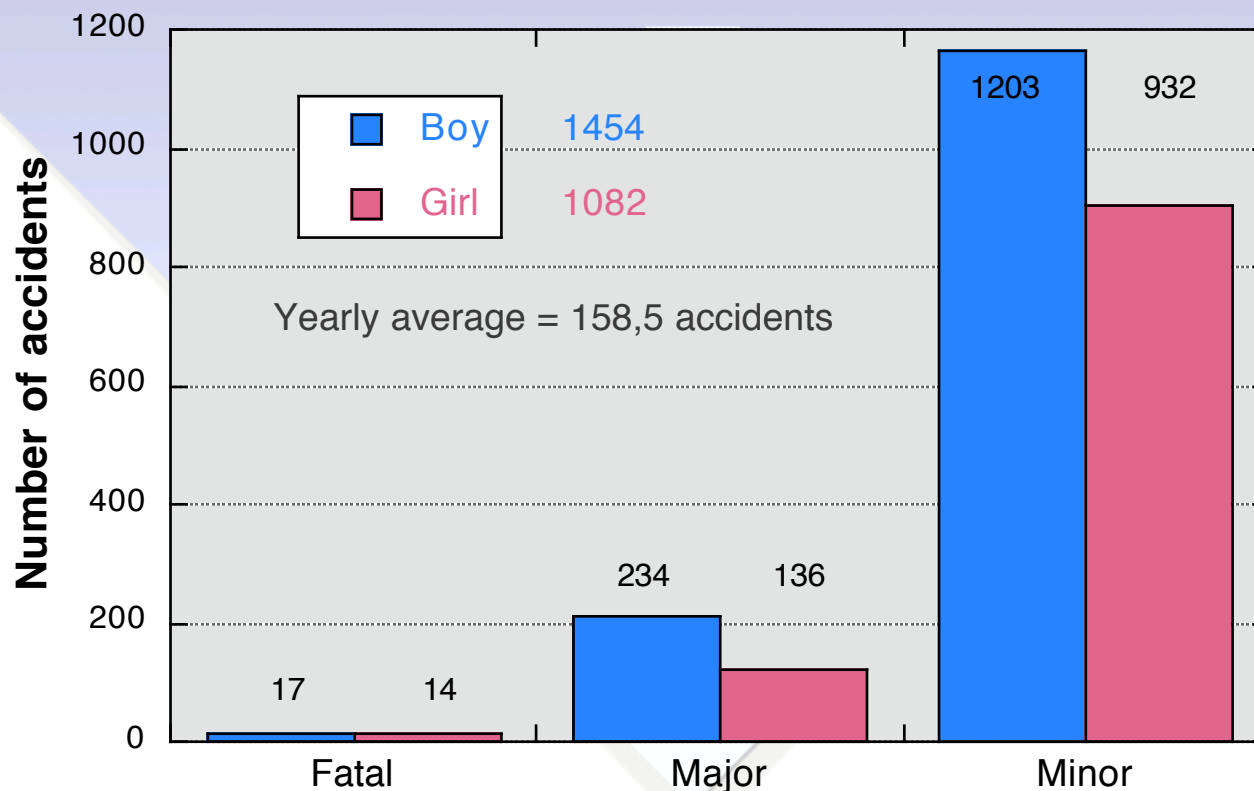
Children's traffic accidents must be viewed in the context of other traffic accidents. Thus, for instance, there has been a substantial and general decrease in traffic accidents in all the Nordic countries since the mid-1960s.

Icelandic traffic accidents (1975-2005, all ages) in three severity categories



In 1990 - 1992 injury definition in the Icelandic accident registration was altered so that more slight injuries were included. In 1998 the registration was computerised and made more detailed and precise. Consequently, minor injury data may not be directly comparable to such data from other countries (Þorvarðarson et al., 2001).

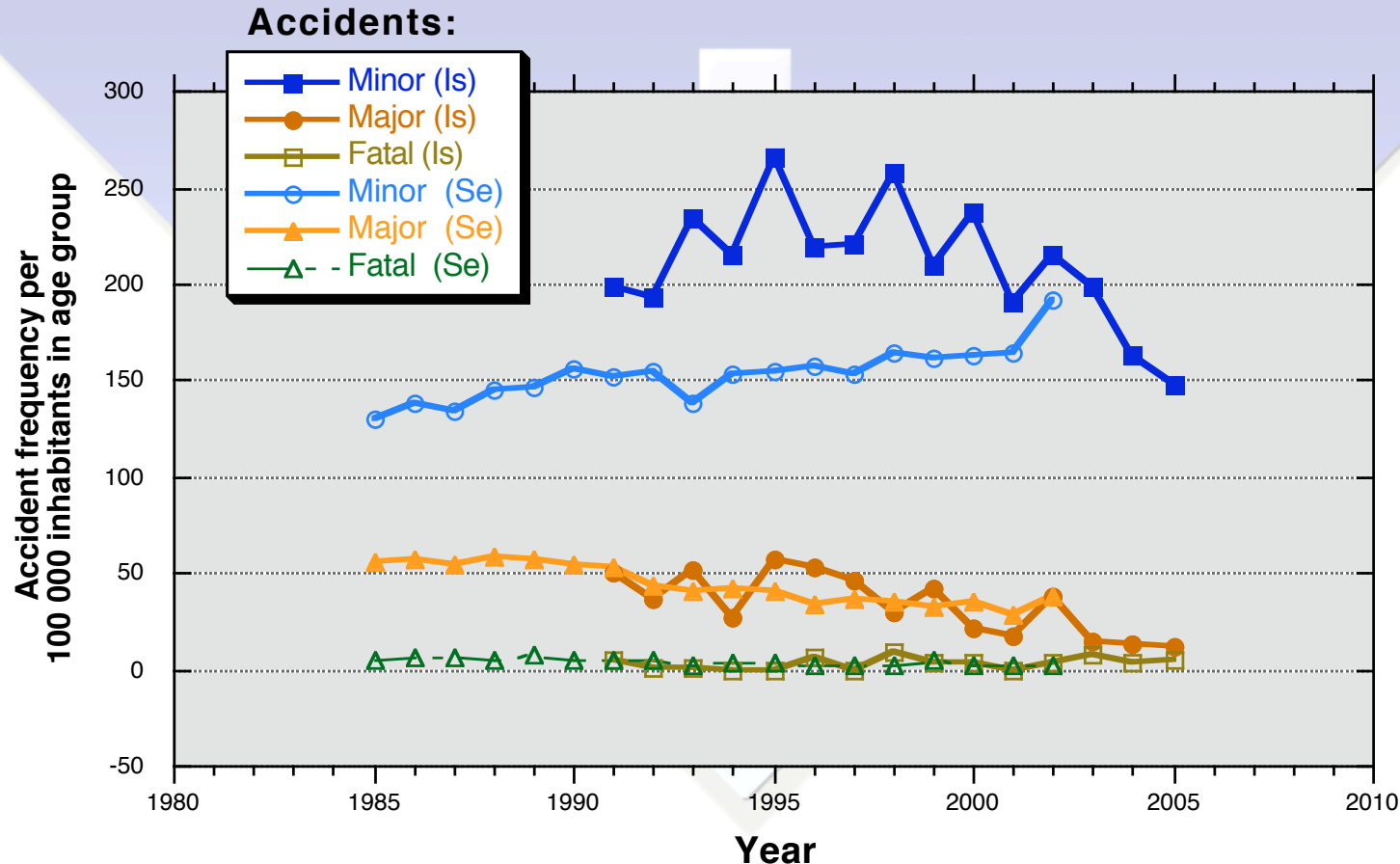
Children's traffic accidents in Iceland 1991 - 2005 in three severity categories



