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SWOV Fact sheet

Rewards for safe road behaviour

Summary

It is known from psychology that behaviour can be changed more quickly and long lasting by rewarding desirable behaviour than by penalizing undesirable behaviour. Rewarding road safety behaviour can also be effective, as shown by research into, for instance, the use of seatbelts and driving speeds. However, the effectiveness depends on the design of the rewarding programme, such as the scale, the target group, the feedback, the combination with other measures and the type of reward. It should yet become clear how these factors in fact determine the effectiveness, for instance, for which behaviour and which groups of road users rewarding is most suitable, or, on the contrary, least suitable. The effectiveness can also be determined by the way in which the organization of rewards can be incorporated in the traffic system. It is clear, however, that new techniques make it easier to carry out reward programmes: behaviour can be continuously monitored and feedback can be given and a possible reward can directly be linked to it. A combination of rewarding and other interventions appears to be more effective than each of these interventions separately. Therefore, rewarding may probably be applied most successfully in addition to traditional police enforcement, rather than be used as its replacement.

Background and content

(Educational) psychology has shown that behaviour can be changed more quickly and long lasting by rewarding desirable behaviour than by penalizing undesirable behaviour. Nevertheless, it is the traditional traffic practice to try to encourage desirable behaviour by penalizing violation of the rules (see SWOV fact sheet [Penalties in Traffic](#)). The options of rewarding, however, are considered more and more often, as illustrated by the *Strategic Road Safety Plan 2008-2020* of the Dutch Ministry of Infrastructure and the Environment. In this fact sheet we will present what is known about rewarding road safety behaviour. Which are the theories that rewarding is based on? How does a reward programme work? For which behaviour have the effects of rewarding been studied and does it work? What is important for setting up reward campaigns? A few recent examples will be discussed and new developments will be presented.

Which are the theories that rewarding is based on?

Many psychological theories, often with respect to learning and motivation, consider rewarding as a powerful instrument for influencing behaviour. Examples are the operant conditioning theory of Skinner (1953) and the educational theory of Bandura (1977). Yet, more cognitively oriented socio-psychological theories, such as the cognitive dissonance theory of Festinger (1957), also give plenty of room to rewarding. The points of departure and the assumed explanatory mechanisms, however, are quite different. Educational theories consider rewards as the most important means to change behaviour. The socio-cognitive oriented theories emphasize the effect of rewards on cognitive processes, such as (intrinsic) motivation. Various subjective utility theories (see for instance Gilovich & Griffin, 2010) state that behavioural choices are made by weighing the pros and cons of various behavioural alternatives. People will eventually choose the alternative from which they will (subjectively) benefit most; rewards increase the benefits of a particular choice. There also is some attention for rewards in the field of road user behaviour, although to a limited degree. Thus, some researchers (for instance Wilde, 1982; Janssen, 1990) assume that rewards are especially effective if they are given for a concrete result, accident-free driving for instance. Fuller (1984), on the other hand, assumes that rewards may help change hazardous driving behaviour that is considered as pleasant by drivers (such as speeding) into safer behaviour. The world of road safety generally assumes that penalizing and rewarding complement each other and that a combination of penalties and rewards can be more effective than they can separately. This is partly because different groups of people prefer a different approach. Some people are more sensitive to rewarding than penalizing, or the other way around. A field study also found empirical evidence that a combination of enforcement and rewarding works better than they do separately (Mortimer et al., 1990).

What is a reward programme?

A reward programme, also sometimes called a reward campaign or action, is meant to change (road user) behaviour. The basic idea of a reward programme is that the prospect of a reward is held out for desirable behaviour or a desirable result. This way, it is attempted to persuade, as it were, those that do not yet show this behaviour to demonstrate this desirable behaviour or to do their best to achieve a desirable result – in exchange for a reward. Rewarding will be continued for a while under the assumption that this new behaviour will sink in and will be maintained after the reward programme, even without the prospect of a reward.

The rewards in such programmes are mostly material in nature: a sum of money, a reduction in the insurance premium, (small) gifts or only a small chance of a reward. Also non-material rewards, such as paying compliments or attention by role models from the participants' social environment help to influence behaviour. The value and type of reward are factors that influence the effect of a reward programme. Other factors that are influential are, among others, the chance of receiving a reward and the moment it is handed out, the type of task or kind of behaviour that is rewarded and the social environment in which the programme takes place. It generally shows that small-scale reward programmes among more or less homogeneous groups (such as employees of the same company) have better results than larger-scale programmes (such as those in which all car drivers of a specific region are the target group). The [guidelines for an effective reward programme](#) as presented later in this fact sheet are based on this kind of knowledge.

Within the world of road safety, rewarding has long been limited to behaviour that is easily observed, such as using seatbelts. This was mainly because it was difficult to collect long-term objective data about the behaviour of individual road users. However, current technical possibilities make it much easier – and cheaper – to continuously register and give feedback on speed, following distance et cetera. The number of reward programmes applying this kind of technique is therefore increasing.

