Traffic education

SWOV Fact sheet, December 2017

SWOV Fact sheets contain concise relevant knowledge on topics within the road safety themes and are updated regularly. Recently updated SWOV Fact sheets can be found on swov.nl/fact-sheets.

Summary

Traffic education is defined here as any kind of formal or informal education that is aimed at learning and improving the knowledge, insight, skills and attitudes that are necessary for safe traffic participation, including the wish to safely participate in traffic.

Those who provide traffic education can be schools (traffic education is a legally mandatory part of the curriculum in elementary schools), but also road safety organisations and parents. Traffic education is basically meant for all road users in all traffic roles. It is therefore not only meant for children, but also for novice drivers, older drivers, novice drivers of pedelecs, et cetera. Continuous traffic education is aimed at providing traffic education in all stages of life and traffic roles.

Not much is known about the effects of traffic education. An effect on the crash rate has not yet been demonstrated. Some evaluations indicate that traffic education can have an effect on (self-reported) attitude or behaviour, provided the program is properly set up. Requirements for a well set up programme are:

- It focuses on behaviour that has been shown to have a clear relationship with road safety.
- It focuses on the group that that shows the problem behaviour; this group is capable of behaviour change.
- It takes into account the reasons why the group shows the behaviour.
- It offers the possibility to learn from own experiences.

It is important to evaluate traffic education projects on their effectiveness (improvement of behaviour, knowledge, or attitudes), didactic quality, and/or reaching the target group. This makes it possible to use strong programmes more frequently and to discontinue or improve weak programmes.

Rehabiitation courses, focusing on deviant traffic behaviour of drivers, can also be considered traffic education. These educational measures are discussed in the SWOV fact sheet *Traffic enforcement*. Separate fact sheets have been published about *Public service advertising* and *Driver training and driving tests*.

1 What is traffic education?

We define traffic education as any kind of formal or informal education that is focused on learning and improving the knowledge, insight, skills and attitudes that are necessary for safe traffic participation, including the will to safely take part in the traffic. This definition is taken from the definition of driver education by Senserrick et al. [1], but is applicable to the whole field of traffic education.

Formal traffic education is defined as those forms of education provided in an educational programme or project, usually provided by a school, or educational Institute. *Informal* education comprises the parents' activities in daily life to help their children acquire the knowledge and skills that are necessary for safe traffic participation.

2 What is the role of the school?

In primary schools traffic education is a mandatory part of the curriculum, but in secondary schools, this is not the case. However, the subject of traffic is included in the core goals for secondary schools (in Dutch). In the lower grades road safety is mainly presented as part of other subjects. In the higher grades traffic is almost exclusively covered in campaigns for the target group, such as (light) mopeds and alcohol in traffic [2] [3].

For adolescents, there is a tendency for courses not only to focus on safe traffic behaviour, but on risk behaviour in general (no drugs, safe sex, and so on). One example is the project developed by VeiligheidNL 'Fight your inner monkey'. This project particularly focuses on offering resistance to peer pressure. An evaluation in 2013 (referred to in the Toolkit Traffic Education [4]) showed that the students, compared to students in a control school, had more knowledge about peer pressure after following the project, and situations where peer pressure occurs were recognized better. The project had no effect on awareness and behaviour. Another example is the project 'Power or Control', that aims at teaching students to stand up for themselves and, at the same time, be considerate of others. This project has not yet been evaluated in terms of behavioural effects, though a process evaluation was performed [5]. A so-called resilience training in Australia focusing on all forms of risk behaviour, led to a decrease in the number of traffic crashes involving adolescents, whereas a specific training only focusing on traffic showed no decline [1].

3 What is the role of parents?

Parents also have a role in teaching their children the knowledge and skills necessary to safely participate in traffic. This usually does not happen in the form of a programme or project as done in school, but in a more informal manner, in everyday life. This informal education can be a way to let children and youngsters gain practical experience. For example, parents can point out possible hazards to their child during the route from home to school or while driving draw their attention to certain situations or behaviour [6]. In the former case informal education focuses on children who do not yet travel to school independently. But also when children do go to school independently, parents can still have a positive influence on the risk behaviour of their children [7] [8] [9].

