

# Bicycle helmet use among schoolchildren—the influence of parental involvement and children's attitudes

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## Abstract

**Objective**—To study attitudes towards and use of bicycle helmets among schoolchildren; to determine whether these attitudes are associated with the involvement of parents and school in bike safety.

**Settings**—Nine intermediate level schools and five upper level schools in two Swedish municipalities.

**Method**—A survey with 1485 participants aimed at pupils aged 12–15 years conducted during late spring 1997. Associations between parent and school involvement and children's attitudes and helmet use were studied using LisRel analyses.

**Result**—At some point during their school years, a majority of the children stopped wearing bicycle helmets. Of 12–13 year olds, 80% said that they had used helmets when they were younger but at the time of the study, only 3% aged 14–15 years used helmets. Use decreased significantly during school years ( $p < 0.001$ ). The majority stated they quit using helmets because they were ugly, silly, uncomfortable, or inconvenient. There was a strong association between parental involvement, children's attitudes, and helmet use. However, parent involvement decreased as the children grew older.

**Conclusion**—To increase the voluntary use of bicycle helmets among schoolchildren their attitudes must be influenced. An intervention aimed at both parents and children may be required.

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Keywords: bicycle helmet use; parental involvement; children's attitudes; safety promotion

Head injuries resulting from bicycle related accidents are a global problem. Each year in the United States, 300 000 children are treated in emergency departments for bicycle injuries; one third of which involve the head.<sup>1</sup> In Sweden it is estimated that 35 000–50 000 cyclists are injured and need medical care<sup>2</sup> and 5000 cyclists are hospitalised each year.<sup>3</sup>

A Swedish study shows that one third of bicycle casualties involve schoolchildren,<sup>4</sup> and in Australia, the proportion is two thirds.<sup>5</sup> Almost 25% of all brain injuries in children are bicycle related<sup>6 7</sup> and two thirds of bicycle injuries involve the head.<sup>8</sup>

A bicycle helmet reduces the risk of head injury by between 60 to 90%.<sup>9 10</sup> Making people wear helmets is cost effective.<sup>2 11–15</sup>

In 1991 the Swedish Helmet Initiative Group was formed by the World Health Organization Collaborating Centre on Community Safety Promotion at the *Karolinska Institutet*. Since then campaigns aimed at influencing the public have been common, along with some campaigns aimed at more specific groups.<sup>8</sup> There are, however, no national helmet regulations in Sweden. Observational studies of helmet use in Sweden have been carried out annually by the Swedish National Road and Transport Research Institute since 1988. These reveal a change in helmet use among 12–15 year olds.<sup>16</sup>

The objective of this study is to survey the use of, and attitudes towards bicycle helmets in this age group. Specifically, we wish to determine whether these attitudes and behaviours are associated with the involvement of parents and school. This will help determine if there is a need for an intervention to increase voluntary helmet use.

## Subjects and methods

The municipalities of Bålsta and Enköping are situated in Uppsala County, 50 km and 80 km respectively north east of Stockholm. Bålsta has 17 000 inhabitants and Enköping 36 000 inhabitants, with 24% and 22% between 0–15 years, respectively. Swedish grade schools are organised on three levels: junior 8–10 years; intermediate 11–13 years; upper 14–16 years.

A survey involving all pupils aged 12–15 was conducted in spring 1997 involving all 14 schools in the two municipalities—a total of 2076 pupils. Altogether 1673 participated and 1485 answered the questionnaire. Questions included: use of bicycle helmets, attitudes towards helmets, the involvement of parents and school, and intended future use of helmet. The frequencies of use and attitudes were analysed using SAS.<sup>17</sup> Differences were tested with  $\chi^2$  analyses.

To analyse the association between the involvement of parents and school and helmet use, we used LisRel path analysis<sup>18</sup>—a multivariate approach where the relative influence of parents and schools was examined. The method made it possible to determine the extent to which parents' and schools' involvement had a direct influence on helmet use or whether the influence was indirect, operating by their influence on attitudes.

