

Use of media devices by cyclists and pedestrians

Summary

Many people in the Netherlands use media players and/or mobile phones while cycling or walking. Research has shown that the use of devices while walking or cycling results in an increased crash rate. Pedestrians and cyclists apparently do not compensate sufficiently for the distraction resulting from the use of devices. With pedestrians, this mainly shows from more hazardous pedestrian crossing behaviour. A survey among cyclists has indicated that the use of devices increases the crash rate by a factor of 1.4. Cyclists and pedestrians should be made aware of the risk-increasing effect of the use of devices by way of public information.

Background and contents

Many people in the Netherlands have media players and/or mobile phones. This raises the question how often this kind of device is used while people are walking or cycling and whether this results in less safety. This fact sheet aims at providing answers to these questions. We will report as much as possible on research that specifically looks at cyclists and pedestrians. We will also refer occasionally to relevant research with respect to car drivers. When we refer to portable media devices, we mean devices used for making phone calls, for listening to music, for searching for information and for text messaging.

How many people have portable media devices?

Statistics Netherlands (CBS) reported that in 2005 mp3-players could be found in circa 30% of all Dutch households (CBS, 2009; recent figures are not available). Young people own digital media devices more often than older people do. In 2006, 78% of young people (15-24 years) had iPods or mp3-players (Newrulez Research & Marketing, 2006). Even more people in the Netherlands have mobile phones:

- According to European research of June 2009, 64% of the people in the Netherlands always have a mobile phone with them, 3% of the people in the Netherlands have no mobile phone and 5% have two phones (Synovate, 2009).
- Three-quarters of the 8- to 18-year-olds had a mobile phone in 2009. Of the 8-year-olds this amounted to one quarter, of the 10-year-olds circa half and of the 12-year-olds this was 90%. Practically everybody older than 13 years had a mobile phone (Mijn Kind Online, 2009).

How often are devices used while cycling or walking?

An observational study carried out in the city of Groningen studied the use of devices by cyclists (De Waard et al., 2010). Based on this data, it has been estimated for the Netherlands as a whole that slightly more than 6% of all cyclists use devices while cycling: 5% listen to an audio-player; a little more than 1% use a mobile phone and slightly more than 0.25% operate the menu of the mobile phone for text messaging, dialling a telephone number or another function.

An Internet survey among 2,500 Dutch cyclists (Goldenbeld, Houtenbos & Ehlers, 2010) shows that 17% of all cyclists use a device (almost) each time they ride their bike. This involves listening to music most often: 15% of the cyclists indicate that they listen to music (almost) each time they ride their bike, 3% of the cyclists state that they make phone calls or are contacted by phone (almost) each time they ride their bike, 3% report that they text or receive messages (almost) each time they ride their bike, and almost 2% indicate that they use a device to search for information (almost) each time they ride their bike. Around one-third of all cyclists state never to use a device while cycling. Age turns out to be an important factor for the frequency and method with which devices are used while cycling (see *Table 1*). Three-quarters of the 12- to 17-year-olds report of their own accord that they listen to music and three-quarters also use a mobile phone while cycling; of the over-50s the proportions are one-eighth and one-third respectively. Hence, young people use devices while cycling considerably more often than older people do. Even if we only consider those cyclists who occasionally use devices, and

leave out those that never do so, we are still left with a notable effect of age: the over-50s state that they adjust the use of a device to the complexity of the situation considerably more often than young people do.

Age	Using the phone while cycling	Listening to music while cycling
12-17	77%	76%
25-34	76%	54%
35-49	47%	23%
50-65	34%	14%

Table 1. *The percentages of Dutch cyclists indicating that they listen to music or use the phone while cycling divided in various age categories (source: Goldenbeld, Houtenbos & Ehlers, 2010).*

No research is available in the Netherland about the use of devices by pedestrians.

Why do people use devices while cycling or walking?

A Dutch questionnaire study asked cyclists about the most important reason for listening to music and using the phone while cycling (Goldenbeld, Houtenbos & Ehlers, 2010). They could choose from the following reasons: 'habit', 'fun', 'no other opportunity', 'bored', 'blocking out the environment', 'others do the same' and 'other, namely...'.

