SWOV Fact sheet

Category A1 (to 125 cc) of the new motorcycle driving licence

Summary
The new driving licence category A1 is valid for motorcycles with an engine capacity of up to 125 cc. According to the new European Directive on driving licences, the minimum age for this category is 16, but Member States can also set the minimum age to 17 or 18. In the Netherlands, the minimum age for this category is currently 18. If the minimum age in the Netherlands is lowered, an increase in the number of casualties is expected. This expectation is supported by the experiences in Germany, where the minimum age for light motorcycles was lowered in the 1990s. Based on the results in Germany, an increase in the number of casualties is also expected in the Netherlands if possession of a B driving licence (for passenger cars) allows one to ride a 125 cc motorcycle.

Background and content
In 2006, a new European Directive on driving licences was adopted (EU, 2006). The Directive pertains to motorized, two-wheeled vehicles, with A1, A2 and A driving licences for motorcyclists and an AM driving licence for moped and light-moped riders. The Directive specifies that an A1 driving licence permits one to ride a light motorcycle (with an engine capacity of up to 125 cc and 11 kW) from the age of 16. Up to now, the minimum age in the Netherlands has been 18. The Member States are free to set the minimum age for this category at 16, 17 or 18. Furthermore, Member States have the freedom to decide whether someone who holds only a category B driving licence (for cars) is allowed to ride a 125 cc motorcycle. In most cases, there are restrictions, such as a compulsory practical training and possession of the B driving licence for a minimum number of years. The new Directive comes into force in 2013, by which time the Netherlands and other Member States must have set the minimum age. This fact sheet discusses the expected road safety consequences of a lowered minimum age for the A1 driving licence, and of allowing those who only possess a B licence to ride 125 cc motorcycles.

What driving licence categories are being introduced for motorcycles?
The table below gives an overview of the new driving licence categories for motorcycles in the European Directive: A1, A2 and A. The minimum age for the A1 driving licence has consequences for the minimum age for categories A2 and A (see *Table 1*). A minimum age of 17 is not included, but this age would hold an intermediate position between the minimum ages of 16 and 18 years.

Driving licence category	Motorcycle category	Minimum age if A1 is set at 16 years	Minimum age if A1 is set at 18 years
A1	Engine capacity: max. 125 cc Motor capacity: max. 11 kW Specific capacity: max. 0.1 kW/kg	16 years	18 years
A2	Motor capacity max. 35 kW (is now 25 kW) Specific capacity: < 0.2 kW/kg May not be derived from motor > 70 kW	18 years	20 years
A	Unlimited	24 years (if already in possession of A1 or A2 driving licence: 20 years)	24 years. (if already in possession of A1 or A2 driving licence: 22 years)

Table 1. *Driving licence categories for motorcycles in the Third Driving Licence Directive* (EU, 2006: 2006/126/EC).

The table shows that maintaining the minimum age of 18 years for the A1 driving licence will have consequences for the heavier motorcycles. One will be allowed to start riding these at a higher age compared to the present situation. For example, one will be able to ride the A2 category from the age of 20 (while this is 18 at present) and the category 'A unrestricted' from the age of 24 (which is 21 at present).

What age categories are currently in force for A1 in the various European countries?
For most European countries the A1 category is not new. In 2004, the SWOV conducted a questionnaire study for which fourteen European counties supplied information (Schoon, 2004). Denmark and the Netherlands were the only countries that did not have an A1 category. Eight of the twelve other countries, including Germany, France and Sweden, had a minimum age of 16 for the A1 category. Austria, Belgium and Switzerland had a minimum age of 18, and only the UK had a minimum age set at 17.

What are the fatality rates for the various modes of transport and age groups?
In the Netherlands, the fatality rate for riders of motorized, two-wheeled vehicles is clearly higher than the fatality rate for cyclists. That applies to moped and light-moped riders as well as to motorcyclists (see also the SWOV fact sheets *Motorcyclists* and *Moped and light-moped riders*. The fatality rates are different for different age groups (see *Table 2*). The rate for the youngest groups is clearly higher than for the higher age groups. From the age of 50, the fatality rate starts to rise again; from the age of 60 it even rises by a factor of 4 or 5 among cyclists and moped and light-moped riders (see the SWOV fact sheet *The elderly in traffic*).