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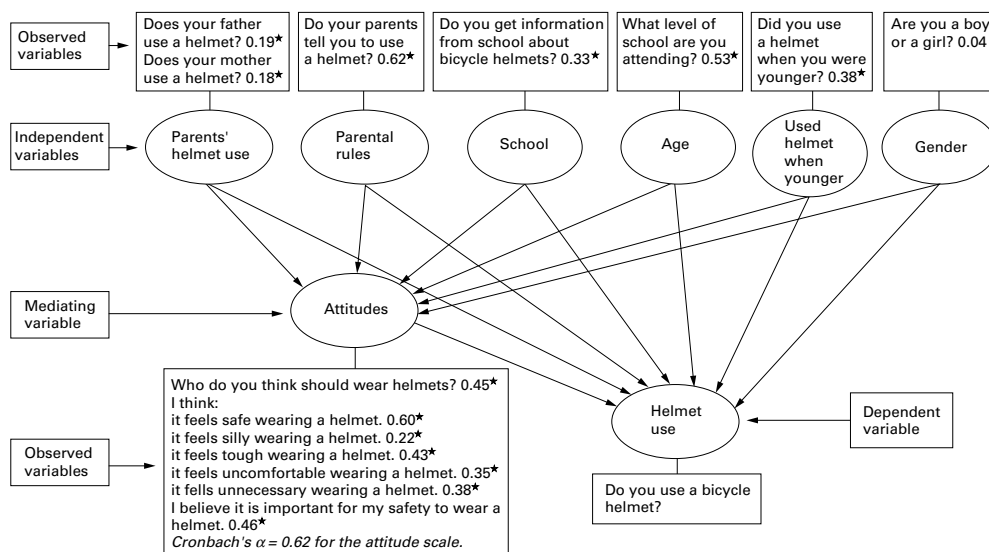


Figure 1 Postulated model where the independent variables' influence on the dependent variable can either be direct or indirect via the mediating variable. Observed variables (that is, questions asked in the survey) with correlation to helmet use (\* $p < 0.05$ ).

Parent and school involvement, the influence of age, sex, and earlier helmet use were included as independent variables in our model. Attitudes served as a mediating variable, and helmet use as a dependent variable.

The polychoric correlations between the variables included in the model with helmet use are presented in fig 1. Missing values were treated using pairwise deletion. A maximum likelihood solution of the model was calculated. LisRel estimates are estimates of the effect (the strength) that an independent variable has on a dependent variable, keeping all other independent variables at fixed values. The estimates can only be compared with each other and only within the same model.

**Results**

Most children reported having worn helmets when they were younger (80% at the intermediate level and 60% at the upper level). At the time of the study, however, only 27% of 12 year olds wore helmets and by 15 years, the figure was 1% (fig 2). A majority ceased wearing helmets after they started attending school. Around 20% stopped at the junior level, but 62% stopped at the intermediate level. We did not find any significant difference in helmet use between boys and girls, but boys stopped using helmets at earlier ages than did the girls.

**ATTITUDES**

Children at all ages gave similar reasons for why they stopping wearing helmets. A majority (60%) reported that they quit because they thought wearing helmet was ugly, silly, uncomfortable, or inconvenient (table 1).

There was a discrepancy between what the children believed to be the reasons for stopping and reasons for actually stopping. For example, 75% were of the opinion that children stop because they are afraid of being teased. However, only 1%–3% claimed that they did so for this reason. Similarly, 80% believed others

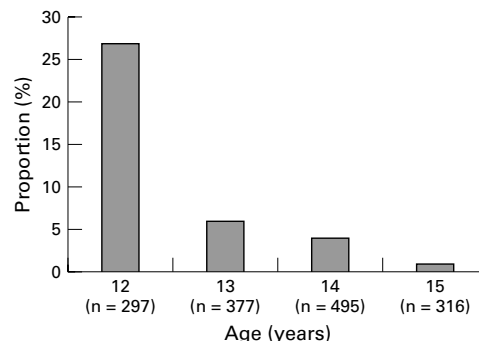


Figure 2 Proportion of schoolchildren aged 12–15 years who use a bicycle helmet, by age ( $p < 0.001$ ).

quit because their friends did so but only 10% gave this as the reason they stopped.

A clear majority stated it is important to wear a helmet for safety (table 2) and 99% of those who still used helmets at the intermediate level believed that it is “very” or “rather important” for their safety. Even among those who did not use helmets, as many as 75% believed them to be very or rather important safety measures. Children at the upper level had similar attitudes (respectively 87% and 67%).

There were significant differences, however, between boys and girls: more girls than boys believed helmets were important to safety and girls reported that helmets were more uncomfortable and silly than did boys.

Most helmets users (80%) thought everyone should wear one when cycling. Even among those who did not wear helmets, one third thought everyone should use helmets.

Parental rules were considered important by 80% of the children at the intermediate and 63% at the upper level. In general most children (55%–76%) judged it important for helmet use that parents, friends, and older pupils use helmets and that the school disseminates related information.