The most important reason for cyclists to listen to music is that they consider it as 'mere fun'. This applies to all age categories. Boredom comes in second position and is mentioned by young people (30%) more frequently than by the older age categories. Circa 12% of all age categories mention 'habit' as being the most important reason.

When asked about the reason for using a mobile phone while cycling, all age categories choose the category 'other, namely...' most often; yet the older age categories choose this option twice as often compared to young people. They often fill in this category with 'necessity', 'being able to be contacted (private/work)', 'making/changing appointments', and 'urgent matters'. Older cyclists (35+) may be assumed to have more social obligations and responsibilities (as a parent or an employee) than young people, so that they need to be able to be contacted, as they themselves indicate. The second most frequently mentioned reason for using the phone while cycling is 'habit'; younger cyclists mention this slightly more often than older cyclists.

No data is available about the motives for the use of devices while walking, but it is unlikely that they would differ from the reasons for the use of devices while cycling.

Why is it hazardous to use devices while participating in traffic?

The use of (media) devices while participating in traffic can distract the road user in various ways and, consequently, have an effect on road safety (Meesmann, Boets & Tant, 2009; AVV, 2006; Lee, 2007).

The following types of distraction can play a part:

1. bio-mechanical/physical distraction because the use of the device interferes with the traffic task;
2. visual distraction when the user watches the device instead of the traffic situation;
3. cognitive distraction because the music, the conversation, or other information distracts the user from the traffic task;
4. auditory distraction because a ringtone or music is heard and (if earplugs are used) fewer sounds from the surrounding environment are registered by the road user;
5. state of mind/mood due to the music or the conversation having an effect on road user behaviour.

These various effects apply to all kinds of road users: pedestrians, cyclists, car drivers and other motor vehicle drivers. However, according to Lee (2007), these effects will be larger for young (car) drivers, because they tend to test and use infotainment technology while driving far more often than older drivers do.

Based on research literature, the Dutch Transport Research Centre (AVV, 2006) estimated that the use of a mobile phone by cyclists has at least an equally large effect on traffic participation as it has for car drivers. With cycling, as well as with driving a car, the effect is particularly negative on cognitive processing, that is, the decisions to be taken during the traffic task. The Transport Research Centre estimates that the negative effect on visual processing is slightly less for cyclists than it is for car

drivers, because cyclists have more time to scan the environment and to react to it. On the other hand, the effect of the use of a mobile phone on auditory processing is probably more substantial for cycling than it is for driving a car, because cyclists have to make greater efforts to filter sounds from the surrounding environment while cycling.

More information about distraction as a result of the use of a mobile phone and its consequences for car drivers can be found in the SWOV fact sheet [Use of the mobile phone while driving](#). More information about the part played by distraction in traffic can be found in the SWOV fact sheet [Concentration problems behind the wheel](#).

Does the use of devices have an effect on pedestrian behaviour?

Various foreign studies indicate that pedestrian behaviour becomes more hazardous when they use devices, especially mobile phones, while crossing the street (Hatfield & Murphy, 2007; Nasar, Hecht & Wener, 2008; Stavrinou, Byington & Schwebel, 2009).

Moreover, Hatfield & Murphy (2007) detect a difference between men and women: women using a mobile phone while crossing the street pay less attention to traffic than men using a phone. According to the researchers, the explanation may be that women are more involved in a telephone conversation than men. This Australian case-control study by Hatfield & Murphy was conducted in such a way that the crossing behaviour of pedestrians using the phone was compared with the behaviour of the next pedestrian at the same crossing, crossing the street into the same direction, being of the same gender and the same (estimated) age, not using a mobile phone.

The study by Nasar, Hecht & Wener (2008) shows that users of mobile phones behave more dangerously than non-users, but also more so than users of audio-devices. This study from Columbus (Ohio) defines dangerous behaviour as crossing the street while a car is approaching.

Simulator research shows that children (10-11 years) also behave more dangerously when crossing a street while using a mobile phone compared to non-users. This applies to all children, also when they are well-experienced in crossing the street or in using the mobile phone and also when they are capable of concentrating well in general (Stavrinou, Byington & Schwebel, 2009).

Does the use of devices have an effect on cycling behaviour?