Accompanied driving for novice drivers is also based on informal traffic education. A parent or other person travels with the novice driver for a certain period of time, so that the novice driver gains driving experience in a relatively protected environment. For more information, see the archived SWOV Fact sheet *Accompanied driving.*

4 Who is traffic education intended for?

Traffic education is basically intended for all road users in all traffic roles that do not have (sufficient) knowledge, insight, skills and attitudes to participate in traffic safely and who are able to learn. It is therefore not only meant for children, but also for novice drivers, elderly drivers, novice riders of pedelecs, et cetera. There are also so-called 'refresher' courses that mainly focus on the knowledge of traffic rules among drivers who have had their driver's license for a while. The effects of some of these forms of education have been investigated. An evaluation of the Dutch BROEM-dries for elderly drivers by Davidse & Hoekstra [10] concluded that these did not lead to an improved level of knowledge. In this study the effect on driving behaviour could not be determined. However, there is international evidence that education for elderly drivers can improve driving behaviour when combined with practical lessons [11].

Pedelec riders of electric bicycles are another potential target group for traffic education. This is rather self-evident as riding a pedelec is different from riding a regular bike. Research shows that people go faster on a pedelec than on a regular bike, and in complex situations do not reduce speed sufficiently [12]. We also know that pedelec riders are frequently more severely injured in a crash than cyclists on regular bikes [13]. At various locations in the Netherlands courses are organized for pedelec riders, e.g. the e-bike days in the Province of Zeeland and the e-bike training days by SOAB. These courses have not yet been evaluated for effectiveness.

5 What is permanent traffic education?

Permanent traffic education (PVE) stands for the idea that education projects are offered for each age group and each mode of transport. The goal is to create the conditions for safe traffic behaviour in terms of knowledge, ability and willingness. These elements lead to a formal definition of permanent traffic education: “a coherent package (in terms of both age-related development and road users’ mode of transport) of consecutive and continuous activities aimed at internalized change or maintenance of the desired safe traffic behaviour, by creating the necessary conditions for the desired behaviour (of knowledge, ability and willingness)” [14].

Within permanent traffic education six target groups are distinguished:

- 0 – 4 years old (early and preschool education)
- 4 – 12 years old (primary school)
- 12 – 16 years old (secondary education)
- 16 – about 25 years old (novice drivers)
- about 25 – about 60 years old (driving licence owners)
- from about 60 years old (elderly road users)

6 What are the learning objectives of traffic education?

The learning objectives of traffic education are numerous. They are described in the report 'Leerdoelendocument Permanente verkeerseducatie (PVE)’ (Learning Objectives Permanent Traffic Education (PVE)) [15]. Every PVE-target group has its own learning objectives, some of which may overlap. They have been defined as precisely as possible and provide insight into the topics that are of interest for that target group when it comes to knowledge, skills, attitude and behaviour. Below some examples of learning objectives are listed for each PVE-target group. For the target group 0-4 years, most learning objectives are aimed at parents/guardians.

0 – 4 years-old (early and preschool education)

- The parent can describe what risks play a role when a child participates in traffic or is playing
- the child knows the basic principles of crossing a road

4–12 years-old (primary school)

- The child shows willingness to take responsibility for its own behaviour and thus for the safety of others

12–16 years-old (secondary education)

- The teenager can describe what aspects are important for safe bicycle use and the use of the safety facilities

16–about 25 years-old (novice drivers)

- The novice driver can describe which risks play a role in performing manoeuvres in traffic and can analyse what to do to prevent these risks having a negative impact on performing manoeuvres

about 25–about 60 years-old (driving licence holders)

- The driving licence holder can describe which rules he or she must follow, can describe why it is important that these rules are respected and can correctly apply the rules in concrete situations

about 60 years and older (elderly road users)

- The older road user can describe how he or she can optimize, select and compensate for limitations of motor, sensory and cognitive skills in managing traffic situations, and can also show this behaviour

7 How can the effect of traffic education be measured?

We often evaluate the extent to which a measure contributes to road safety on the basis of proven effects. A good effect study is a study that is set up in such a way that you can be fairly sure of the causal relationship between measure and effect. In this case: is the found effect indeed due to the education programme and can we exclude alternative explanations? And can we expect this programme to have the same results for similar groups? Mesken [16] gives a complete overview of aspects that play a role in the evaluation of education programmes. Here we will discuss three aspects that are important for the evaluation of the effectiveness of road safety programmes: the control group, self-selection and the outcome measure.

