Speed and motivation

Established and newly developed ideas about the content of questionnaires and the designing of campaigns

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Speed and motivation:
established and newly developed ideas about the content of questionnaires and the designing of campaigns

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Summary

This literature study focuses on the preparation of surveys to be presented to road users (both motorists as well as vulnerable road users) in regard to areas within and beyond their own residential neighbourhoods. The purpose of these surveys is to provide data about motivations road users have in regard to how fast they travel on the roads and what they think about the driving speed of others. The information thus collected has consequences for the form and content of the questions that can be asked as well as for the content of possible information campaigns.

As far as the form of the questions is concerned, determining an attitude is based on asking two kinds of questions: a question about the probability that a certain behaviour will lead to a certain consequence, and a question about how the respondent evaluates that consequence. These answers are then multiplied by one another during statistical analysis. Additional processing of these products (correlations, factor analysis) places high demands on the character of the original scales; this processing is possible only by using ratio scales. Since many attitude studies about speed and other traffic behaviour fail to take this rule into account, basing results on them becomes very difficult if not impossible.

As to the content of the questionnaires and information campaigns, both established and newly developed concepts can be found in the literature pertaining to road safety psychology and social psychology. Traditional methods of measuring attitude sometimes ignore the possibility that new motivations are going to be a factor and underestimate the factor of feelings people may have in the future. This study, however, provides an overview of what is known about the influence of attitudes, as well as the possible influencing of attitudes, in regard to speed, speed control measures and the speed of other road users. Attention is requested for such attitude characteristics as strength, accessibility, ambivalence, importance and consistency as well as for the difference between cognitive and affective aspects.

The behaviour of road users in regard to driving speed is affected by the driving speed of fellow road users and by how people evaluate the opinions and reactions of significant others (family, friends, the government, police and passengers). The relative importance of attitudes and social norms depends on the kind of road in question. People are not only subject to but also exert social influences. Information campaigns can make use of this fact. People's intentions and behaviours are also affected by the control people think they have over their behaviour. People not only have the feeling that it is difficult to control driving speed behaviour, but they also overestimate their own ability to control the consequences of speed.

Attitudes can be seen as anticipated emotions: people weigh the advantages against the disadvantages as well as the pleasant and unpleasant feelings to be expected. These do not necessarily have to agree with the emotions that will arise when the time comes. Gradually, more and more is becoming known about the effect that emotions have on the choice of a certain speed and on the assessment of another person's speed, as well as about the use of emotional

appeals in campaigns. Such emotions as guilt, regret, fear, anger, boredom and pleasure occupy an important place here. Emotion theory offers a good framework for studying these emotions as the basis for motivations. Attention is requested for investigating moods since moods appear to be important for all kinds of operations and behaviours.

Finally, personality characteristics are investigated. People vary in their propensities for experiencing emotions such as fearfulness as well as the way in which they manage their emotions. The most familiar factor in speed behaviour is that of sensation-seeking. The need to control difficult situations is probably a primary factor in driving at higher speeds; the need for danger plays a lesser role. A second possibility is aggression. Aggression probably leads to all kinds of dangerous behaviour, including driving at high speeds .

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Foreword

Thanks to my colleagues Rianne Vogelesang and Siem Oppe. They have contributed to chapter 2 by making me understand some of the measurement problems.
This report has been written in a continuous discussion with Ralf Risser (Factum). Ursula Lehner ensured that our communication went smoothly.
Thanks to both for their marvellous contribution.

Peter Levelt

1. Introduction

1.1. Purpose of the study

MASTER intends to offer recommendations for speed management strategies and policies in order to improve road safety while maintaining or improving the effectiveness of road traffic.

To make such recommendations, it is necessary to develop a foundation for the appraisal of different levels of speed, to determine the influences on speeding behaviour and to specify innovative speed management tools.