What are the experiences with rewarding road safety behaviour?

Nationally, as well as internationally, reward programmes have resulted in quite a lot of experience, even though mainly in the shape of relatively small-scale tests. The registered effects of such tests are mainly positive. However, they generally are short-term effects. After a reward programme, the behavioural effects tend to disappear relatively quickly; often within a few weeks or months, depending on the specific programme. A few examples of reward programmes for road safety behaviour are presented below.

Specific behaviour

In the past, rewarding was mainly used to stimulate specific road safety behaviour. This mainly concerned seatbelt use, mostly in situations/countries in which using seatbelts was not yet compulsory. A survey of the literature from the 1990s (Hagenzieker, 1999) indicates that rewarding the use of seatbelts generally results in a substantial improvement. It also turned out that various types of rewarding that were investigated are often as effective as traditional police enforcement. Even if the use of seatbelts is compulsory and relatively widespread, rewarding still appears to be effective. Rewards, in combination with feedback, also appear to have a positive effect on speeding behaviour. This has been shown, for instance, from the evaluation of a reward programme with drivers of commercial vehicles in a non-Western culture (Syria). These drivers were given points if they complied with various behavioural traffic rules, among which those concerning speed limits. The subjects were given a small material reward in exchange for points. During the programme, the average speed and the percentage of speeding offences were reduced (Nijen Twilhaar et al., 2000). In the Netherlands something similar was tested by giving lease car drivers feedback on their following distance and speed. The subjects were given points for 'good' behaviour that they could exchange for a material reward. During the reward period the subjects kept to the speed limit better and they kept a better following distance than before or after this period (Practice test Belonitor, 2004; Mazureck & Van Hattem, 2006).

Claim-free driving

In addition to rewarding specific behaviour, the final desirable result – crash-free driving – can also be rewarded. These types of reward programmes for accident-free driving are often found in companies. For instance, employees receive a reward (money or days off) when they have not been involved in road crashes over a specific period; the reward often becomes more substantial the longer they have driven accident-free. The no claims bonus system used by many insurance companies offering

crash-free drivers a reduction in the premium is also an example of a reward programme. When this kind of programme is evaluated and reported, the effects are generally considered positive: the programmes usually result in crash reduction (Hagenzieker, 1999; Haworth et al., 2000). It should however be noted here that the rewarding is often part of a more extensive package of safety measures, so that it is difficult to determine which is the specific effect of rewarding and which are the effects of other components of the package. Besides, it cannot be excluded that rewarding crash-free driving leads to non-reporting of damages/crashes. When we look at the no claims bonus system of insurance companies, insurance companies using such a reward system do not appear to have fewer crash-related claims than insurance companies not using such a system (Bijleveld, 1998). Nevertheless, a direct comparison is difficult, because the fairly substantial group of cars registered in a company name is often excluded from the no claims bonus system.

Rewards for choosing safe routes

Presently, a study into the effect of rewards for choosing safe routes is being conducted which also focusses on companies. The programme has been developed in consultation with professional drivers, an insurance company and a transport company. The first results of a questionnaire study have shown that drivers hardly think of safety considerations when choosing routes, but that rewards do have an effect on their choices (Bie et al., 2010). The actual routes chosen will be investigated in follow-up studies.

Novice drivers

In the Netherlands and in other countries, various tests with rewarding young drivers have recently been carried out. This is a group with a relatively high crash risk (see SWOV fact sheet [Young novice drivers](#)). The study into rewarding this group traditionally is originally from Scandinavia. For instance, a test in Norway, in which part of the insurance premium was returned to young drivers if they remained accident-free, resulted in far fewer crash reports compared to young drivers not participating in this test (Vaaje, 1990). A test in Sweden was specifically concerned with speeding violations by young drivers (Hultkrantz & Lindberg, 2003). The participants in this test received a 'starting bonus' and for each minute that they drove faster than the limit, an amount was deducted from this starting bonus. At the end of the month the participant received the remaining amount. The study showed that the participants committed fewer speeding violations. Especially the number of serious speeding violations was reduced. In the Dutch Transumo project *Insuring per kilometre*, the cars of young drivers were equipped with a box that registered how much they drove, at what hours and how fast. Their premium was decided on the basis of the outcome. The safer they drove, for example by not driving at night or not committing speeding violations, the less premium they paid. The group receiving a positive rewarding incentive committed fewer speeding violations than the control group (Bolderdijk, 2011; Van Egeraat, 2009).