Mode of transport (riders and passengers)	0-17 years	15-17 years	18-29 years	30-39 years	40-49 years	50-59 years	60+ years
Cyclists	8	--	7	5	6	9	42
Moped and light-moped riders	--	80	62	41	35	48	292
Motorcycle and scooter riders	--	--	121	72	50	55	64

Table 2. *The average annual fatality rate (number of recorded deaths per billion kilometres travelled) for riders and passengers of bicycles and motorized, two-wheeled vehicles per age category over the period 2000 to 2009 (source: Netherlands Ministry of Infrastructure and the Environment and Statistics Netherlands).*

What is the relation between age and experience?
In general, one can identify two clusters of causes for the decline in the crash rate among motorized road users as they get older. Firstly, the higher the age at which one first becomes a motorized road user, the lower the initial crash rate. As people get older, they lose their 'wild streak': they take fewer risks and are less inclined to overestimate their own driving skills. Secondly, the crash rate declines in proportion to the amount of driving experience acquired. With more driving experience, a person gains more skills such as improved hazard perception and the ability to assess relevant traffic situations. Research conducted among young car drivers shows that about 60 % of their higher crash rate is determined by lack of experience and about 40% by age-related factors (Maycock et al., 1991; Gregersen & Bjurulf, 1996; Vlakveld, 2005). See the SWOV fact sheet *Young novice drivers*.

Research into the relation between age, experience and crashes has also been conducted for motorcyclists. In 2002, an extensive survey was conducted in the UK, in which 30.000 questionnaires were distributed to motorcyclists (Sexton et al., 2004). Of these, 11,265 questionnaires were completed. Altogether, the motorcyclists had had 1,495 crashes; more than half of these took place while commuting or on work-related journeys. A statistical model was used to calculate the crash rate. This showed that the age of the motorcyclist was the most important indicator of a high crash rate: young riders are more likely to be involved in a crash. Experience also had an effect – the more experience, the lower the crash rate. In short, where the high crash rate amongst young drivers is caused mainly by their lack of experience (as mentioned above), for young motorcycle riders their age is mainly responsible for the high crash rate. Baughan et al. (2005) explain these results through the hypothesis that although the skills improve with experience in riding the motorcycle, this is cancelled out by the higher risks that motorcycle riders take.

After correction for distance travelled, age and experience, riders of 125 cc motorcycles were found to have a 15% higher risk of being involved in a crash than those on more powerful/heavier motorcycles. However, the injury severity was less in crashes involving 125 cc motorcycles, than in crashes involving more powerful/heavier motorcycles (Sexton et al., 2004). The same study illustrated the relationship between starting age and experience for riders of motorcycles up to 125 cc (see *Figure 1*). The upper curve shows only the crash rate (called accident liability in the Figure) related to age. This is highest at 17 (the minimum age in the UK). The higher the age at which one first starts to ride a

motorcycle, the lower the initial crash rate. The two lower curves show the effect of experience for the starting ages of 17 and 40 years. In both cases, the crash rate declines with the years of experience; after about ten years, very little road safety benefit can be attained from increasing experience.

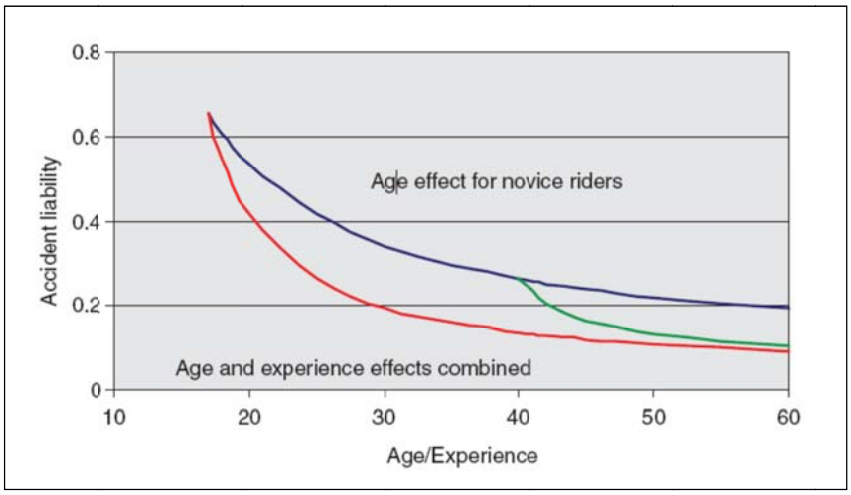

Figure 1. *Illustration of the relationship between crash rate (accident liability), age and experience for riders of motorcycles up to 125 cc riding 7,500 km per year (Sexton et al., 2004).*