One of the steps required is to determine the acceptability of speeds and speed limits to drivers and vulnerable road users. To this end, attitude surveys will be held in five EU countries plus Hungary, commencing with a group of 100 drivers in each country. This will reflect what people think about certain speed behaviour themselves, how they interpret the social view of these types of behaviour, and how strong their own motivation is to behave according to these beliefs. At the same time, it is important to take into account the needs of vulnerable road users and local residents in terms of safe access in a proper environment. This category will also be interviewed. For the purposes of this study, it will be assumed that both drivers and vulnerable road users will also be local residents.

Attitudes towards speed are measured to understand and explain speed choices, but also to influence drivers and to guide persuasive communication. In order to prepare for the interviews, this literature study is being conducted. The study will contribute to the content and organisation of the questionnaire. In addition, it will provide suggestions for information campaigns.

1.2. Attitudes

The theoretical model normally used in traffic psychology is the Theory of Planned Behaviour (Ajzen, 1985), an extension of the Theory of Reasoned Action (Fishbein & Ajzen, 1975).

In short, the theory states that behaviour is motivated by intentions (see *Figure 1*), and by perceived behavioural control (do I have the means to behave?). The intentions are caused by attitudes and subjective norm (or the social perception). The attitude determines how favourable the behaviour is deemed to be, based on the valued beliefs (valued expectations) associated with the behaviour (the behaviour probably has certain outcomes, and I evaluate these outcomes as more or less positive or negative). The subjective norm is built on the perceived opinions of people judged as important with respect to this behaviour. The perceived behavioural control also influences the intention. When I am convinced that I cannot perform the behaviour, I will probably not form an intention to do so.

This model generally guides the operationalisation of variables by means of questions asked to people.

Since the Theory of Planned Behaviour has dominated our thinking of the attitude - behaviour relationship, a critical evaluation of this theory is in order.
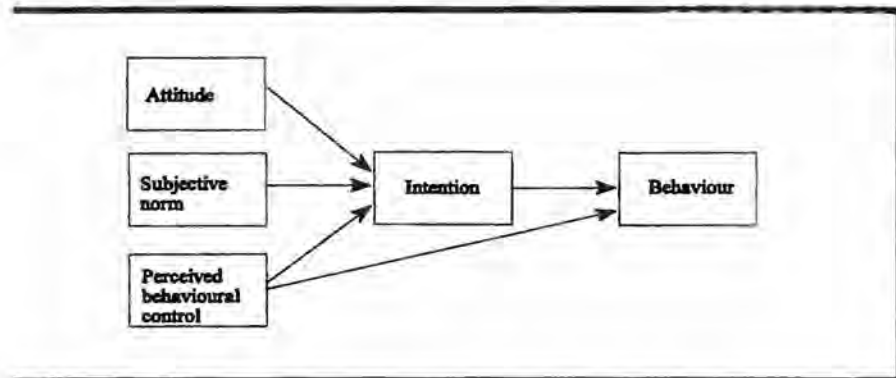
Figure 1. *The elements of the Theory of Planned Behaviour.*

1.3. Two kinds of problems

We meet two kinds of problems in using this model. The first is methodological, the second is the problem of content.

1.3.1. *Methodological*

The Theory of Planned Behaviour uses a certain method to trace salient beliefs that have an influence on attitude. It has been shown that this method treats the affective domain as less important, while there are indications that this domain actually contributes to the motivation for speeding behaviour. Another problem is that the determination of motivational factors that exert an influence on the choice of speed does not offer a guarantee that all factors that could be or will have an influence will be discovered.
Furthermore, the standard method to determine attitudes offers a statistical problem that makes the interpretation of a number of results dubious.
The literature study will devote attention to these problems.

1.3.2. *Content*

The traditional use of the Theory of Planned Behaviour in the assessment of attitudes towards speed sometimes overlooks developments in attitude theory. Some of these are:

1. As already noted, the affective domain is neglected, even though affects or emotions represent important motivational factors, also for speeding behaviour. Several studies have demonstrated the importance of emotions and anticipated feelings as motivator and as an effective aid in information and education campaigns.

2. People's behaviour can be influenced by many different social influences: internalised social norms (conscience), social pressure, the models people meet, the perception of the opinion of important others, etc. Only the latter aspect is included in the theory.