Children's accidents grouped according to severity

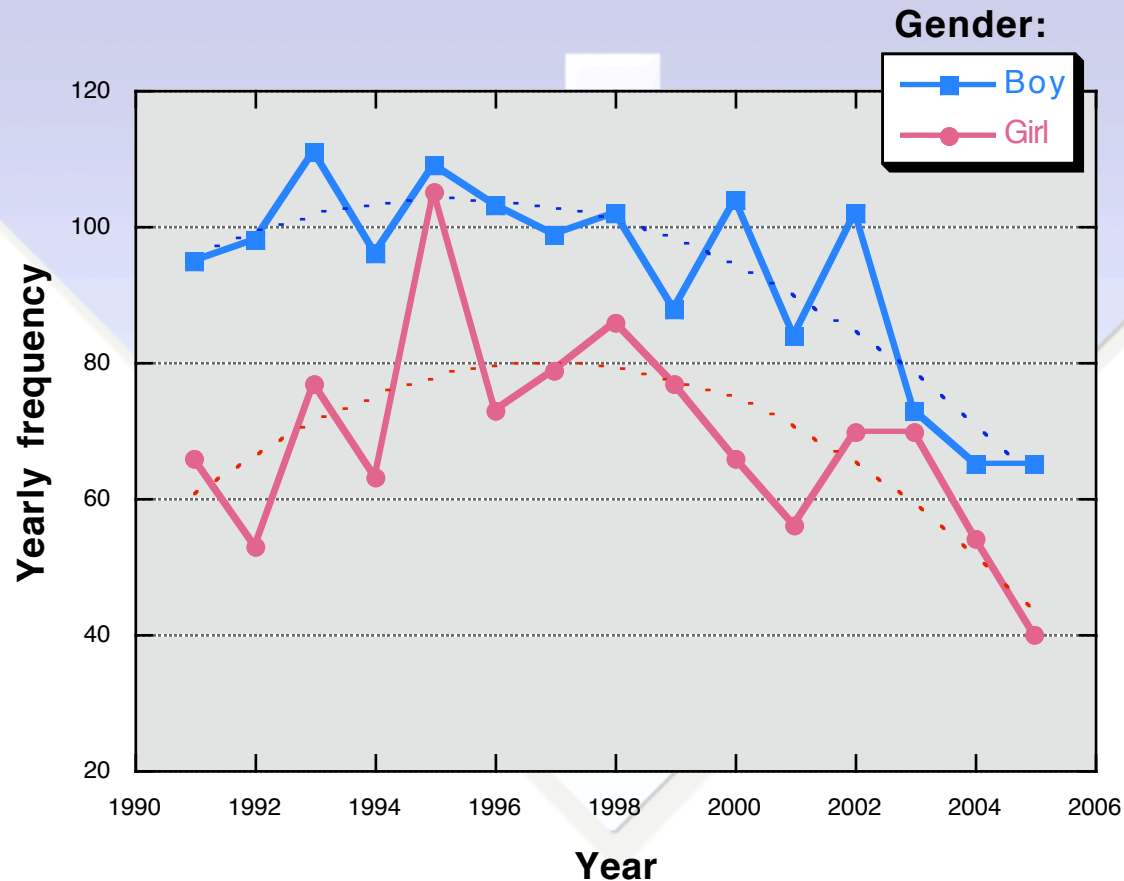
The proportions with respect to severity are 85% for minor and 14% for major injury, and 1% for fatal accidents. Overall accident ratio between girls' and boys' is 1:1,35, with 1:1,29 for minor and 1:1,78 for major injury, and 1:1,15 for fatal accidents.

Children's (0-14) traffic accidents - Iceland and Sweden compared



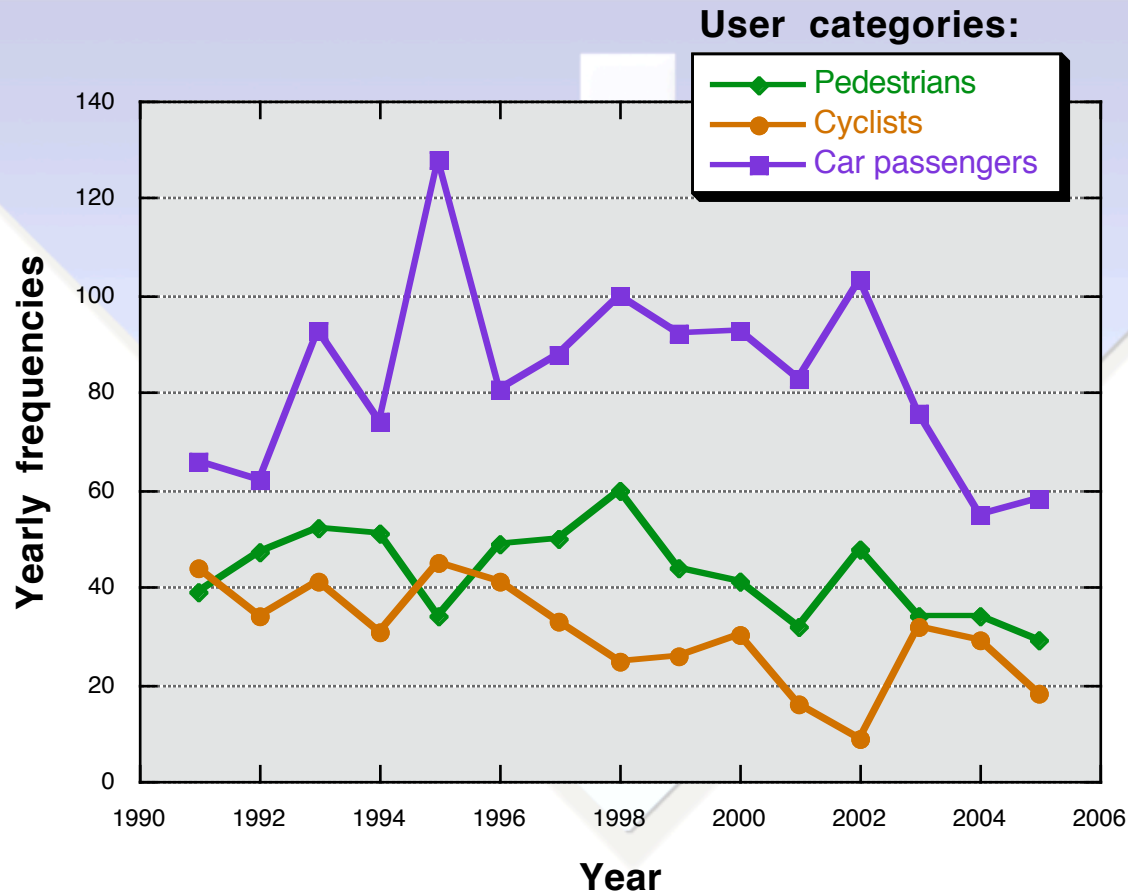
In Iceland and Sweden there has been a general decrease in serious accident rate since the 1980s, and while the rate of minor accidents has increased steadily in Sweden during the same period, it has been decreasing in Iceland for the last decade

Gender differences in children's traffic accidents in Iceland



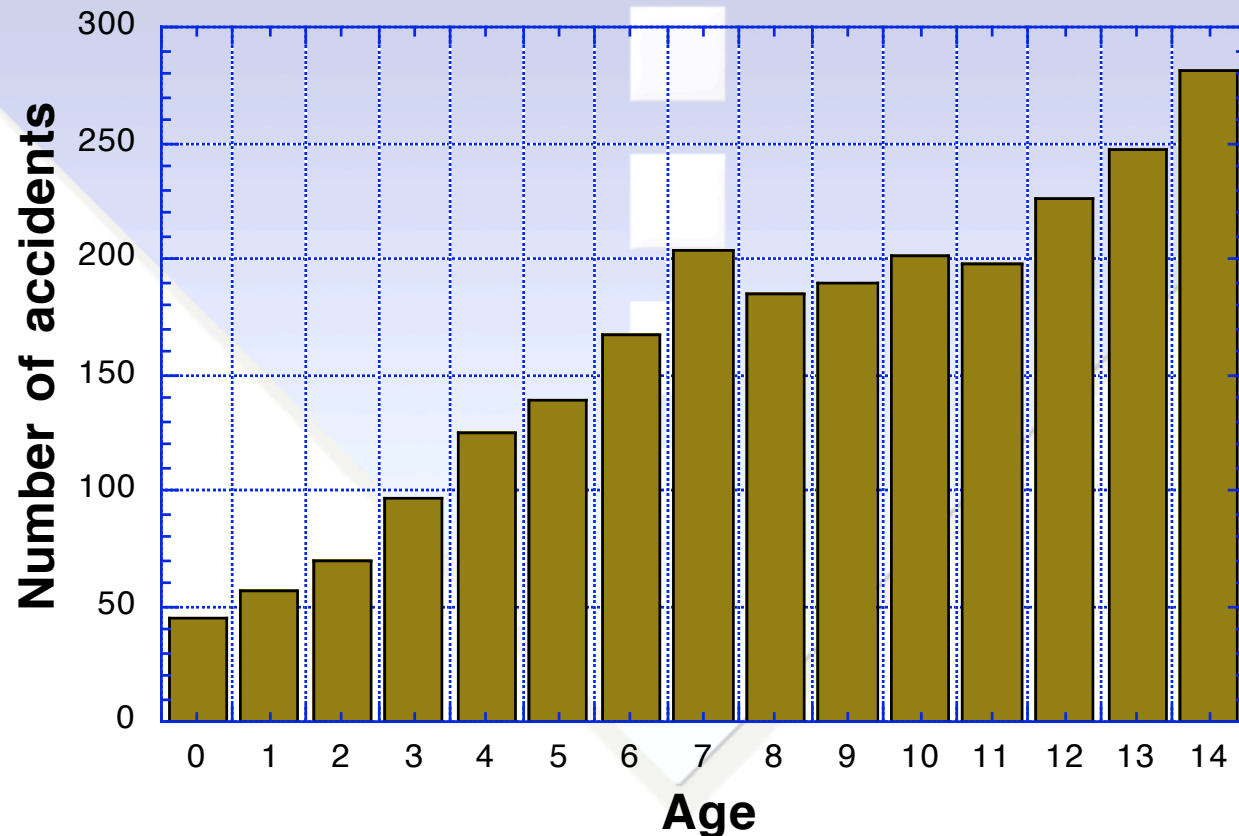
Accident trends are generally similar for boys and girls - both trends are quite reliable, with R^2 about 0,6. Although boys have consistently more accidents than girls, the gender differences have diminished during the registration period.