A control group is a group of subjects that resembles or is equal to the 'education group', but which has not taken part in the traffic education programme under evaluation (no course and/or information). By comparing the control group and the education group you can determine whether (unintentional) changes have occurred due to external influences, for example by simultaneous intensified enforcement, or by the education programme.

Self-selection means that the persons who choose the education programme and the persons who voluntarily choose the control group can differ too much. For example, elderly road users who choose to participate in a driver training are often people who are already aware of the possibility that functional limitations may affect their participation in traffic. In that case a difference between this group and the control group may not be due to the course, but to differences between the two groups that are already present.

The outcome measure is that what you expect to change as a result of the education programme. Of course the most desired outcome measure in the field of road safety is a reduction of crashes. But since relatively few crashes occur and the experimental group is too small, behavioural measures (e.g. violations) or self-reported behaviour, often measured with questionnaires, are used instead. The WEVER [17] project aims at an instrument that measures the actual behaviour as closely as possible.

8 What is the road safety effect of traffic education?

Not much is known about the effects of traffic education. Relevant studies are often too small to allow for drawing conclusions. Nor is it in most cases officially tested whether the stated learning objectives are in fact achieved. In a large-scale meta-analysis [18] 674 evaluation studies were examined, of which only 15 were found to meet the methodological requirements. The results of this meta-analysis indicated that crossing programmes for pedestrians resulted in safer behaviour. These studies did not investigate if there was also a decline in the risk of crashes. In some other studies children seemed to have a slightly higher risk of crashes after road safety education, possibly as a result of overconfidence [19]. A Dutch systematic evaluation of eleven different education programmes for primary schools showed that some of the evaluated projects had a small effect on self-reported behaviour [20] [21]. Furthermore, this study could not determine whether this was actually accompanied by safer behaviour or fewer crashes.

In addition to the formal effects on behaviour and crashes, traffic education can lead to activating the target group. In this way, traffic education could be indirectly effective, even if no behavioural effect can be found. For example, schools or areas may pay more attention to road safety. However, these effects are difficult to quantify.

Traffic education is not a matter of ‘it can’t hurt to try’; projects that have not been correctly set up, can also have a adverse effect [19] [22]. Moreover, these projects cost money that could have been better spent on more effective projects.

9 Why is it important to evaluate traffic education programmes?

It is important to evaluate traffic education programmes, because this provides insight in which programmes work and which do not. This way, strong programmes can be used more frequently and weak programmes can be improved or discontinued. A strong experimental research design must be chosen for an evaluation (see, for example, Mesken [16]) with at least a before and after measurement and a control group. It is also better to measure the actual behaviour than a derivative thereof. Behavioural observations are therefore preferable to questionnaires, as stated in the WEVER programme (On the Way to Effective Traffic Education [17]). In addition to an evaluation on the effect, a process evaluation can be carried out, which for example investigates the didactic quality of the programme or whether or not the target group has been reached [23].

For more information see the archived SWOV Fact sheet *Necessity, contents and assessment of traffic education*.

10 What are characteristics of a good traffic education programme?

Effective education requires a logical connection between the road safety problem, the behaviour and the didactic method. Therefore, a good education programme has the following characteristics (see also Vissers [23] and Kok et al. [24]):

- The programme focuses on behaviour of which a clear relationship with road safety has been established.
- The programme focuses on the group that shows the problem behaviour; this group is capable of behaviour change (this is a problem, for example, in very young children).
- The programme takes into account the reasons *why* the group shows the behaviour (for example: does the group know that the behaviour is problematic? Does the group know but continue to act this way for specific reasons?).
- The programme offers the possibility to learn from own experiences.

Traffic education with the strongest possibility of behavioural change contains an interplay between formal instruction and frequent exercise in safe conditions. Twisk [25] concludes that there is a need for programmes that allow youths to practice in complex traffic situations, but in which additional hazards are limited as much as possible.

11 Which teaching methods and work formats are there and when can they best be employed?

The following six didactic starting points are very suitable for traffic education [26]:

- integrate theory and practice;
- encourage self-learning capabilities;
- teach knowledge, insight and understanding in a meaningful context;
- make use of informal learning;
- pay attention to all levels of acting safely;
- pay attention to social, communicative and moral aspects of traffic participation.

In addition to these general principles, specific work formats are often used in traffic education. Teaching is used when information is unilaterally communicated by the trainer or teacher to the target group. There is limited interaction. This form is especially suitable if increasing knowledge is the learning objective. For improving insight of understanding or application, this method is less suitable. Other work formats have more interaction and are suitable for more learning objectives, such as educational conversation and group discussion.