3. The assessment of salient beliefs and important others used in the development of an attitude questionnaire cannot reveal beliefs held by only very few people, that are nevertheless usable in persuasion communication. For example, drivers are convinced that children are the

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ones who take the necessary evasive actions (Howarth, 1985). Somebody has to convince them that this is not always the case, and they can be persuaded in this respect.

4. Personality and other background variables which can explain part of the attitude, and which can be used in persuasion communication, are normally not taken into account. Some of these variables play an important role in traffic psychology, especially in the explanation of speed choices, e.g. the personality characteristic of Sensation Seeking. It must be attempted to incorporate these variables into the survey.

5. The theory of emotion is rapidly developing in psychology. For many people, speeding is an emotional (positive or negative) experience. It has already been indicated that 'affects' are of increased importance in attitude theory, but, independently from this, emotion theory can open perspectives on speeding, as can persuasion communication, not yet tried.

This study will add elements to the traditional approach of attitude measurement in traffic psychology, leading to suggestions for the survey questionnaire, in order to gain a better understanding of speeding behaviour, and to offer better suggestions for persuasion communication.

1.4. Subjects

Firstly, the methodological problems will be considered. The motivational factors are then dealt with consecutively: attitudes, social influences, the effect of perceived behavioural control, of emotions and of personality characteristics.
For each motivational factor, suggestions will be made for education and information and for the content of questions.

Most motivational factors cannot be considered independently. They influence each other, supplement each other or work in tandem. To deal with them separately is therefore somewhat artificial. An approach was selected whereby with each new subject, the relationship with previous subjects will be dealt with, insofar there is reason to do so.

1.5. Familiar and unfamiliar

The suggestions made are based on the one hand on research performed in the context of traffic psychology and on the other on the basis of general psychological research. It will be clear that the latter suggestions are considerably more speculative, because there is little experience in this field as regards traffic. Nevertheless, this is the only way to progress and to detect new ways of influencing people.

1.6. Sources

Three types of sources are used: psychological traffic studies regarding attitudes with respect to speed and speeding measures, general attitude literature and emotion literature. The traffic literature was largely derived from the IRRD database after 1988, where a search was conducted on 'speed & attitude (psychol)'.

2.   Problems of measurement

As stated, there are three types of measurement problems: statistical problems, the problem of the consequences which the determination of attitude have on influencing behaviour, and thirdly the problem that standard methods lead to a disregard of affective motives.

2.1.   Statistical problem

In recent years, attention was requested several times for the misuse of simple correlational analysis for assessing the relationship between a multiplicative composite and a simple variable (as is found, for example, in a value expectancy formulation). Two recent publications have been written on this subject by Mellenbergh et al. (1990) and Evans (1991).
Working within the framework of the Theory of Planned Behaviour, people often use the sums of products of variables. This is done both with the expectancy-value concept, where the sum is calculated of the products of the probability of a consequence, times the value attributed to this, as with the concept of social norm, which is calculated as the sum of the products of the normative belief of a reference, times the motivation to emulate the reference.

What becomes apparent is that correlations based on the variables thus calculated are dependent on the scale of measurement used. If one moves from a scale of 'not worthwhile', 'neutral', 'worthwhile' (-1, 0, +1) to a scale (0, +1, +2), and if these two scales are used for products with, for example, a value on a scale of probability to arrive at new variables, and the correlation of these two variables is calculated with a third, then the result will not be the same. The same applies for correlations based on sum products.

The outcome is that the results cannot be accurately interpreted. With transitions from one scale to another, the correlation can rise or fall and even change in sign. Calculations based on these correlations (viz. factor analysis) will therefore be impossible to interpret.
A regression analysis will also be erroneous, unless one adds the original variables to the analysis, prior to their application to the product. If one therefore wishes to consider the influence of attitude and social norm on behaviour, then six variables will have to be applied in the analysis; three for each variable. The problem in this regard is that the results become difficult to interpret. What does it mean if 'expectancy' proves to contribute significantly, regardless of the 'value' added to the prediction of behaviour, or the 'importance one attaches to the opinion of others', independent of 'the strength of conviction one attributes to these persons'.