Changes in Icelandic children's accident rates (3 categories) during 15 years



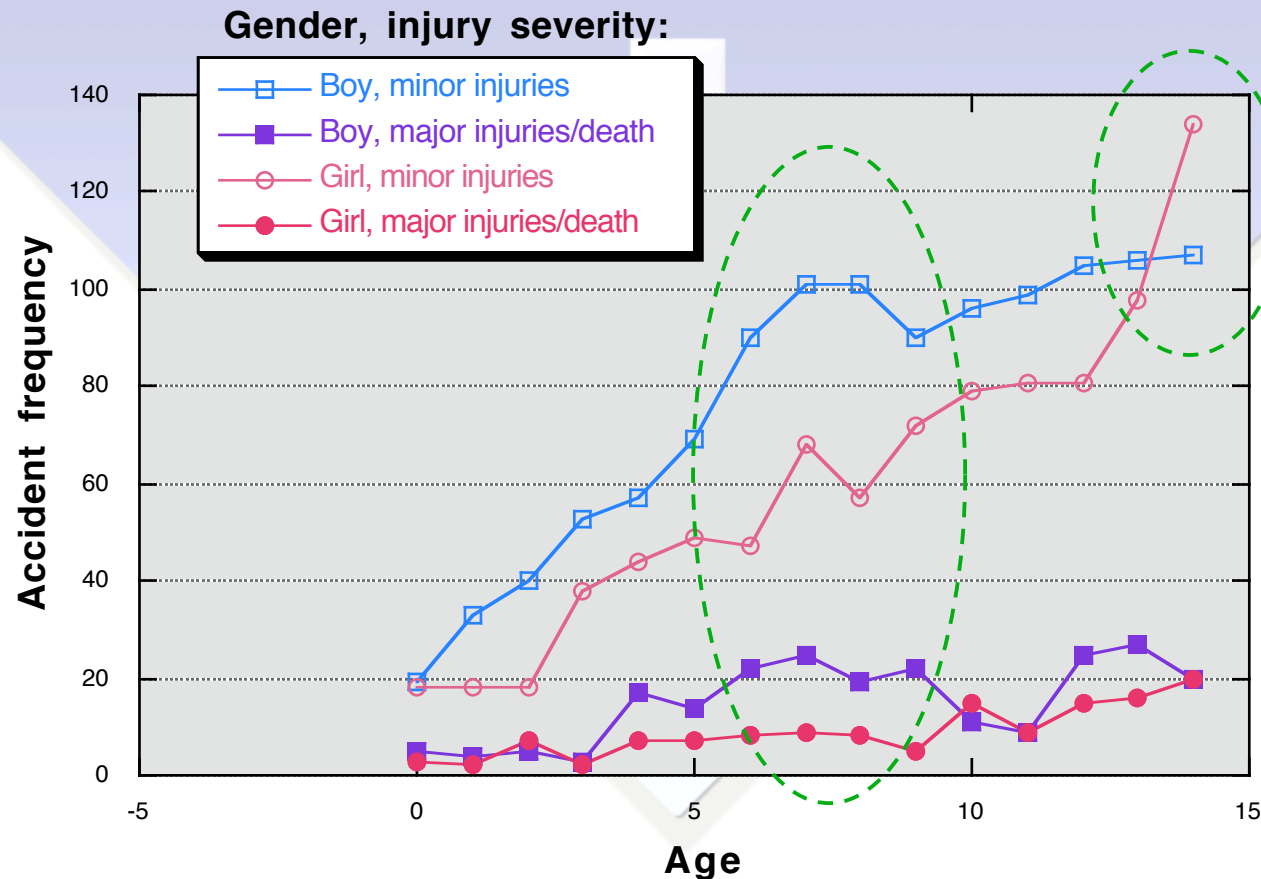
Children's traffic accidents have decreased markedly during the last decade, mainly for car passengers, where an initial "rise-drop" is probably not a registration artifact, but a result of an increase the use of in-car safety equipment in the mid-1990s (cf. Briem & Þórðarson, 1995).

Age differences in the number of children's traffic accidents in Iceland



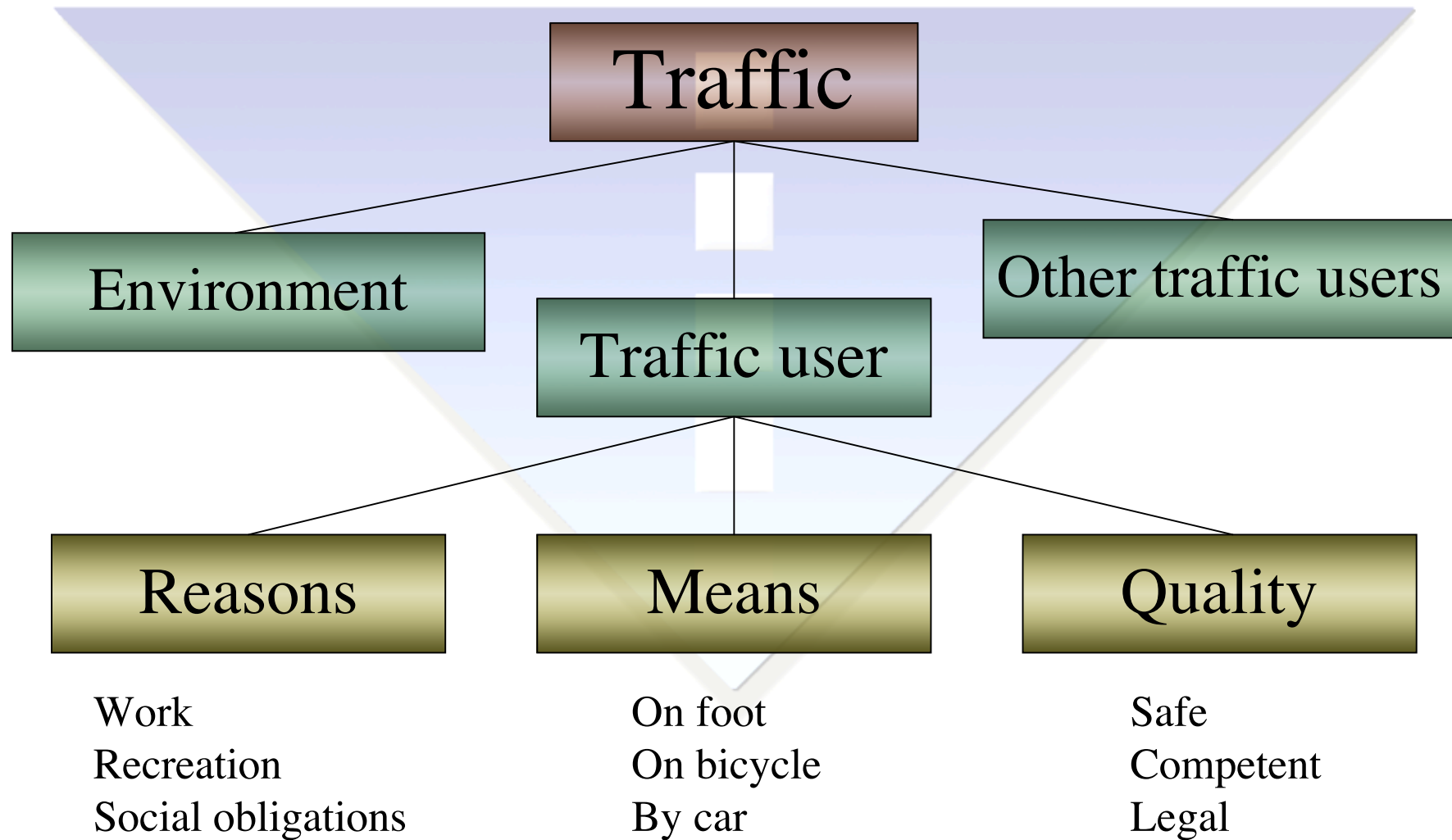
The total number of accidents increases steadily from birth and peaks around the time children begin primary school. It is steady until around the time the children enter secondary school, and then increases during the teens.