What was the safety effect of the introduction of the A1 category in Germany?
The A1 category was introduced in Germany in 1996. After passing the motorcycle test, it was possible to ride a 125 cc motorcycle from the age of 16. Of all the light motorcycles in Germany in 1997, 13% were owned by 16 to 17 year-olds. However, 44% of crashes involved this age group: over-representation by a factor of 3.4. A 1998 survey showed that, among owners of 125 cc motorcycles, the age group of 16 to 17 year-olds travelled fewer kilometres per year than older riders (on average, 4035 km and 4870 km, respectively). Younger riders use light motorcycles somewhat more for commuting than older riders. They participated more in motocross and speeding in bends (along winding roads), and rode in groups for pleasure more than the older age groups (Schulz, 2000).

Another German report on crashes relates to the period 1994-2000 (Assing, 2002). The number of fatal casualties per 100,000 motorcycles was calculated for the various age groups. The 16-17 age group rode motorcycles with an engine capacity of up to 125 cc. This group had by far the highest crash rate: over 150 fatalities per 100,000 motorcycles, compared to 75 fatal casualties per 100,000 motorcycles in the 18-21 and 21-25 age groups.

Based on questionnaires completed by 137 young moped and motorcycle riders, Raithel (1998) states that mopeds and 125 cc motorcycles are often 'tuned up' to improve their performance. Half of the respondents stated that they had tuned up their moped or 125 cc motorcycle. Unfortunately, the distribution between the two vehicle categories is not known. In the Netherlands, nothing is known about the frequency or the extent to which 125 cc motorcycles are tuned up. However, it is known that a tuned-up motorized, two-wheeled vehicle has a higher crash rate; for mopeds, this is estimated to be 50% higher (Elvik & Vaa, 2004).

What are the anticipated mobility effects of reducing the A1 category minimum age from 18 to 16?
In addition to age and experience, mobility also has its effect on road safety. Mobility shifts can occur if the minimum age for riding a motorcycle in the Netherlands is reduced from 18 (current situation) to 16 (for the 125 cc category). Van Norden & Schoon (2009) mention the following potential shifts in mobility:

- A number of 16 and 17 year-olds who now ride mopeds will switch to riding a motorcycle. These youths will have to follow a more extensive training (A1 driving license) than for the moped (AM licence). However, due to the higher speed of a 125 cc motorcycle, the crash rate for motorcyclists of 16 and 17 is expected to be higher than that of moped riders aged 16 and 17. This would lead to more casualties. On the other hand, the experience gained by motorcyclists at the ages of 16 and 17 will lead to a reduced crash rate as they get older. This would result in fewer casualties. It is

difficult to estimate whether more experience can compensate for a younger starting age; this depends greatly on the amount of experience gained.
- A number of 16 and 17 year-olds who, in the present situation, do not own a moped or light moped but use a bicycle or public transport, will switch to using a motorcycle (their number is expected to be small). Because the crash rate is considerably higher for motorcyclists than for cyclists and passengers on public transport, this would lead to more casualties.
- The distance travelled will increase because people will cover greater distances on a 125 cc motorcycle than they would have done on a moped. More kilometres travelled lead to more casualties.
- The number of motorcyclists of 18 and over will increase because the 18 year-old already has a motorcycle and therefore switches to driving a car at a later age. Due to the big difference in crash rate between motorcycles and cars, this would lead to more casualties.

On balance, therefore, an increase in the number of road casualties is to be expected if the minimum age for riding a motorcycle is lowered. It is difficult to estimate the size of this increase.

What is the effect of riding a 125 cc motorcycle when only in possession of a driving licence for cars?