These kinds of problems are not manifest if ratio-scales are applied, i e. interval scales with an absolute zero. This is done relatively often, e.g. when estimating a probability. A scale of 0 to 1 is often used in that case. In other cases, this is less clear. Ajzen himself recognises this problem and now takes measures to work with the correct scales (Ajzen et al, 1995).
Two examples are given below, where it is not entirely clear what is happening, and whether the conclusions of the study are reliable.

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Example 1
Vogel & Rothengatter (1984) calculate attitude with respect to speed based on three questions:

1. The evaluation of the consequences of speeding using 4-point scales or 7-point scales.

   Examples of four-point scales: unpleasant (0).. very unpleasant (-3); not bad / not good (0)...very good (+3); not pleasant but also not unpleasant (0) ... very pleasant (3). The 7-point scale is as follows: very unpleasant (-3) .. very pleasant (+3).

   The 4-point scales are 'half' 7-points scales, where it is assumed that the omitted half is not applicable.

2. It was asked whether the relevant consequence was more (+1), less (-1) or equally (0) applicable when driving faster than 110 km/h, versus not driving faster than 110 km/h.

3. Finally, it was asked how certain the respondent was of his answer: very certain (+3), certain (+2) or fairly certain (+1).

   The attitude was calculated by taking the sum of the product of the three variables. It is doubtful whether the four-point scales of the first variable and the three-point scale of the last variable were measured on a ratio scale.

The subjective norm was based on two variables:
1. The motivation to comply was measured using a 7-point scale: how much is one influenced by the opinion of various other persons: very much (+7) .. very little (+1)
2. The normative conviction was measured on a 5-point scale: does the reference in question believe that people should not drive faster than 110 m/h: yes, certainly (+2), probably (+1) perhaps (0), probably not (-1), no, certainly not (-2).

The product of these two variable gives the score for the subjective norm. Particularly with regard to the first variable, one may ask whether there is question of a ratio scale here. A fixed zero-point is lacking.
The end product of the sum and the product variables are also used in calculations that can only be applied to ratio scales, e.g. a factor analysis. Therefore, the results cannot be interpreted reliably.

Example 2
Manstead & Parker (1995) apply a 'subjective norm' as follows: "The determinants of subjective norm are said to be a small set of salient beliefs, i.e. the individual's beliefs about the perceived wishes of each of a number of significant others, weighted by the individual's *motivations to comply* with each of these other people's expectations. Thus, a respondents's score on a normative belief item, measured in the same way as the behavioural belief items, would be multiplied by his or her score on the corresponding motivation to comply item, measured on a bipolar *agree disagree* scale, scored from +1 to +7. A belief-based measure of subjective norm may be derived from the sum of the products of normative beliefs and motivations to comply". With this approach, it is virtually certain that the latter scale is not a ratio scale. If this suggestion is correct, then the results of their study cannot be accurately interpreted (Parker et al, 1992b). Even though they have applied regression analysis to this variable, this did not include the two original variables.

2.2. The use of the results of attitude measurement for influencing behaviour

There are various reasons to look beyond the standard method of detecting factors to be influenced by means of attitude measurement according to the Theory of Planned Behaviour.

1. *Making insignificant factors important*
Research into the motives for speeding or other hazardous behaviour on the road often results in conclusions about how to change behaviour. In such cases, the various motives found are considered and suggestions are made about the (im)possibility of influencing these motives and hence behaviour. Vogel & Rothengatter (1984) believe that driving pleasure is very important as a motive for speeding. This motive is then assessed for its influencing potential. Rothengatter (1994) proposes that the Theory of Planned Behaviour prescribes that changes in behaviour should be achieved through changes in beliefs. He then proposes: "It is difficult to see how to change the belief of people that they experience pleasure when performing a certain act. It is even more difficult to see how to change the evaluation of pleasure". There is a tendency to devote particular attention to motives that prove to be more strongly related to the (un)desirable behaviour. This is where the solution is expected to be found, if there is a solution at all. This thinking process is not entirely logical. An insignificant motive that is not related to behaviour could in principle be made important. 'Costs' prove to have a lesser influence on the choice of speed. Nevertheless, it is clear that if the costs are raised considerably, this could start to play a role in the formation of attitude with respect to speed.