Age and gender differences in Icelandic children's traffic accidents



Accident curves are often composed of different kinds of accidents. The components indicate what happened, what the children were doing, as *e.g.* cyclists, pedestrians, and passengers. Gender is important. The trends are easier to understand if we think of traffic as a system.

A hierarchical traffic system

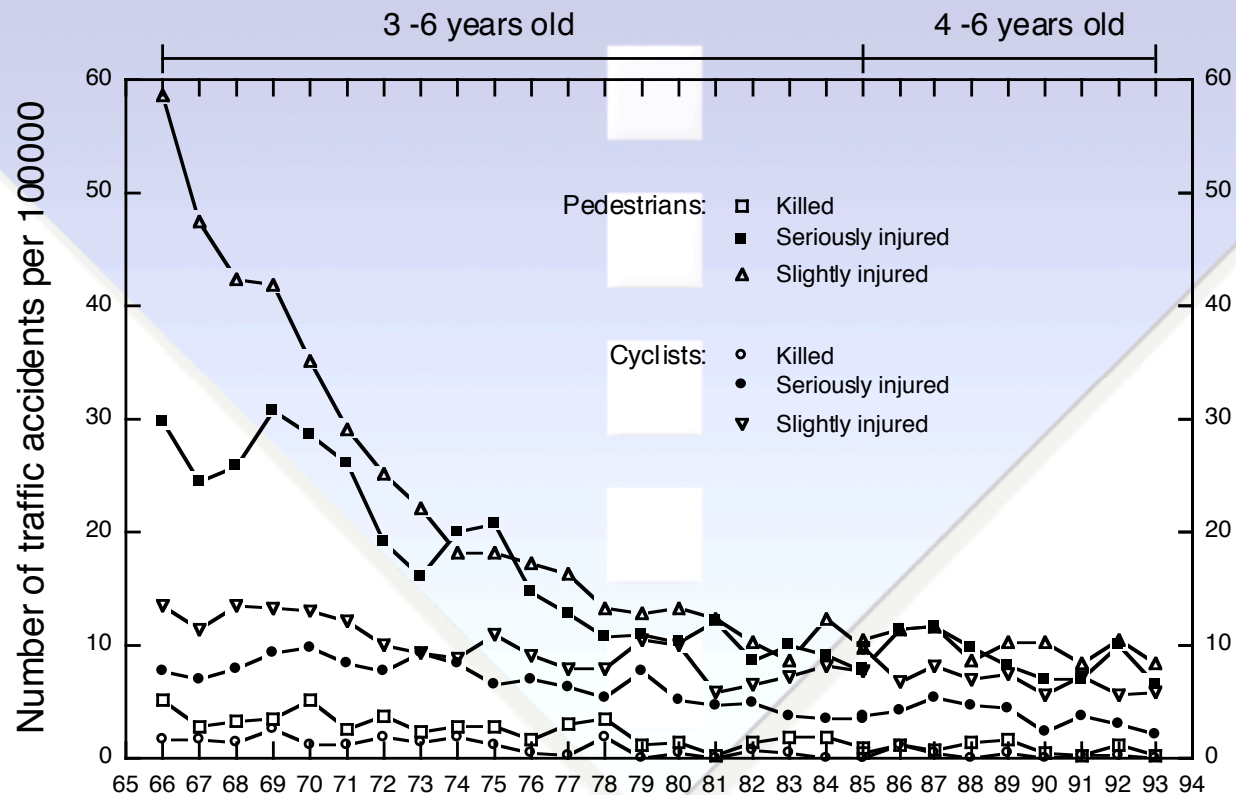


Environmental factors in children's traffic accidents

Children perceive their surroundings just as well as adults, but their understanding of the environment is often incomplete

- Sandels (1968) pointed out some elementary facts:
 - Small children have a different view of traffic than adults
 - Children as young as 2-3 years played unsupervised in urban traffic
 - Small children often act unpredictably in dangerous traffic situations
- In Sweden, Sandels' findings were incorporated in a radical restructuring of the traffic environment (SCAFT), implemented from 1968 onwards. Key elements in this scheme were greater separation and visibility of vulnerable traffic users. The result was a marked reduction in unprotected children's traffic accidents
- Ampofo-Boateng (1993): Children's behaviour as pedestrians in urban streets depends on environmental features of the road. What the child can perceive at any given moment often determines the child's immediate behaviour

Environmental factors in children's traffic accidents: Unprotected children's traffic accidents in Sweden during 30 years



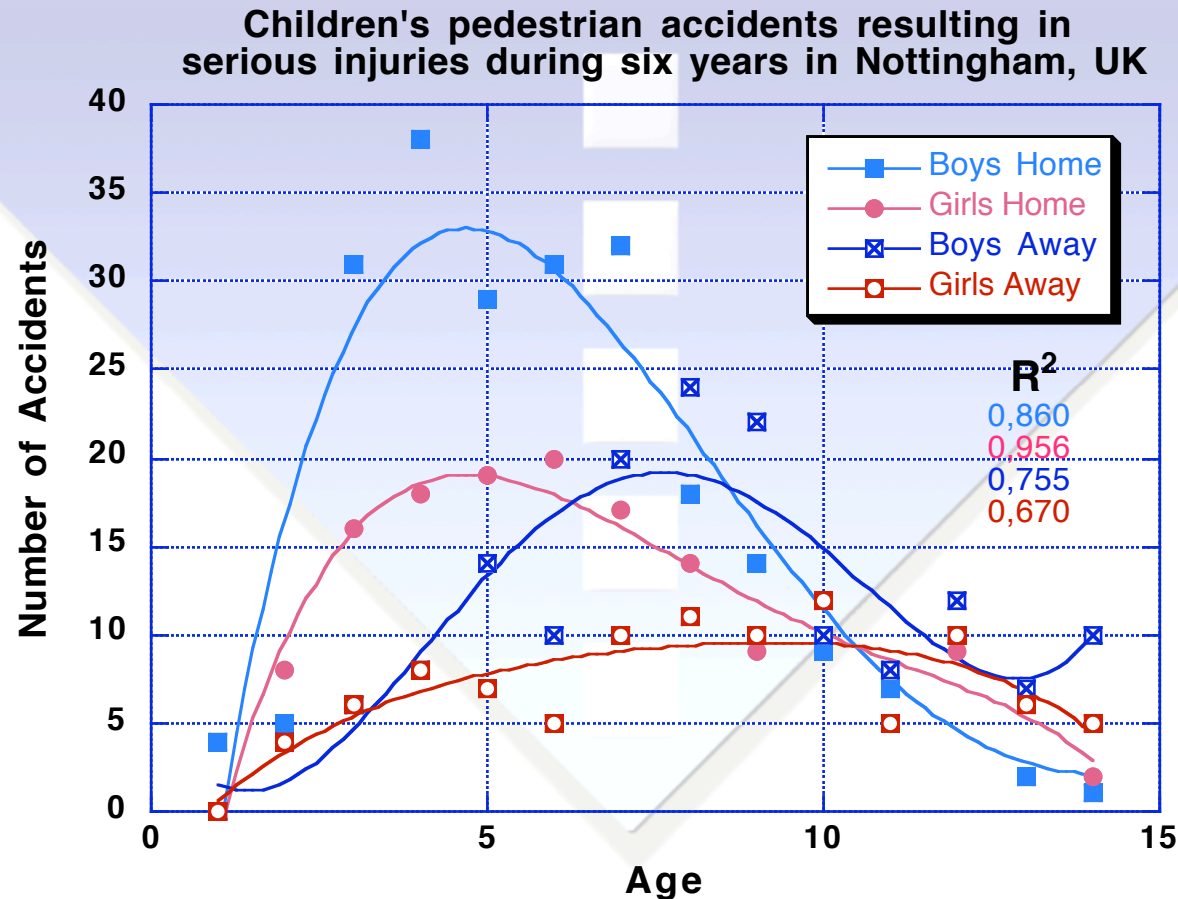
At the beginning of the 1960s, practically nothing had been done to make children's traffic environment safe, but this changed rapidly at the end of the 1960s, partly through the pioneering work of Professor Stina Sandels. Following this, the traffic accident rate for unprotected children also declined.