In many European countries, a person with a category B driving licence is automatically allowed to ride a 125 cc motorcycle; a separate category A driving licence is not required. This has been the situation in Germany since February 1996, albeit only for drivers who gained their category B licence before 1980. Assing (2002) has examined the effect of this. There was a big increase in motorcycle ownership in the age group 35 or older, from 750,000 motorcycles in 1994 to over 2 million in 2000. Assing ascribes part of this increase to the popularity of the 125 cc class. The general increase in motorcycle ownership went hand in hand with a clear increase in the number of injury crashes among motorcyclists of 35 and older (see uppermost curve in *Figure 2*). Assing ascribes this increase in the number of injury crashes among motorcyclists in the age group 35 or older to the increase in the number of motorcycles (more motorcycles = more crashes). Tthe number of crashes per 100.000 motorcycles turned out to be the highest for the youngest age group of motorcyclists (aged 16 to 18)

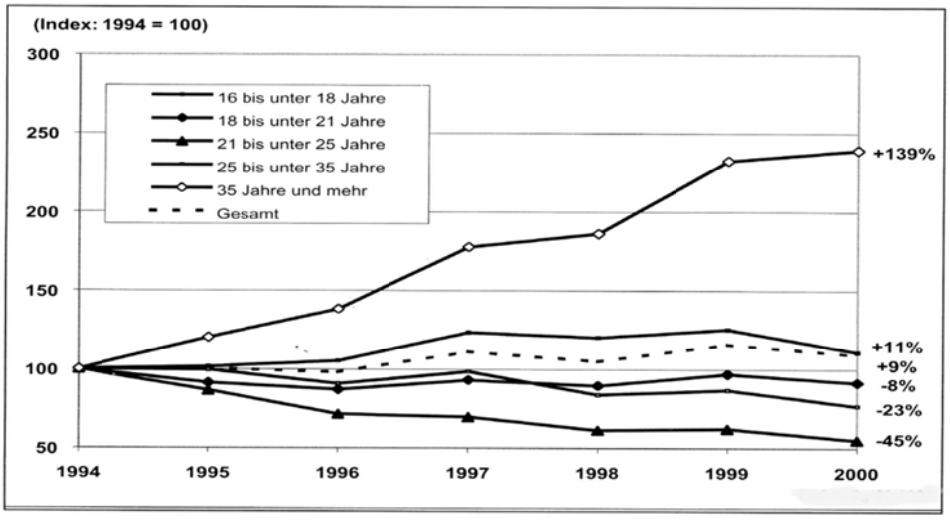

Figure 2. *The development in the number of injury crashes among motorcyclists for various age groups in Germany in the period 1994-2000, taking 1994 = 100 as the index (Assing, 2002)*

Conclusion

A reduction in the minimum age for riding a (light) motorcycle from 18 to 16 is expected to cause a number of changes in mobility, and will therefore have an effect on road safety. In the first place there is the shift from relatively safe modes of transport, such as the bicycle and public transport, to the relatively unsafe motorcycle. In addition, a motorcyclist's action radius is considerably bigger than that of a cyclist or moped rider. This could easily lead to 16 and 17 year-olds travelling more kilometres if they have a motorcycle at their disposal. More kilometres lead to more crashes, especially if these kilometres are ridden on a vehicle with a relatively high risk of serious injury.

Moreover, various studies show that young motorcyclists are at particularly high risk in comparison with older motorcyclists. This is due not only to lack of experience but also to age-related aspects, such as a higher acceptance of risk and overestimation of one's own skills. Age-related factors explain about 30 to 40% of the high crash rate for young riders or drivers and will play a greater role in the 16-17 age group than in the 18-19 age group. On the other hand, the experience gained by motorcyclists at the age of 16 and 17 will presumably lead to a lower crash rate as they get older. Thus a positive development can be expected for motorcyclist in the age group of 18 and older. On balance, however, we anticipate an increase in the number of road casualties if the minimum age for riding a 125 cc motorcycle is reduced from 18 to 16. Experiences in Germany, where an age reduction was introduced in 1996, confirm this expectation. In that country, 16 and 17 year-olds on 125 cc motorcycles are indeed clearly over-represented in crash involvement. There is no reason to suppose that the situation would be different in the Netherlands. It is difficult to determine the extent, in absolute terms, to which road safety will decline, because it is not known how many young people in the Netherlands will actually make use of the possibility to ride a 125 cc motorcycle.

In many European countries, a person with a category B driving licence is allowed to ride a 125 cc motorcycle. In these cases, no separate category A licence is necessary, though a short training course may be required. The effect of this on road safety has been studied in Germany, where it was shown that this possibility went hand in hand with a big increase in motorcycle ownership among people of 35 and older, plus a clear increase in the number of crashes involving injury in this group of motorcyclists. There are no clear reasons to suppose that this would be any different in the Netherlands.

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