2. *Adding external variables*
According to the Theory of Planned Behaviour, *external variables* are claimed to influence intention via their influence on attitude. This part of the theory is often confirmed. People do find a relationship between external variables (sex, age, personality variables) and attitudes and intentions, but these variables add nothing to the prediction of intention based on attitudes. We have already encountered the conclusion drawn: intention can only be changed by changing the attitude, particularly the convictions.
This is not a logical consequence. If external variables (help to) determine the attitude, then by influencing external variables, it should be possible to influence attitude and hence intention.
Ajzen (1988) is very sceptical about the possibility of predicting behaviour based on the knowledge of someone's general personality characteristics. This gives extra support to his argument. He also refers to speeding behaviour in this regard. This impression has changed in the past ten years, however. In particular, results have been achieved with the personality characteristic of Sensation Seeking.
Of course, the problem remains that external variables are not easy to influence, but this also applies, although to a lesser degree, to attitudes. Marketing stresses the importance of more stable personality characteristics as variables enabling segmentation of the market (Kotler & Roberto, 1989).

3. *Attention for emotions and addiction*
The Theory of Planned Behaviour does not intend to explain behaviour that is determined by factors such as *emotion, addiction, stress* etc. (Ajzen, 1988). Sometimes, these factors can be present in the 'perceived behavioural control', i.e. people can be aware of their addiction and hence of their limitations, leading in turn to a diminished intention. But often, it is true that addicts regularly have very good intentions, even though these never lead to the desired behaviour.
These factors should therefore be detected in another way, and should not be excluded from attempts to influence behaviour.

2.3. Salient beliefs and affects

The Theory of Planned Behaviour assumes that the attitude with respect to an object is determined by the subjective probability that the object has certain attributes, and the evaluation of these attributes. There is a recommended way to detect these salient beliefs. A group of persons is questioned about the characteristics, qualities and attributes of the attitude object, or about the advantages and disadvantages of behaviour. The most cited characteristics are referred to as the modal salient beliefs (Ajzen & Fishbein, 1980).
This methodology has two disadvantages. In the first place, the method does not uncover any convictions that could be significant, but are not as yet. This was discussed previously.
A second objection is that in this way, emphasis is placed on instrumental, more cognitive beliefs, while emotional reactions and affects are considered less. Meantime, solutions have been suggested for this problem. Ajzen et al. (1995) ask for example about the possible costs and benefits of an activity first (instrumental beliefs), followed by questions about the things they liked or enjoyed about the activity and the things they disliked or hated about the activity (affective beliefs). This development seems to be of major importance, particularly because the consequences for influencing behaviour are considerable. In advertising, it is quite standard to not as much influence convictions as to associate a product with positive feelings (Van der Pligt & De Vries, 1995).
Praschl et al. (1994) also offer an interesting solution. They ask two kinds of questions about motives for the use of cars and alternative behaviours (walking, cycling, and using public transport). The first kind of questions ask for free associations about feelings linked to the object. The second kind of questions ask for the most important advantage and disadvantage. The first method yields more affective arguments, the second more rational arguments. Another solution is to strongly involve people in the behaviour at stake. This can be done by presenting them with stories, and to convince them to imagine what happens very lively. Arnett (1997) has made use of diaries to map moods of drivers.

2.4. Consequences for influencing behaviour and for the questionnaire

Regarding statistical problems
- When applying the Theory of Planned Behaviour, one must first ensure that one is dealing with ratio scales if one wishes to apply variables based on the products of variables.
- If this is not possible, then it is better to move away from indirect measures of attitudes and subjective norms.