Developmental factors in children's traffic accidents

Children's behaviour in traffic improves with age, but not as much as one would expect.

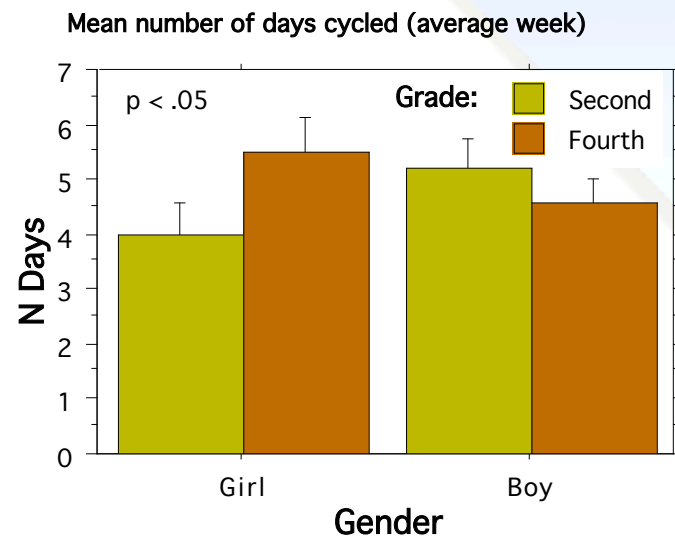
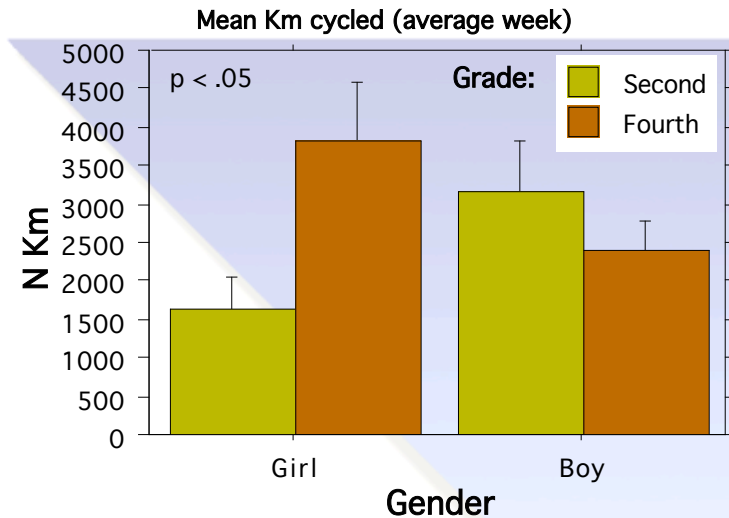
- Sandels (1973): Small children often know the traffic rules, but frequently do not follow these rules in dangerous traffic. Rule following improves with age, but even older children often forget to act according to their rule knowledge
- Howarth (1974): The accident risk of unaccompanied, small children in urban streets can be dozens of times higher than that of adults, when both accident frequency and exposure are considered
- Van der Molen (1984): Child pedestrians behave differently when crossing streets than adults
- Briem (1997): Traffic uses change both qualitatively and quantitatively during childhood

Children's traffic accident scores, home and away in England



Howarth & Lightburn (1981) presented data that showed that the distance from home determined the locations of unprotected children's traffic accidents, and that this was also dependent on the children's ages.

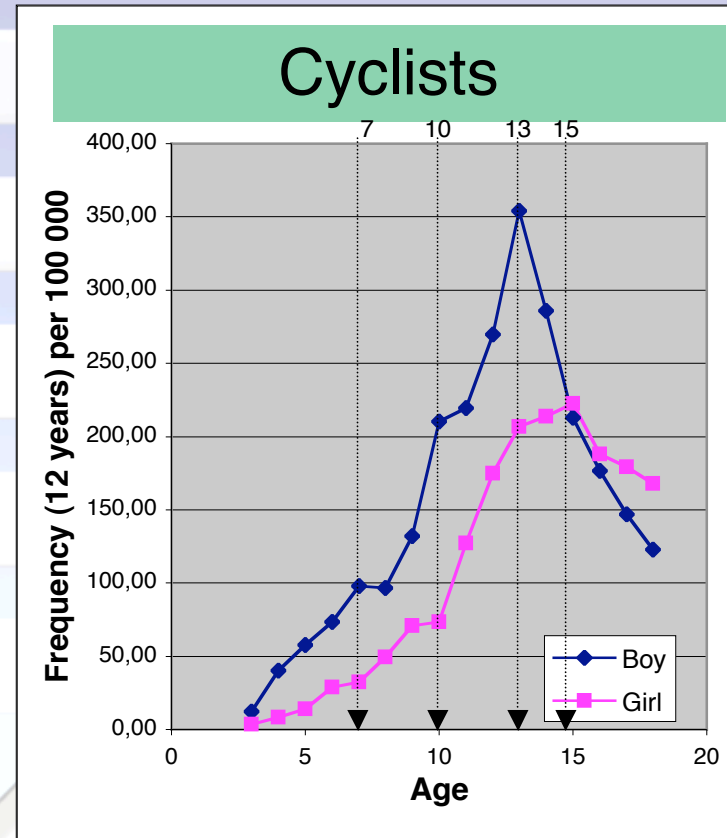
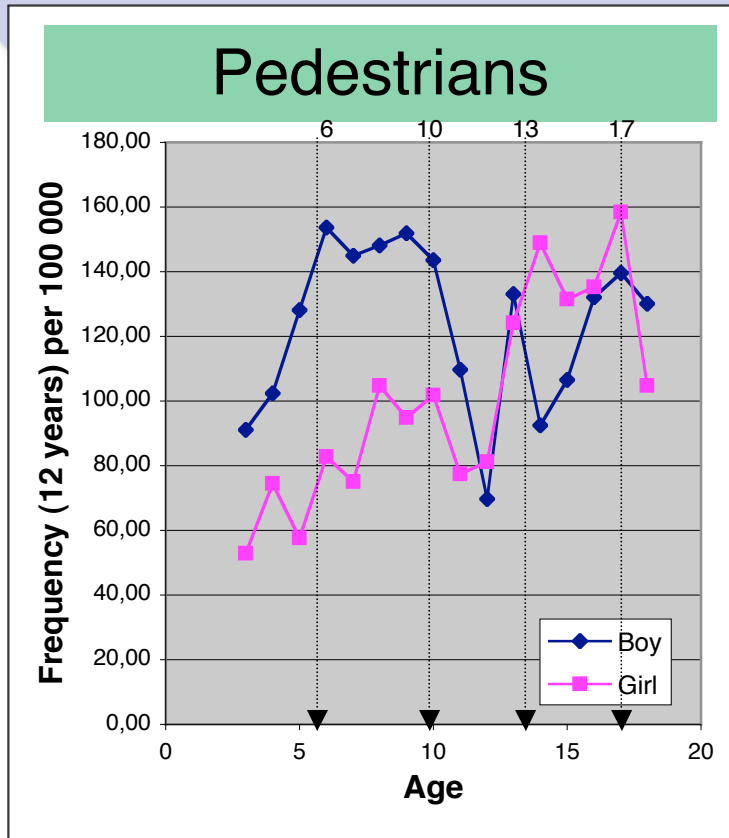
Developmental factors in children's traffic accidents: Swedish children's (8 & 10 years) bicycle journeys