A minority at the intermediate level stated they intended to wear helmets when they

Table 1 The proportion (%) of the children that stopped using helmet by their stated reason to stop and by level of school

Stated reason	Level of school	
	Intermediate level (n=408)	Upper level (n=631)
It is ugly/silly	35	37
It is uncomfortable	15	14
It feels unnecessary	10	12
It is inconvenient	13	12
My friends have stopped	10	10
Need a new helmet (old one are broken or too small)	9	7
My parents have stopped telling me	2	3
Other reasons	2	3
I have been harassed	3	1
I wanted to be tough	1	1

Table 2 The proportion (%) of all the children who agree with the following attitude statements

Agree with the statement	Children aged 12–15 years
Only children should use helmet	52
Everyone should use helmet	39
It feels safe wearing helmet	25
It feels silly wearing helmet	57
It feels tough wearing helmet	4
It feels uncomfortable wearing helmet	55
It feels unnecessary wearing helmet	21
It is important for my security wearing helmet	76

reached the upper level, and a little less than two thirds declared that they would not do so. Of those wearing helmets, 40% said that they would continue doing so and another 50% said that they might continue to do so. Most of those who did not use helmets said they would continue not to; 20% said, though, that they might start using helmets again. Somewhat more of those who used helmets when younger intend to wear them at the upper level compared with those who did not use them when younger. There was no significant gender difference.

A minority favoured compulsory helmet legislation, and this decreased with age. About half of the children age 12 and most of the children age of 15 opposed such legislation.

#### IMPORTANCE OF PARENTS AND SCHOOLS

The involvement of adults seems to decrease as the children get older. The children reported a low helmet use among their parents (1%–2%). About half had parents who stopped telling them to wear a helmet. Slightly more than one third at the intermediate level and 10% at the upper level declared that their parents had rules about bicycling with helmets. Importantly, most who use helmets (84%) also had parents that still tell them to do so. Among the children at the intermediate level who had parents who set rules, one third used helmets; at

Table 3 Lisrel estimates showing the effect (the strength) that the independent variables and the mediating variable "attitudes" have on the dependent variable "helmet use"; values are estimate (SD)

	Indirect effect	Direct effect	Total effects
Parents' use	-0.01 (0.01)	0.23 (0.02)*	0.22 (0.02)*
Parental rules	0.14 (0.01)*	0.34 (0.02)*	0.48 (0.02)*
School	0.01 (0.01)	-0.08 (0.02)*	-0.07 (0.02)*
Age	0.03 (0.01)*	0.39 (0.02)*	0.42 (0.02)*
Used when younger	0.06 (0.01)*	-0.11 (0.02)*	-0.05 (0.02)*
Gender	-0.06 (0.01)*	0.08 (0.02)*	0.02 (0.02)
Attitudes	—	0.33 (0.03)*	0.33 (0.03)*

\*Parameter estimates are significant ( $p < 0.05$ ).

#### Key points

- A majority of the children ceased wearing bicycle helmets after they started attending school.
- The greatest influence on bicycle helmet use was from parental rules, age, and attitudes of the children.
- Parental rules, meaning that parents tell their children to wear helmets when cycling, were considered as important by 80% of the children at the intermediate and 63% at the upper level.
- However, the involvement of the parents seems to decrease considerable as the children grow older.
- To increase the use of bicycle helmets among schoolchildren on a voluntary basis, it is necessary that their attitudes are influenced and that parental involvement is emphasised.

the upper level, the proportion was one fifth. Among those with parents without rules, almost none of the children used helmets.

The involvement of the school seemed to decrease with age as well. Among both boys and girls of all ages, 10% said that they never received any information from their schools at the intermediate level. Information about helmets from schools fell substantially once the children reached the upper level. As many as 80% at the upper level said that they had never received any bicycle helmet information while attending school at that level.

#### LISREL ANALYSES

The greatest influence on bicycle helmet use was from parental rules, age, and attitudes of the children (fig 1, table 3). Parents' use of helmets also influenced the children's use significantly. Parental involvement mainly had a direct effect on helmet use. This was also true for the age of the children. Parental rules, however, also had an indirect effect by influencing the child's attitudes.

#### Discussion

Of children aged 12–13 years, 80% reported that they had used bicycle helmets when younger. When this study was conducted, only 1% of the children aged 15 used helmets. A majority had stopped wearing helmets during their school years.

Several international<sup>11 19–21</sup> and national<sup>16</sup> studies found higher helmet use among both older children and adults than what the results from this study show. Most likely, the difference in some cases can be explained by the fact that most studies use a wider age interval that includes younger children, thus producing the impression of greater use.

Most reported that they quit using their helmet because it was, or was supposed to be, ugly, silly, uncomfortable, and inconvenient. A majority was afraid of being teased, but only a few per cent claimed to have been teased. Thus, it is of great importance to inform

children that the risk of being harassed is not as high as they appear to believe.