- The results of Vogel & Rothengatter (1984) and Parker et al. (1992b) are very appropriate to suggest possible motives, but less appropriate to base an estimate upon them of the relative or absolute contribution of these motives.

Regarding attitude measurement
- If it is shown that a factor exerts no influence on the attitude with respect to speed, there could nevertheless be reasons to recommend the factor as a starting point for influencing behaviour.
- Emotions, stress and personality variables should not remain out of the picture in the questions posed and in influencing strategies.
- The questionnaire should not only devote attention to the factors found relevant to date. If there is a suspicion that other factors could be made significant, then it is useful to enquire into these.

Regarding salient beliefs and affects
- Influencing behaviour should not be restricted to changing convictions and the associated values. Feelings and emotions should be appealed to.
- Questions need to be asked to trace the feelings and emotions that have an influence on speeding behaviour. Free associations about feelings, questions about emotions and feelings, and the use of stories and logbooks or diaries emphasise the role of affective components.

3. Attitudes

Attitude is understood to mean an internal situation which causes a person to respond favourably or otherwise to an object (Wittink & Levelt, 1994). The situation is characterised by a certain degree of resolve, but is also changeable, subject to outside influences. The object has a characteristic and this characteristic is evaluated in either a positive or a negative sense. Often, attitudes are only considered applicable to behaviour, implying either a positive or negative evaluation of the consequences of behaviour. This attitude predisposes someone to actually perform or not perform the behaviour. The attitude therefore has two components: the conviction that the behaviour has a certain consequence, and an evaluation of that consequence. An attitude does not lead directly to behaviour. People often insert an intention that is elicited by an attitude. The intention then leads to the behaviour. Often, it is thought that attitudes contribute to the prediction of intentions and it is not unusual to find a correlation of $R=.60$ between intentions and behaviour.

3.1. Attitudes with respect to speed

A number of studies have been performed where attitudes have been defined with respect to the own speed and to speeding measures. The studies concerning the speeding behaviour of others are limited in number.
There are studies where attitude is seen in relation to the intention for speed choices, with claimed behaviour or with actually measured speed. Many studies also look for relationships with other variables. These could be: road characteristics, characteristics of the person or personality, or of information campaigns.
In this field, important work has been performed by the Traffic Research Centre of the University of Groningen, the Netherlands (e.g. Rothengatter, 1994), and by the University of Manchester (e.g. Parker et al. 1992a). Rothengatter (1994) gives a brief overview of the former. In a series of studies, a reasonable relationship is usually found between direct ly and indirectly measured attitudes (the sum of consequences times evaluations), between attitudes and speed intention and between speed intention and repor-ted behaviour. De Waard et al. (1992) found reasonable relationships between attitudes with respect to driving over the 120 km/h limit, reported behaviour and actual speeding offences. Fildes & Leening (1989) also found a relationship between reported and noted behaviour, as did Åberg & Larsen (1994) and West & French (1993).
The principal attitude elements that determine speed intention and behaviour, where it concerns driving over the speed limit, are in descending order: pleasure in driving, risk, travel time and costs (Vogel & Rothengatter, 1984). This concerns motorways with a speed limit of 100 km/h. Once the speed limit is raised to 120 km/h, the factor of driving pleasure was given more weight. On urban trunk roads, this factor was lacking. A correlation of $R=.79$ was found between attitude and reported behaviour. With these studies, it is not very clear whether the conviction or the evaluation plays a greater role. It could be that people are more positive about exceeding the spe ed limit, the more they are convinced that this contributes to driving pleasure, or the more positively this consequence is eva luated, or both. Other studies note that

people hardly realise the hazards of driving too fast (Carthy et al., 1993b; Fildes & Leening, 1989).

The group from the University of Manchester uses behaviour in traffic to further develop the application of attitude theories.
Parker (1991) reports research based on what people think about their own offences: drunk driving, tailgating, dangerous overtaking and 40 mph driving on a 30 mph road whether in the daytime or at night, with or without pas- senger(s). People were least negative about speeding. Beliefs based on which this attitude was determined included: rapid arrival at destination, 40 mph is more pleasant than 30 mph, adapting to the speed of others, probability of getting caught and fined, hazard to pedestrians, probability of an accident. The attitude correlates significantly to the intention (.36).