The results show that:

- Traffic uses and transport modes change both qualitatively and quantitatively during childhood
- Boys cycle more than girls at age 8 (second grade), but girls cycle more than boys at age 10 (fourth grade)
- This is shown both in the number of Km and in number of days cycled, where children who use the cycle a lot also cycle more on average.
- The younger boys use the bicycle more for recreation and for social interaction, while the older girls use the bicycle more pragmatically as a means of transport

Swedish children's serious and fatal traffic accidents (1986-1997)



Children's principal means of transport

Before age 10

After age 10

Feet

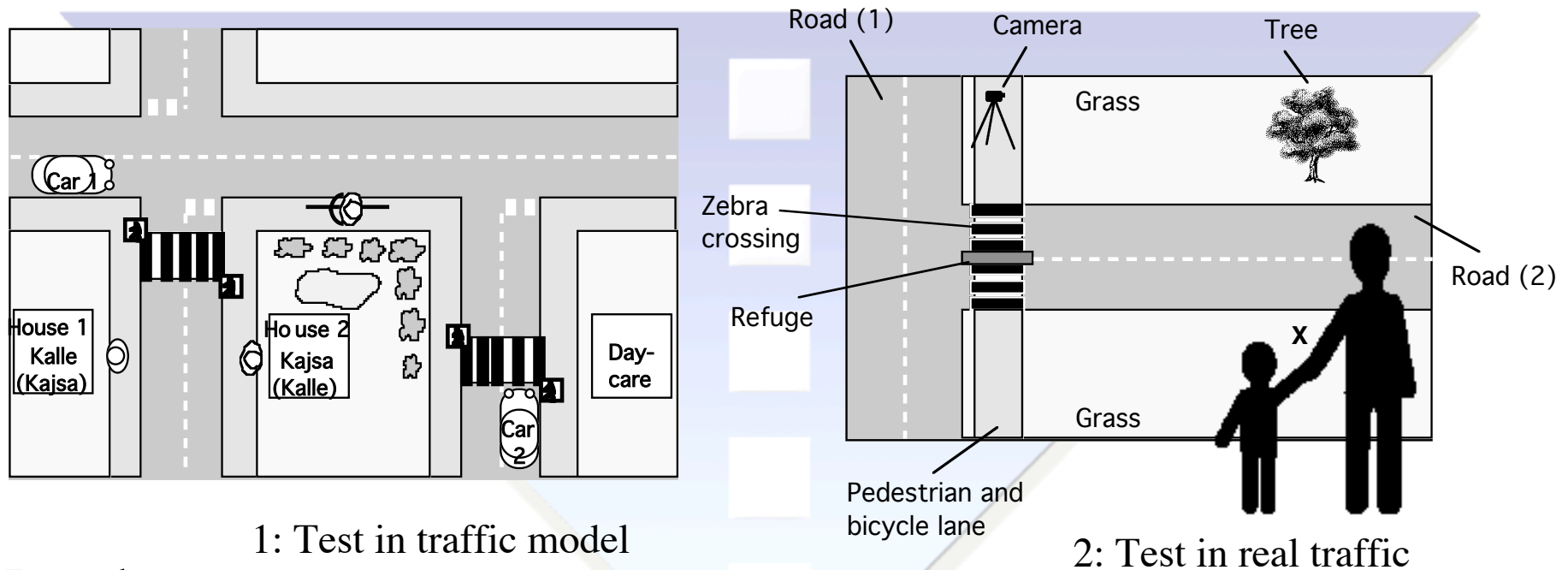
Bicycle

Psychological and social factors in children's traffic accidents

Cognitive factors and personality traits influence children's risk-taking and accident proneness:

- Vinje (1986): Distractability characterises children who show risky traffic behaviour (particularly boys)
- Hargreaves and Davies (1995): Cognitive factors, such as risk perception, individual differences, such as reflection-impulsivity, and social structure, such as broken home, determine risk-taking in children, and are ultimately related to children's traffic accident rates
- Briem and Bengtsson (2000): Both knowledge and understanding of traffic rules and traffic environment determine young children's behaviour in traffic
- Briem et al. (2004): Both age and gender determine children's cycling performance, but older children do not always behave more safely than younger children
- Briem (2004): It is possible to some extent to predict 10 - 12 year-old children's involvement in serious accidents from psychobiological factors, such as anxiety and covert aggression

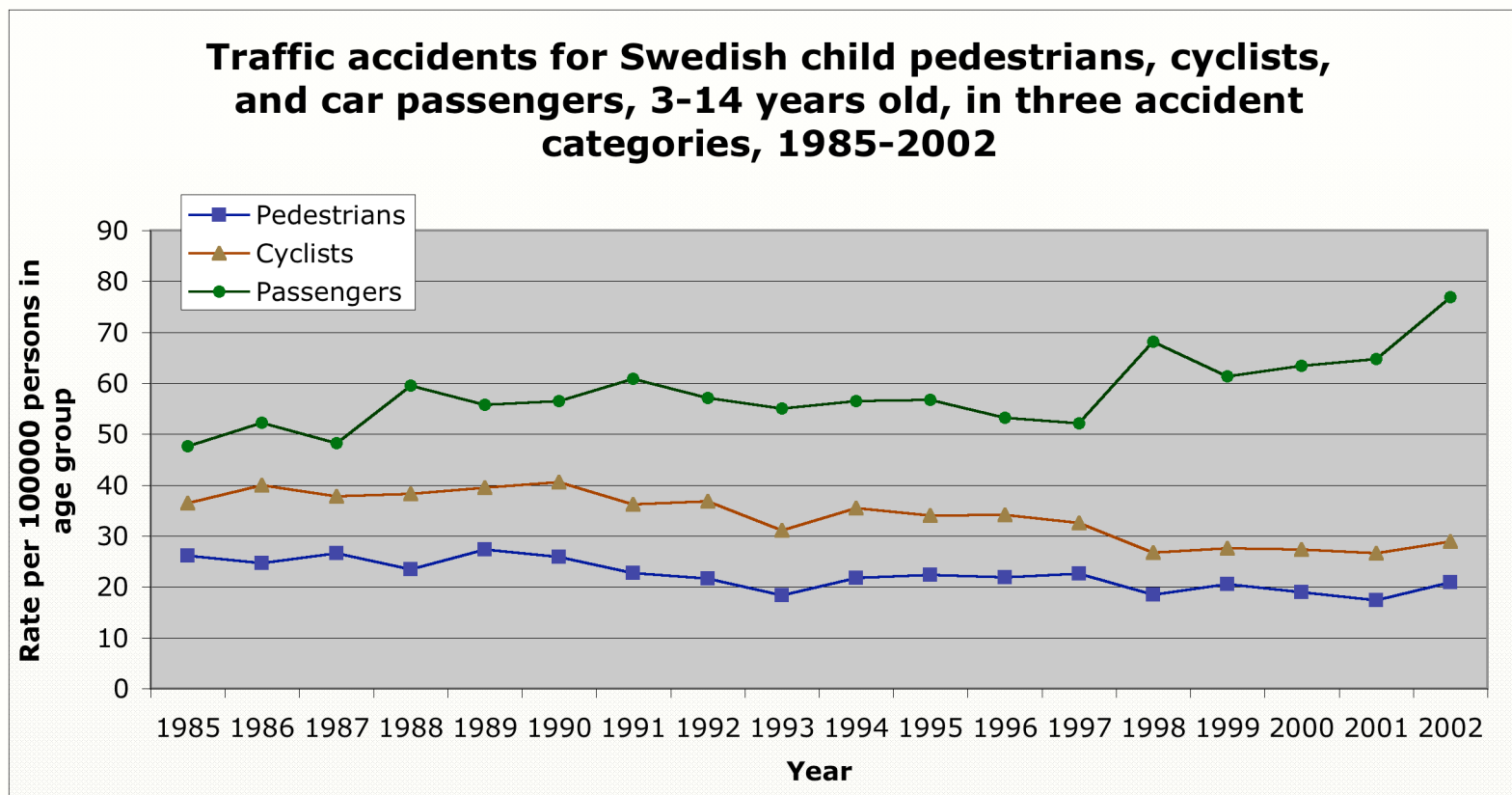
Psychological factors in children's traffic accidents: Young children's (3-6 years) traffic behaviour and understanding of risk and safety