Keith en Frese [27] conducted a meta-analysis of the effect of the Error Management Training: a training in which participants – in a safe environment – are explicitly encouraged to commit errors and learn from it. The investigation showed that EMT was effective and led to better training results than training in which committing errors was avoided.

There are also various work formats that use new technology: Virtual Reality, E-learning, serious games, et cetera. At this moment, little research has been done on the effectiveness of such work formats. However, Lehtonen et al. [28] did perform such a study and evaluated a computer game that was developed to teach children situation awareness. No effect was found.

Publications and sources

Below you will find the list of references that are used in this fact sheet; all sources can be consulted or retrieved. Via Publications you can find more literature on the subject of road safety.

[1]. Senserrick, T., Ivers, R., Boufous, S., Chen, H.-Y., et al. (2009). *Young driver education programs that build resilience have potential to reduce road crashes*. In: Pediatrics, vol. 124, nr. 5, p. 1287-1292.

[2]. Nägele, R. & Doff, H. (2009). *Implementatie van verkeers- en gezondheidseducatie in het voortgezet onderwijs: een literatuuronderzoek*. Kennisplatform Verkeer en Vervoer (KpVV), Rotterdam.

[3]. Vermeulen, W. (2009). *Overzicht verkeerseducatie in Nederland: stand van zaken en vooruitzicht*. Ministerie van Verkeer en Waterstaat, Directoraat-Generaal Rijkswaterstaat, Dienst Verkeer en Scheepvaart DVS, Delft.

[4]. CROW (2016). *Toolkit Verkeerseducatie*. CROW. Geraadpleegd 03-10-2017 op http://www.crow.nl/mobiliteit-en-gedrag/tools/toolkit/documenten/fight-your-inner-monkey?onderwerp=505;&page=1&searchsort=date&pagesize=10&parenturl=/Mobiliteit-en-Gedrag/Tools/Toolkit.

[5]. Claassen, A. (2010). *Wat heb je ervan geleerd? Focussen !!!! Procesevaluatie van het pilot-project 'Power of Control': Hoofdrapport*. ITS, Radboud Universiteit Nijmegen.

[6]. Hoekstra, A.T.G. & Twisk, D.A.M. (2010). *De rol van ouders in het informele leerproces van kinderen van 4 tot 12 jaar. Een eerste verkenning*. R-2010-19. SWOV, Leidschendam.

[7]. Brooks-Russell, A., Simons-Morton, B. & Ehsani, J. (2014). *Parents are the key to improving teen driving safety*. In: The Journal of Adolescent Health, vol. 55, nr. 5, p. 600.

[8]. Curry, A.E., Peek-Asa, C., Hamann, C.J. & Mirman, J.H. (2015). *Effectiveness of parent-focused interventions to increase teen driver safety: A critical review*. In: Journal of Adolescent Health, vol. 57, nr. 1, p. S6-S14.

[9]. Shimshoni, Y., Farah, H., Lotan, T., Grimberg, E., et al. (2015). *Effects of parental vigilant care and feedback on novice driver risk*. In: Journal of Adolescence, vol. 38, p. 69-80.

[10]. Davidse, R.J. & Hoekstra, A.T.G. (2010). *Evaluatie van de BROEM-cursus nieuwe stijl. Een vragenlijststudie onder oudere automobilisten*. R-2010-6. SWOV, Leidschendam.

[11]. Korner-Bitensky, N., Kua, A., Zweck, C. Von & Van Benthem, K. (2009). *Older driver retraining: An updated systematic review of evidence of effectiveness*. In: Journal of Safety Research, vol. 40, nr. 2, p. 105-111.

[12]. Vlakveld, W.P., Twisk, D., Christoph, M., Boele, M., et al. (2015). *Speed choice and mental workload of elderly cyclists on e-bikes in simple and complex traffic situations: A field experiment*. In: Accident Analysis & Prevention, vol. 74, p. 97-106.

[13]. Poos, H.P.A.M., Lefarth, T.L., Harbers, J.S., Wendt, K.W., et al. (2017). *E-bikers raken vaker ernstig gewond na fietsongeval: Resultaten uit de Groningse fietsongevallendatabase*. In: Nederlands Tijdschrift voor Geneeskunde, vol. 161, nr. D1520.

