Anger, aggression in traffic, and risky driving behaviour

Summary
Various studies show a relation between anger and aggressive and risky driving behaviour. The occurrence of both anger and aggression in traffic depends on personal and situational aspects. Objectively determining what aggressive behaviour is proves to be quite difficult, as much depends on individual interpretation. Behaviour which is not actually intended to be aggressive, can still be experienced as aggressive by a fellow road user and, subsequently, give rise to an aggressive reaction. Anger proves to be related to aggression and risky driving behaviour: drivers who get angry often drive more aggressively and seem to be involved in near-misses more frequently. Various measures in the areas of education, infrastructure, engineering and enforcement could tackle the problem of aggression for road safety. However, no research has been done into the effects of those measures.

Background and content
Many people experience driver aggression as a problem, even more so than the problem of traffic jams (Zandvliet, 2009). The media also frequently pays attention to cases of excessive aggression in traffic. But what exactly does driver aggression entail? Since driver aggression is closely related to a negative emotion, such as anger, this fact sheet discusses both driver aggression and anger. What are their characteristics and what causes them? Can anything be said about the effect on road safety and the extent of the problem? Finally we will discuss the question of whether any measures can be identified to tackle the problem.

What is emotion?
Since driver aggression may be caused by (negative) emotions, the concept emotion will also be explained in more detail. Emotion is a broad phenomenon and difficult to define, also because there are different views of it. The most important literature describes emotion as follows.

Emotions consist of physical and mental sensations coupled with thoughts. Emotions can cause thoughts or can themselves be caused by thoughts. Furthermore, emotions are accompanied by an inclination to undertake action or to not do so, depending on what is in our interest (Zeelenberg & Aarts, 1999). This can result in avoidance behaviour or in approach behaviour (Gray, 2001). Avoidance behaviour mainly occurs with negative emotions (such as anger) and approach behaviour mainly with positive emotions (such as happiness).

Emotions are accompanied by universal facial expressions, which are described in the same way for all cultures (Gray, 2011). These facial expressions also play a role in the ‘emotional synchronization’ in which we ‘infect’ each other with emotions, actually. This emotional synchronization will be enhanced when we copy facial expressions from each other (Stel, 2005). It is possible that emotional contagion and imitation of emotional expressions play a role in interaction in traffic.

What is driver aggression?
There is no general definition of driver aggression. In Dura & Geller (2003) and Richer & Bergeron (2012), different descriptions can be found. In many of these descriptions, the following characteristics of aggression in traffic are given:

- behaviour that may cause physical or emotional harm to a fellow road user;
- behaviour that consists of a violation or otherwise exceeds moral standards.

The lack of a general definition is mainly caused by disagreement on the motivation of behaviour; to what extent the behaviour is malicious, to what extent the behaviour is really intended to harm another person, and to what extent the behaviour is caused by negative emotions (such as anger). Moreover, the term ‘road rage’ is sometimes used as a synonym for driver aggression and is sometimes
considered to be an individual concept, involving extremely violent behaviour that is intended to cause direct damage to the other person.

Psychology often makes a distinction between two types of aggression: hostile aggression and instrumental aggression (see for example Bushman & Anderson, 2001; Levelt, 1997). Hostile aggression, which originates from anger, makes the offender feel the need to harm another person. In the context of driver aggression, one can think of, for example, making obscene gestures to insult the other person, cursing, hitting the car, quickly overtaking again, tailgating, and cutting in on someone. All of these are risky types of behaviour in traffic. Instrumental aggression, on the other hand, is especially aimed at achieving individual goals, for example reaching the destination without delay. In this case, the aggressive behaviour can consist of the violation of formal and informal traffic rules, and, as a side effect, the violation of other road users’ interests. Examples are risky types of behaviour such as speeding, red light running, tailgating and honking. Instrumental aggression is much more diverse in its forms of expression than hostile aggression; every type of behaviour that violates other road user’s interests or exceeds moral standards can be an expression of instrumental aggression if it is deliberate. Moreover, behaviour that unintentionally violates other road users’ interests or exceeds moral standards can be seen as deliberate by another person, and can thus be experienced as aggressive. Therefore, instrumental aggression can also cause hostile aggression in fellow road users.

What causes anger in traffic?

Anger in traffic is caused by both personal factors and the traffic situation. First of all, there are individual differences in the extent to which someone tends to react emotionally; this is also the case in traffic. People who tend to react angrily or aggressively in general, more often report anger and also rage in traffic (Deffenbacher et al., 2003). Individuals rating high on Attention Deficiency Hyperactivity Disorder (ADHD) are also more often angry in traffic than people with a low rating (Richards, Deffenbacher & Rosén, 2002). Emotions in traffic can be evoked preceding traffic participation or can arise during traffic participation. Moreover, the cause differs per emotion. For example, happiness will usually not be related to the traffic situation, whereas the cause of amazement, anger and fear will be related to traffic more often.