An important base for understanding helmet habits among schoolchildren would be a better understanding for how negative attitudes arise and how to influence such attitudes. The behavioural and psychological characteristics of adolescents may partly explain this.<sup>22</sup> This will be of importance when designing future interventions along with socioeconomic and psychosocial factors.<sup>19 20 23-31</sup>

Parental and school involvement seems to decrease as the children grow older. Nearly half of the parents had stopped telling their children to wear bicycle helmets by the time the child was between 12 and 15 years. Despite very low helmet use among parents, there is a positive effect on use among children whose parents use helmets themselves. The influence from parents is obvious, and the school seems to be an under-utilised resource.

Even among those who do not use helmets, most children believed that helmets contribute to safety. Many also believed that everyone should wear a bicycle helmet when cycling. However, the study discovered a determined resistance against a compulsory helmet law. The strength of this attitude may help explain why international studies reveal only limited increases in helmet use among teenagers despite the passage of such laws.<sup>30</sup>

The claim by one third of the pupils at the intermediate level that they might use helmets at the upper level indicates that there is a considerable potential for increasing use among older children.

The pupils answered the questionnaire during school hours under the supervision of their teachers. This set an atmosphere of order and seriousness and probably positively affected the response rate.

However, one should be aware of the limitations due to the fact that the results are based on pupils' perceptions of the extent to which adults convey information and use helmets themselves. It might have been easier for children who use helmets to be aware of their parents' involvement. Yet in this study we do not have information about the parents' view of their use, but this should be an important issue for further studies. There may also be recall bias concerning the data on previous helmet use. Therefore, one should be cautious when drawing conclusions about the correlations. Nevertheless, there seems to be a strong association between the children's belief about their parents' involvement and their own use of helmets.

The LisRel analysis used in this study provides in-depth understanding of the mechanisms that influence the use of helmets. Our LisRel model helped elucidate the importance of the part played by parents and the limited contribution of the school. The methodological point to be made here is that if the children were asked directly, their answers indicated that attitudes were the main reason for not using helmets. However, the LisRel analysis showed an obvious connection with parental involvement. This involvement turned out to

have connections both to the children's attitudes and to their helmet use. The influence of parental rules appeared to have the strongest effect on use.

### Implications for prevention

International interventions to increase bicycle helmet use among schoolchildren, mainly from the US, Canada, and Australia, have shown that community-wide campaigns aimed at schoolchildren have a positive effect on the use of and attitudes towards helmets.<sup>10 31-38</sup> An important task would be to motivate parents to encourage their children to use helmets,<sup>18 19 23 30 39</sup> as shown by this study. Activities aimed at both the children and their parents are likely to yield the best result.<sup>31</sup>

It is important that interventions continue over a long period of time.<sup>36</sup> Otherwise, one runs the risk that the changes in attitudes will not endure.<sup>28 29 40 41</sup>

By merging experiences from earlier interventions together with the results from this study, we believe it may be possible to achieve a lasting increase in helmet use among schoolchildren based on voluntary decisions.

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### Despite critics, New York City moves closer to requiring helmets for scooter riders

Less than a month after legislators introduced a bill taking aim at drivers who use cell phones, the City Council set its sights on the juvenile scooter set. This time, it is considering branding helmetless scooter tykes as outlaws. Some of the critics said that a helmet would take all of the fun out of the popular toys, which are sold from Main Street to Madison Avenue, relegating them to the back of the closet. Describing scooters as a “simple pleasure of childhood”, Martha Rowen, a member of Right of Way, a pedestrian advocacy group, said, “The exercise children get with a scooter develops strength, coordination and a whole range of motor abilities, not to mention helping prevent obesity, a huge and growing problem for both children and adults in our society”. She also said that adults would resist carrying children's helmets to playgrounds or parks along with the scooters and other gear that are already needed for such excursions. Others said that helmets were not needed because riding scooters was no more dangerous than playing on swing sets or playing touch football.

Even the city's Police Department and Department of Health had parts of the bill softened from its original version before the council's committee on health passed it 7 to 0.

But the Democratic chairman of the Council's committee on health, said data compiled by the federal government showing a rash of scooter related injuries, including 8600 mishaps in September, demonstrated that helmets were necessary. He said no data were available for scooter related injuries in New York City. A 6 year old boy was killed in Elizabeth, NJ, in September when he rode his scooter into traffic, although the authorities said later that a helmet would not have saved him.

Once signed by Mayor Rudolph W Giuliani, who has already endorsed it, the bill would become law in 60 days. Violators could be fined \$50. One amendment to the original bill, which was added to satisfy the police, stipulates that summonses will not be issued directly to children, but only to parents or guardians who are present when scooters are being used without helmets. Another amendment, which came in response to objections from the Department of Health, removed a requirement that emergency room personnel at public hospitals inform the police when children are treated for scooter related head injuries. Instead, the bill passed yesterday calls on city health officials to prepare and distribute educational material on the hazards of scooters (*New York Times*, January 2001).