Results:

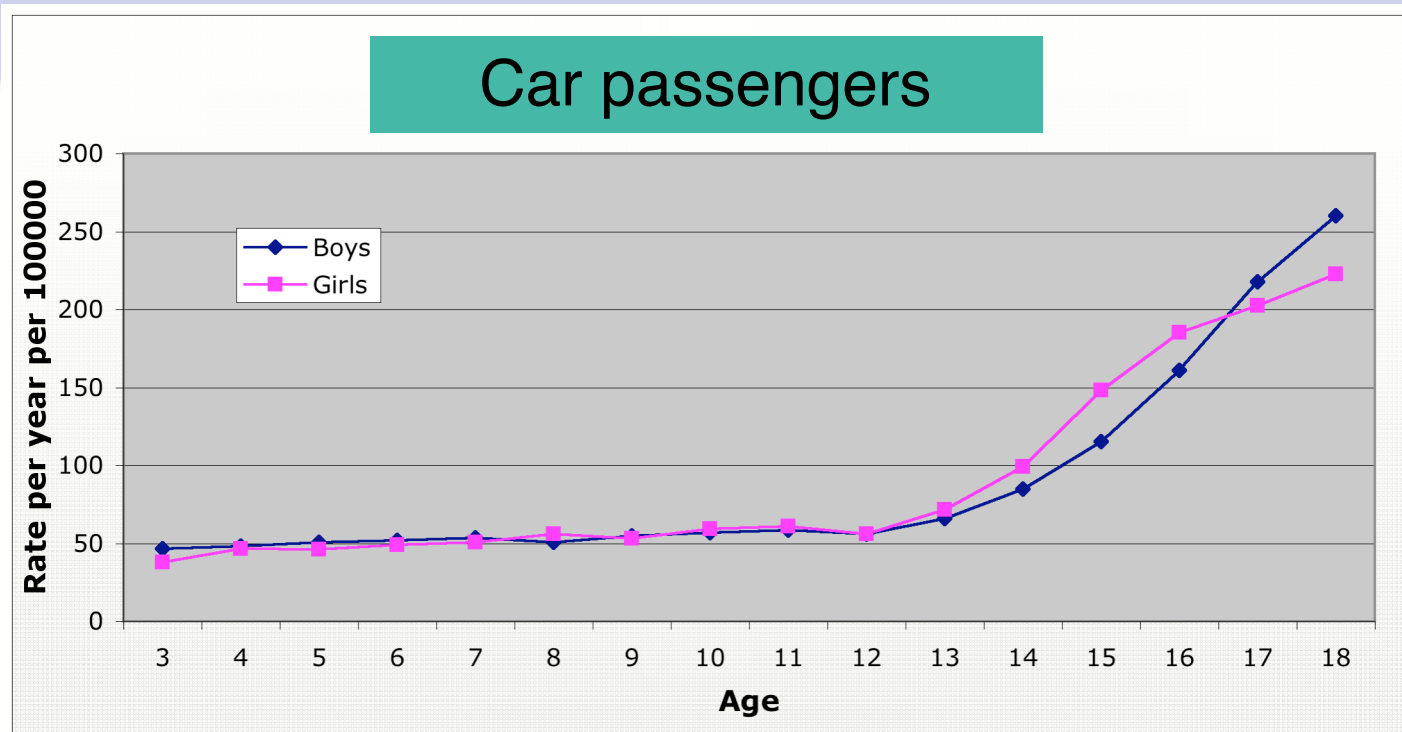
- *Age*, but not gender, was significantly related to appropriate behaviour
- *Understanding* of the task was an important predictor of appropriate behaviour in both traffic situations (simulated and real)
- *Knowledge* about how to use a zebra crossing and about various traffic signs only predicted safe behaviour in the model, but not in real traffic
- *Impulsivity* (personality trait) was reliably related to unsafe traffic behaviour

Swedish children's traffic accidents as active and passive users, 1985-2002



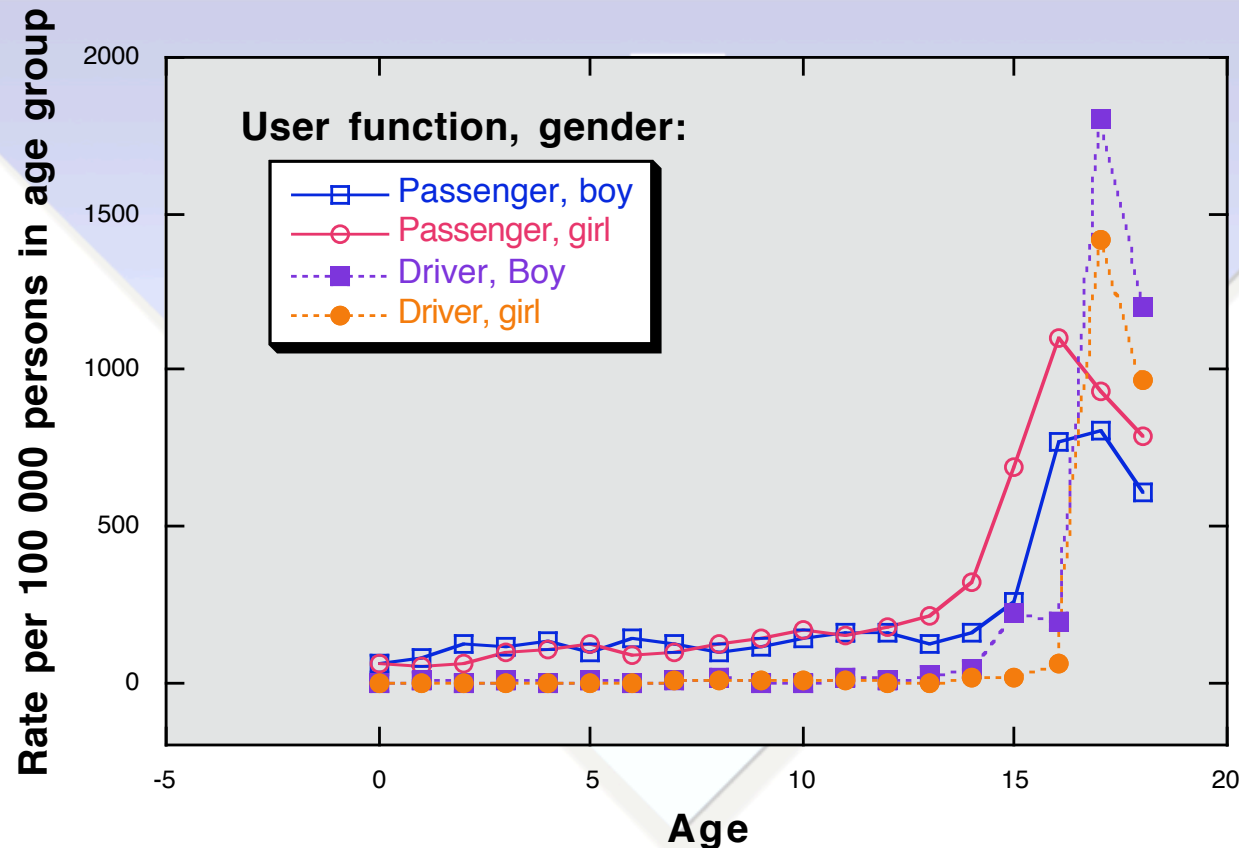
During the period 1997-2002, accident rate for 3-14-year-old children in Sweden in the traffic user categories *pedestrians* and *cyclists* (active traffic users) were relatively constant at a slightly lower level than previously, while for *car passengers* (passive traffic users) the rate climbed to new highs.