What is the cause of driver aggression?

Driver aggression, too, can be caused by personal factors as well as by the traffic situation. Various studies indicate that anger and aggressive behaviour in traffic decreases as one grows older, that men show (physically) aggressive behaviour more frequently than women, and that people who tend to get angry, are also quicker to show aggressive behaviour in traffic (see for an overview Mesken, Hagenzieker & Rothengatter, 2008). Furthermore, persons with an obsessive passion for driving show aggressive driving behaviour more frequently (Philippe et al, 2009). Concerning the traffic situation, driver aggression is often said to be stronger in situations where the own interests are prejudiced and frustration arises: the so-called frustration-aggression theory (Dollard et al., 1939). Typical situations include traffic jams, red light delays, or violations committed by others that cause inconvenience. Finally, anonymity and drivers’ lack of direct communication opportunities have been found to contribute to driver aggression (Ellison et al., 1995).

How frequent do anger and aggression occur in traffic?

Research shows that some emotions are more frequent than others. Anger, happiness, and anxiety seem to occur relatively often (Mesken et al., 2007). The method that is used to determine the prevalence of emotions in traffic has, however, been shown to influence the type and frequency of the emotions that are reported. Anxiety has been found to be reported more frequently in interviews while driving than in questionnaire studies.

The prevalence of driver aggression is hard to determine objectively. This can largely be explained by the fact that certain behaviours in traffic are not experienced as equally aggressive by everyone. In the biennial Periodic Regional Road Safety Survey respondents indicate how they usually respond to dangerous behaviour of others. Nearly three-quarters of the respondents indicated being annoyed by dangerous behaviour of other road users, but that annoyance is usually not expressed visibly. Yet, 14% indicate expressing their anger through gestures, light signals or honking. Furthermore, respondents are found to experience driver aggression as a relatively large problem compared to traffic jams, parking problems, road safety and bad accessibility (Zandvliet, 2009). Police reports provide another indication. Based on the available data, a rough estimate was made of the national
situation, which resulted in 4,000 to 5,000 people annually reporting incidents of violence against strangers in traffic to the police (Terlouw et al., 1999).

What are the consequences of anger and driver aggression for road safety?

Although it cannot immediately be determined how often driver aggression causes a crash, it is quite plausible that anger and driver aggression have a negative effect on road safety (for an overview, see Mesken, Hagenzieker & Rothengatter, 2008). Questionnaire studies, in particular, show a relation between, on the one hand, the inclination to react angrily and driver aggression, and near-misses and crashes and risky driving behaviour on the other (for example speeding and tailgating; see for an overview Mesken et al., 2007). These acts, which can be an expression of driver aggression, are known to increase the risk of crashes (e.g. Aarts & Van Schagen, 2006).

Studies by Deffenbacher et al. (1994; 2003) show that drivers with a relatively strong tendency towards anger (determined by using the Driving Anger Scale – DAS) become angry in traffic about twice as often, experience more anger, and report acts of aggression in traffic about three times more than drivers without this tendency. In driving simulators they also show a greater tendency to risky driving behaviour (close following, more speeding, less steady driving behaviour), and they are found to be involved in (virtual) crashes twice as often. In addition, in their diaries they report more near-misses in real traffic. In frustrating situations (such as being stuck in busy, slow traffic) they are found to be more angry, and to have a greater tendency to express that anger (verbally or physically).

Apart from that, the question remains whether drivers with a strong tendency towards anger take as much risk in real life as they do in driving simulations, in which there is no actual risk for them. As said earlier, it cannot directly be found out how often driver aggression is the cause of crashes. In an American study which estimates that aggressive driving behaviour plays a role in more than half of all fatal crashes (AAA, 2009), aggressive driving behaviour was defined very broadly. For example, not or wrongly indicating direction and ignoring traffic signs were also included as aggressive driving behaviour.

Do anger and aggression also play a part in Sustainable Safety?

The Sustainable Safety road safety vision is based on five principles. These five principles are the functionality of roads, the homogeneity of mass and/or speed and direction, physical and social forgivingness, the predictability of roads and behaviour, and, finally, state awareness (see SWOV Fact sheet Background of the five Sustainable Safety principles). Anger and aggression are likely to play a role in a number of these principles.