In an experimental study, De Waard et al. (2010) examined the effects of the use of mobile phones on cycling behaviour. A total of 24 cyclists cycled a course on a secluded bicycle track under six different conditions: with or without the use of devices and with or without simultaneously carrying out a simple or more complex arithmetic task. The study indicates that on average cyclists using a mobile phone cycle at a lower speed, report greater mental efforts and experience greater risks. While texting messages, cyclists ride in the centre of the cycle track more often. When using the phone or texting a message, cyclists more often overlook things compared to not using the phone or texting. Text messaging has the largest effect on cycling behaviour and is perceived as most hazardous, even at a very slow speed. This study detected no or only limited effects of listening to music on the cycling behaviour examined. However, cyclists themselves indicated that they experienced a higher risk while listening to music compared to not listening to music.

What is the effect of the use of devices on crash involvement and risk?

Various studies indicate that cyclists are more often involved in cycling crashes or (near-) crashes when they use a telephone or other devices while cycling.

Two recent Dutch studies found that in 3 to 4% of the bicycle crashes with injury, the use of a mobile phone preceded the crash and may have played a part (De Waard et al, 2010; Goldenbeld, Houtenbos & Ehlers, 2010). Goldenbeld et al. further found that, immediately prior to the crash, the use of a mobile phone was mentioned as frequently as listening to music (use of the phone prior to the crash: 4.3%; listening to music prior to the crash: 4.8%), while cyclists listen to music far more often than they use the mobile phone. This indicates that the use of a mobile phone constitutes a higher risk factor for bicycle crashes than listening to music.

A Japanese questionnaire study into the use of mobile phones among young cyclists also indicates a possible risk-increasing effect of the use of mobile phones (N=3.266; cyclists 15-18 years; Ichikawa & Nakahara, 2008). However, firm conclusions cannot be drawn from this study, because it does not correct for other potentially relevant factors, such as the extent to which cyclist were exposed to hazardous traffic situations. On the other hand, the questionnaire study by Goldenbeld, Houtenbos & Ehlers (2010) does correct for various exposure factors and the study shows that the (self-reported) use of devices while cycling corresponds with the (self-reported) bicycle crashes. The risk of a (self-reported) crash for cyclists, stating that they make and answer telephone calls and listen to music each time they ride their bike, turns out to be higher by a factor of 1.4, compared with cyclists who

never use devices while cycling. By way of illustration: this increased risk is similar to the increase of the crash rate for car drivers with 0.50 ‰ blood alcohol concentration (BAC) (Compton et al., 2002). For pedestrians, no studies are available about the effect of the use of devices on crash involvement.

Which measures can be taken?

For reasons of safety it is to be recommended to restrict the use of devices by cyclists and pedestrians; a number of options are available to do so.

Education and public information can contribute to the awareness of cyclists and pedestrians that the use of devices increases their traffic risk (see also the SWOV fact sheet [Public information about road safety](#)).

Another option is a legal prohibition on the (hand-held) use of mobile phones while cycling. This measure is in force in Germany, for instance. Laws are being prepared in various parts of the United States, for example in the State of California and the city of Ann Arbor. For as yet, the Netherlands have not planned the introduction of legal measures in this respect. However, in the Netherlands, as well as in the majority of other countries, a general law prevails that prohibits hazardous road user behaviour. By reason of this law, the use of devices while cycling or walking can be fined if this results in hazardous behaviour (Meesmann, Boets & Tant, 2009).

Conclusions and recommendations

With walking and cycling, portable media devices are frequently used for the purpose of listening to music, making telephone calls, reading or sending text messages, or searching for information. Studies have shown that among cyclists, young people use these devices considerably more often than adults. No quantitative data is available about the use by pedestrians in the Netherlands. The use of devices while walking or cycling results in less safe behaviour. With pedestrians, this particularly shows from the way they cross the street. Based on the outcome of questionnaires, it has been concluded that the use of devices while cycling increases this crash risk by a factor of 1.4. This can be compared with an increased risk for car drivers who drive a car with a 0.50 ‰ BAC.

In the Netherlands, measures are presently mainly found in education and information that can contribute to the awareness that the use of devices while walking or cycling constitutes a risk-increasing factor. SWOV still considers the data about the degree of increased risk due to the use of devices as insufficiently hard to take further-reaching measures, such as a legal prohibition. For this purpose, further research with objective, rather than self-reported data, is required.

Publications and sources

(Dutch SWOV reports have an English summary)

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