[14]. Betuw, A.J.M. van & Vissers, J.A.M.M. (2002). *Naar een succesvolle invoering van Permanente Verkeerseducatie: uitgangspunten voor beleid*. gezamenlijke Regionale en Provinciale Organen voor de Verkeersveiligheid.

[15]. Vissers, J.A.M.M., Nägele, R.C., Kooistra, A.B., Betuw, A.J.M. van, et al. (2005). *Leerdoelendocument Permanente Verkeerseducatie*. In opdracht van Directoraat-Generaal Rijkswaterstaat, Adviesdienst Verkeer en Vervoer AVV. Traffic Test, Veenendaal.

[16]. Mesken, J. (2011). *De evaluatie van verkeerseducatieprogramma's. Aanbevelingen voor effectmeting en een voorstel voor een verkort meetinstrument*. R-2011-8. SWOV, Leidschendam.

[17]. Slinger, W., Koen, F., Vissers, J. & Twisk, D. (2016). *Op weg naar effectieve verkeerseducatie: het WEVER-project.* Paper gepresenteerd op het Nationaal Verkeersveiligheidscongres NVVC, 21 april 2016, 's Hertogenbosch.

[18]. Duperrex, O., Bunn, F. & Roberts, I. (2002). *Safety education of pedestrians for injury prevention: a systematic review of randomised controlled trials*. In: British Medical Journal, vol. 324, nr. 7346, p. 1129-1131.

[19]. Gregersen, N.P. & Nolén, S. (1994). *Children's road safety and the strategy of voluntary traffic safety clubs*. In: Accident Analysis & Prevention, vol. 26, nr. 4, p. 463-470.

[20]. Twisk, D.A.M., Vlakveld, W.P. & Commandeur, J.J.F. (2006). *Wanneer is verkeerseducatie effectief? Systematische evaluatie van educatieprojecten*. R-2006-28. SWOV, Leidschendam.

[21]. Twisk, D.A.M., Vlakveld, W.P., Commandeur, J.J.F., Shope, J.T., et al. (2014). *Five road safety education programmes for young adolescent pedestrians and cyclists: A multi-programme evaluation in a field setting*. In: Accident Analysis & Prevention, vol. 66, p. 55-61.

[22]. Feenstra, H., Ruiter, R.A.C. & Kok, G. (2014). *Evaluating traffic informers: Testing the behavioral and social-cognitive effects of an adolescent bicycle safety education program*. In: Accident Analysis & Prevention, vol. 73, p. 288-295.

[23]. Vissers, J.A.M.M. (2011). *Checklist verkeerseducatie: Kwaliteitsindicatoren voor het beoordelen van verkeerseducatieprogramma's*. Advies- en ingenieursbureau DHV, Amersfoort.

[24]. Kok, G., Gottlieb, N.H., Peters, G.-J.Y., Mullen, P.D., et al. (2016). *A taxonomy of behaviour change methods: An Intervention Mapping approach*. In: Health Psychology Review, vol. 10, nr. 3, p. 297-312.

[25]. Twisk, D.A.M. (2014). *Protecting pre-license teens from road risk: Identifying risk-contributing factors and quantifying effects of intervention strategies*. Proefschrift Maastricht University, Maastricht.

[26]. Royal Haskoning DHV (2015). *Het meten van effecten van verkeerseducatie – Tien gouden regels voor effectmeting*. CROW-KpVV, Ede.

[27]. Keith, N. & Frese, M. (2008). *Effectiveness of error management training: a meta-analysis*. In: The Journal of applied psychology, vol. 93, nr. 1, p. 59.

[28]. Lehtonen, E., Airaksinen, J., Kanerva, K., Rissanen, A., et al. (2017). *Game-based situation awareness training for child and adult cyclists*. In: Royal Society Open Science, vol. 4, nr. 3. 26

Colophon

URL Source:
https://www.swov.nl/en/facts-figures/factsheet/traffic-education

Topics:
Education

Figures:
Real number of road deaths among young road users (Statistics Netherlands; Tables in Dutch)

Prevent crashes
Reduce injuries
Save lives

SWOV

SWOV Institute for Road Safety Research

PO 93113

2509 AC The Hague

Bezuidenhoutseweg 62

+31 70 317 33 33

info@swov.nl

www.swov.nl

@swov / @swov_nl

linkedin.com/company/swov