The social aspect of the forgivingness principle indicates, for example, the importance of anticipating the behaviour of other road users and the willingness to compensate for the mistakes of others. Especially this willingness affects the way in which the deviant behaviour of a road user is interpreted. Does one interpret the deviant behaviour as aggressive or as an unintended error? Research has indicated that trait anger can predict the inclination to interpret the behaviour of another individual as hostile and aggressive (King & Parker, 2008). This personal emotion in combination with seeing the other as a determined offender can decrease the willingness to compensate. The opposite, being more prepared to compensate if the other's behaviour is considered unintentional, is also possible. In other words, social forgivingness not only involves the willingness to compensate for others, but also involves the ability to recognise the intentions of others (Houtenbos, 2009; see also SWOV Fact sheet Social Forgivingness).

It is conceivable that anger and aggression also play a role in the Sustainable Safety principle of state awareness. State awareness concerns the ability of road users to estimate their task capability. Based on this estimate, one can adjust one’s behaviour to the difficulty of the task. As soon as a situation is experienced as complicated and dangerous, one can, for example, decide to reduce speed (see SWOV Fact sheet State awareness, risk awareness and calibration). Research has shown that being angry or irritated can lead to, amongst others, a lowered risk perception; anxiety, on the other hand, is related to a higher risk perception (Mesken et al., 2007).

Finally, anger and driver aggression can also have consequences for homogeneity. Research has shown that anger can lead to a higher speed and that an annoying event can lead to immediate acceleration (for example McGarva & Steiner, 2000). Differences in speed between vehicles lower the
Which measures can be taken?

Despite the lack of clarity about the exact size of the problem and the exact consequences for road safety, there are various initiatives that aim at reducing driver aggression. For example, a Strategy Memorandum Driver Aggression has been made by order of the Ministry of Infrastructure and the Environment. The measures can best be divided into the three areas 'Education', 'Infrastructure and engineering' and 'Enforcement'.

Education

Concerning education, there are various initiatives which are concerned with aspects that are relevant for driver aggression, even though they are aimed more at the driving style in general (e.g. Effe chillen, Rij met je hart, Think). Other educative measures vary from courses focusing on managing (extreme) anger to courses providing information on the influence of emotions and aggression on driving behaviour and the effect that one's own deviant behaviour can have on the driving behaviour of others. A course that focuses on dealing with anger, for example, is described in Ross & Antonowicz (2004) and in Belgium such a course is also given (Felix et al., 2000). Since October 2008, the Educational Measure Behaviour and Traffic has been used in the Netherlands; see also SWOV Fact sheet Rehabilitation courses for road users. It is important to realise that it will be hard to prevent people from experiencing emotions, because these are mainly determined by individual factors. However, information and courses can be used to try to change the way in which anger is expressed.

Infrastructure and engineering

Also in the area of engineering, various initiatives are possible that can help to push back driver aggression. Measures can be found in the prevention of situations in which interests of road users are hindered, for example by trying to reduce traffic jams or by trying to shorten the waiting time for red lights, and by informing drivers about delays. Information technology can also contribute to decreasing the number of traffic situations that can cause anger or aggression. For example, the behaviour of road users can be homogenized by intelligent speed limiters or intelligent cruise control.

Enforcement

Finally, enforcement remains important to tackle the excessive cases of driver aggression. However, the law does not know the term 'aggressive driving behaviour'. Hence, an individual in the Netherlands cannot be fined for aggressive driving. However, aggressive driving behaviour can be tackled under Article 5 of the Road Traffic Act. This act states that it is forbidden to "act in such a way that menace on the road is caused or can be caused, or that road traffic is hindered or can be hindered".

Enforcement is possible on specific expressions of driver aggression, such as major speeding offences and tailgating. This is already being done. Since a few years, tailgating rules are being actively enforced using regular surveillances with inconspicuous video cars, and, on state roads, also with automatic video control systems.

Since not everyone is inclined to express anger or driver aggression to the same extent, it may help to target measures at different groups. A possible distinction can be made between the small group of repeat offenders and the larger group of people who show 'deviant behaviour' less frequently. Other possibilities are distinguishing between different age groups, genders or trait anger. The effect of the above measures, for that matter, is not systematically evaluated everywhere.

Conclusion

Many different studies (especially questionnaire studies) have already indicated a relation between anger and various dangerous behaviours in traffic. However, little is still known about the magnitude of the problem for road safety. Different expressions of driver aggression that can be caused by anger, for example speeding or tailgating, have been shown to negatively affect road safety.

There are various measures in the area of education, infrastructure, engineering and enforcement, which could tackle the problem of aggression for road safety. However, the effects of those measures remain unknown.
Publications and sources