Rewards and intelligent transport systems (ITS)

Especially ITS that are intended to make road users behave more safely sometimes limit individual freedom of choice in traffic and for that reason meet resistance. One example is the Intelligent Speed Assistance (ISA) providing drivers with information about the locally prevailing speed limit, followed by either a warning or an intervention when exceeding this limit (see SWOV fact sheet [Intelligent Speed Assistance \(ISA\)](#)). A recent study from Denmark (Harms et al., 2008) investigated the behavioural effects of an informative type of ISA. This was applied to a number of participants, whether or not in combination with a reward for correct speeding behaviour (a maximum 30% reduction on their insurance premium). In both cases the participants adhered to the speed limits better than a control group without ISA. Yet the reward did not result in people adhering (even) better to the speed limits. According to the researchers, this was due to the ISA group without extra reward already adhering to the speed limit almost maximally. Hardly any extra gain could have been made. The reward component may be important for maintaining the positive effects of informative ISA also in the long term. An earlier study had already shown that rewards for and positive feedback on one's individual driving behaviour can enhance the acceptance of ITS (Huang et al. 2005).

Other tests with rewards

Other practice tests – not aimed at road safety – also show that rewards are effective in changing road user behaviour, for instance, promoting avoiding rush hours (e.g. Consortium Spitsmijden, 2009). Even though such projects did not generally study the effects on road safety, it appears that other mobility choices or changes in mobility behaviour resulting from reward incentives can also have consequences for road safety (see Schermers & Reurings, 2009).

Which elements are important for an effective reward programme?

Based on the literature and a few of her own studies, Hagenzieker (1999; 2005) formulated a number of guidelines that an effective reward programme should meet:

- Clearly inform participants of what they should do to receive a reward and how this is determined; use simple and clear 'rules'.
- Avoid giving unexpected rewards to participants that they (could) not have anticipated on in advance.
- Use direct, immediate rewards; these may be supplemented with a lottery system with a *chance* of a reward.
- Make sure that the participants find the obtainable rewards attractive.
- Be careful with the value of the reward. Rewards need not be great in order to be effective. They should be large enough to induce behavioural change, but not so large that they are the only motivation for the desirable behaviour.
- Consider a combination of measures. A reward programme is more effective when it is combined with other interventions, such as training or police surveillance.
- Give fast and clear feedback on behaviour and improvements with respect to the actual goals. This enforces the effects.
- Repeat the programme at regular intervals to achieve also long(er)-term effects. However, reward programmes do not need to continue very long to be effective; programmes continuing for a few weeks can already be effective to bring about substantial short-term effects. However, repetition is necessary to achieve longer-term effects.
- Monitor the desirable behaviour systematically.
- Measure the desirable behaviour also prior to the start of the programme, not only to set a realistic target, but also to be able to determine the effectiveness afterwards.

Who can reward?

It is important for rewarding – as well as for penalizing – that this is organized professionally for it to have an effect. For instance, logical options for those giving the rewards as part of the traffic system are insurance companies or employers. They can, for example, give reductions in insurance premiums or give an extra salary bonus when their clients or employees drive with no claims or without traffic violations during a certain period. On a more abstract level, the question of who should hand out rewards also relates to the question whether on principle it is correct to reward behaviour that is compulsory. "You must comply with the rules, this is normal; you should not or are not allowed to reward it." The 'provider' of the rewards plays an important role here. People often do not object to reward programmes used by companies or other non-governmental organizations. On the other hand, fitting in rewards structurally appears to be at odds with the current system of traffic laws. There are no great objections as long as the rewards are supplementary and do not replace surveillance and enforcement. The government did not reward desirable behaviour in the past, but they do so now (Goldenbeld, Popkema & Wildervanck, 2009). For instance, in addition to enforcement activities and campaigns, the police regularly use small rewards for good behaviour, for example with activities concerning carrying bicycle lights by school-age children.

Conclusions

Research shows that rewarding road safety behaviour can be effective. However, the effectiveness depends on the specific design of a reward programme. Small-scale reward programmes among more or less homogeneous groups generally lead to better results than larger-scale programmes. New techniques can enhance (also the larger-scale) reward programmes, because this way behaviour can be continuously monitored relatively easily. Moreover, with these techniques it is better possible to provide direct feedback on behaviour and to combine it with rewards. Not only can positive feedback and rewards enhance greater road safety behaviour, but they can also have a positive effect on the acceptance of ITS applications that limit drivers' individual freedom of choice. A combination of traditional enforcement and rewarding turns out to have greater effects than each of these measures separately. Rewarding may therefore best be considered as a supplement to other measures, such as traditional police enforcement, rather than as an alternative.

Although experience with reward programmes for road safety is greatly increasing, many questions still need to be answered so as to further develop the general principles outlined above. For which behaviour and for which groups of road users is rewarding a suitable instrument and when is it not? Is

rewarding also successful with cyclists? Does it also work for notorious speeding offenders? Who should preferably be the ones giving rewards? Which type of reward is best? And how can rewards be incorporated in the traffic system in terms of organization? The answers to these kinds of questions can be expected to substantially increase the applicability of rewards in addition to traditional police enforcement.

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