Swedish children's passenger accidents, 1985-2002



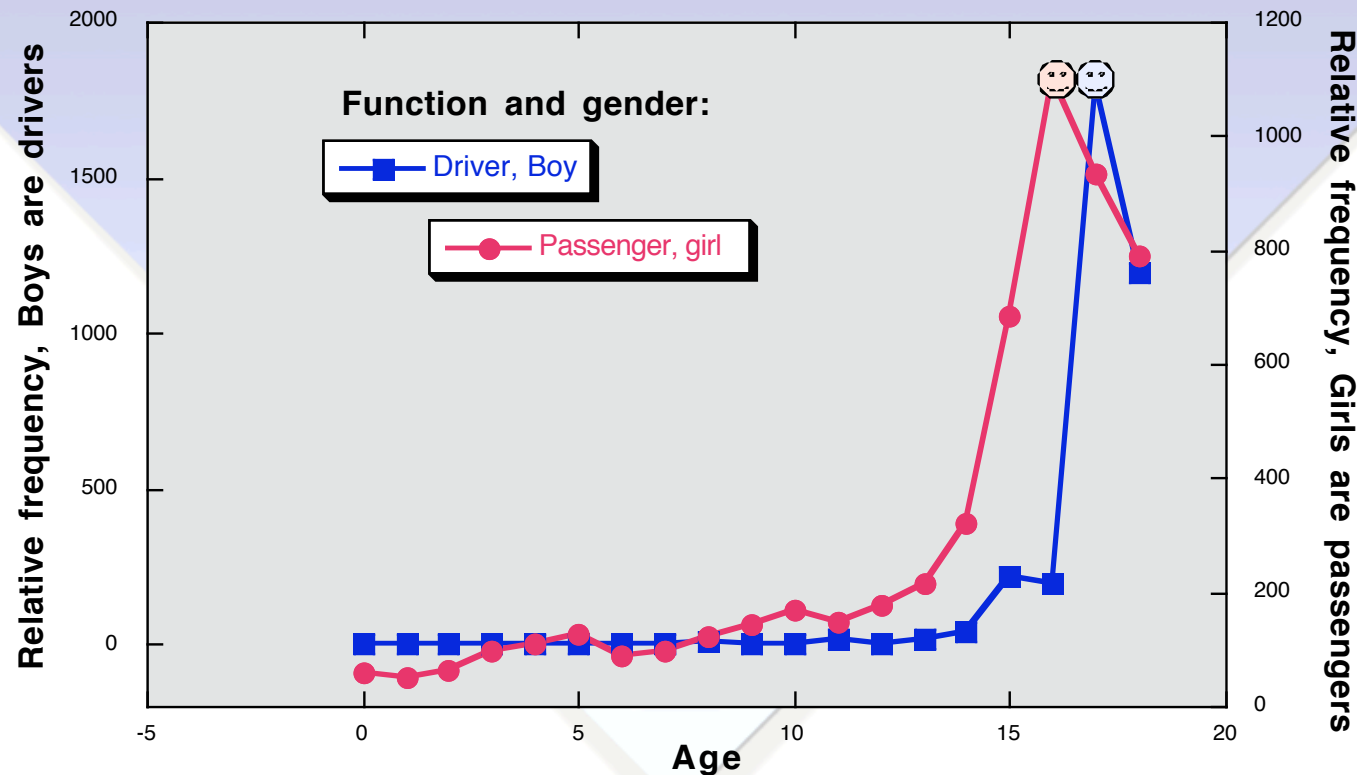
There is a big increase in the accident rate among car passengers during adolescence. Thus, the number of dead or injured passengers in the age range 15-18 is far greater than in the age range 3-14 - the respective, actual means for the two age groups are 90.7 and 22.4, giving a ratio of nearly 4:1.

Icelandic children's passenger and driver accidents, 1991-2005



The increase in accident rate is even greater among Icelandic car passengers during adolescence, and greater for girls than boys. However, the greatest rise in accidents is for car drivers at age 17, especially boys. (Total number of accidents is indicated.)

Icelandic children's passenger and driver accidents, 1991-2005



The relative sizes of the gender differences among passengers and drivers seem to indicate that the girls are more often the passengers in the cars that boys are driving when an accident occurs.

Children's traffic safety education and behaviour in traffic

Children's behaviour in traffic improves with education and training, but not always as much or in the ways one would expect:

- Sandels (1973): Small children often know the traffic rules, but seldom follow these rules in dangerous traffic - older children sometimes also forget to act according to their rule knowledge
- Rothengatter (1983): Young children can easily learn correct traffic behaviour, given appropriate methods
- Van der Molen (1986): Children who had learned safe traffic behaviour, tended not to apply this knowledge when adults were not looking
- Ampofo-Boateng (1993): Five-year old children trained in an urban traffic environment chose safe routes to cross the road on 72% of crossings immediately after training but only 50% nine weeks later
- Briem (2000): Young children (4-6 years), who demonstrated good knowledge of traffic rules and safe behaviour, were generally unable to apply their knowledge in real traffic

Children's traffic safety education in some European countries

- Traffic safety education which is based on stable praxis and scientific research findings is necessary for safe behaviour
- It should be started at an early age and incorporated in an educational continuum up through the school system
- Current educational policy in many European countries (e.g. Austria, France, Britain) is based on such principles
- There are exceptions: In Sweden, traffic safety education as such is not included in the primary/secondary school curriculum, it is entirely at the discretion of the teachers, and authorities previously involved in traffic education in schools, such as the police, are frequently discouraged from engaging in such education.
- How about traffic safety education policy in Norway, Denmark, and Finland?

Children's traffic safety education in Iceland (1)

- Traffic safety education in Iceland has until recently been considered a high priority area, included in the school curriculum, and started in play school
- Another part of the traffic safety education was organised by the former Traffic Council (*Umferðarrád*), which sent out yearly information and study material to play schools and children in the age range 3 - 7 and their parents
- Traffic safety education in play school, as organised by the Traffic Council, culminated in common activities, a *traffic school*, that included all Icelandic children aged 5 and 6 years, and was implemented in collaboration with a nationwide network of teachers and parents
- The Traffic Council also maintained regular information and lectures in the primary schools in collaboration with the school authorities

Children's traffic safety education in Iceland (2)

- In Iceland, traffic safety education is no longer included in the school curriculum, but is now included in a school topic called *life skill*
- *Life skill* is seen as a real and necessary topic for increasing children's awareness of risk and safety, and it incorporates other things such as *the environment, equality, consumer questions, sex-and cohabitation, and risks in consumption of alcohol and narcotics*
- The total weekly study time allocated to *life skill* is 1 hour
- The Traffic Council has been incorporated in another authority, the Traffic Office (*Umferðarstofa*)
- The Traffic Office still sends out yearly information to children in the age range 3 - 7 and their parents, but the *traffic school* for children aged 5 and 6 years has been discontinued, as has the personal dissemination of information in primary schools in collaboration with the school authorities

Children's traffic safety education in Iceland (3)

- The Traffic Office has replaced the former collaboration with parents, teachers, and school authorities with information accessible over the internet: <http://www.us.is/id/1168>
- This site contains information for adults, study material for 6-year olds, and allows children to play a *traffic game* and take part in a *Christmas quiz*
- The Traffic Office has recently also initiated collaboration with the school-book publishing authority and a local school to develop an internet site for parents, teachers, and children: <http://www.umferd.is/>
- The usefulness of net-based learning for children can be questioned. International research indicates that children find it difficult to utilise educational material on the net, that parents are usually not able to assist the children in these studies, and that there can be negative consequences for the children's health, such as obesity and muscle and joint diseases

Icelandic children's traffic accidents: Summing up

- In Iceland, as in Sweden and probably the rest of the Nordic countries, children's traffic safety has improved since the 1960s.
- In Iceland, there has been further improvement during the last 10 years
- The accident reduction in Iceland is mainly in minor injuries, and is more noticeable for car passengers than pedestrians and cyclists
- This may be attributed both to improved safety equipment and its use in cars and to a decrease in children's transportation on foot and bicycle
- Peaks and valleys in the accident curves at certain ages often coincide with important events in children's lives, especially new schools and new modes of transportation
- Children's safety as unprotected traffic users can to a certain extent be explained with reference to environmental, psychobiological and psychosocial factors, that interact with changes in life situation

Icelandic children's traffic education: Summing up

- In Iceland today, children receive much less traffic safety education in school than previously. This change is fairly recent, and the consequences have not yet started to appear
- Having some of the information reappearing on the internet is not likely to compensate for the loss
- Children's safety as unprotected traffic users requires knowledge, which are best acquired through education, practical training in recognising key features of the traffic system, and understanding of the role of their own behaviour in dangerous environments
- Sustainable growth in children's traffic safety depends on the authorities' understanding of children's environmental, developmental, and psychological needs and capabilities, as well as an active cooperation with scientists and educators
- Life-long education for traffic users is without doubt the best way to achieve greater safety in traffic







Thank you!

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