An annual survey held in the Netherlands (Pol et al , 1994) also asks for motives for whether or not speed limits are complied with, for three types of road. Motives for speeding are mainly to adapt to the speed of others, because one is in a hurry, because one is not aware of the limit, and because one enjoys it. Motives for keeping to the limit are safety, legal obligation, risk of fines and not being in a hurry. Environmental and fuel costs are only mentioned by a few people.
People who drive very slowly also have convictions about the consequences (Rajalin & Summala, 1996). Aside from the wish to drive slowly, the poor condition of the car and safety as subjectively experienced play a role . In ad- dition, lack of confidence, hazard to health or telephoning are mentioned. Also, people have plenty of time, and are not in the mood to rush in their leisure time. People who always drive slowly cite time and safety as their argument, the sporadic slow drivers mainly time.
According to Summala (1988), people are motivated to drive at increasingly faster speeds.

3.2. Attitudes with respect to speed limits

Motorists from 16 European countries were asked about all kinds of matters related to road safety (SARTRE, 1994a; b). They were also asked for suitable limits for various types of road: in residential areas, in towns, main roads between towns and motorways. *Table 1* shows the percentages of desired limits on various types of road .
People were asked to give their opinion about a European harmonised speed limit of 50 km/h in towns and 120 km/h on motorways. 77% and 55% agreed to this, respectively. It looks as though people are happy to accept lower limits if it concerns a European regulation.
MacKie & Webster (1995) report research into the acceptability of the introduction of 20 mph (approx . 30 km/h) zones . They conclude that overall reactions of residents to the scheme were generally favourable, with the majority agreeing that the traffic calming created by the 20 mph zone had been of benefit. Residents identified children in particular, and pedestrians in general, as the main beneficiaries . There was some concern, the authors wrote, about damage being caused to vehicles by the speed reducing measures, but this was very much a minority view.

speed limit (km/h)	residential area	town	between towns	motorways
30	24%			
40	20%	11%		
50	29%	51%		
60		26%		
80			22%	
90			25%	
100			31%	
120				28%
130				21%
140				11%
no limit				7%

Table 1. *Desired limits on various types of road.*

An important result is reported by Sammer (1994). He studied the attitude of residents of the Austrian town of Graz with respect to a 30 km/h measure in a large proportion of the town, except for priority roads. The acceptance of the measure increased significantly following the introduction of the measure. The acceptance and approval of pedestrians has risen from 50% to 77%; of cyclists from 47% to 83%; of public transport passengers from 46% to 80%; and of private car drivers from 29% to 68%. This also clearly demonstrates that attitudes based on expectations can radically differ from attitudes based on experiences.

3.3. Attitudes with respect to other speed measures

SARTRE (1994a; b) requested people's opinion about European harmonisation with respect to a *built in speed restricter*. 43% agreed to this. Carthy et al. (1993b) studied attitudes with respect to a number of measures, including several speeding measures. Measures were judged more favourably the more effective they were considered to be, and the less they offered personal disadvantage. The 'disadvantage' consisted of a reduction of choice, increased journey times or discomfort. It was striking to note that the score of favourability was at all times higher than that for effectiveness, except with the measure: "Ban the use of vehicles capable of exceeding the 70 mph speed limit". Their conclusion was that most measures will be received favourably. People have a very positive view of *police enforcement* for speeding inside built-up areas.
Oei & Goldenbeld (1996) questioned drivers in writing following an anti-speeding campaign consisting of information and *intensive enforcement using radar*. 73% of the motorists claimed to support this approach, and 65% also believed that drivers will adhere better to the limit in that case, particularly on controlled roads, and that this would benefit road safety. Comparable results were obtained in previous studies (Oei & Goldenbeld, 1994; 1995a). Another survey (Oei & Goldenbeld, 1995b) resulted in a more positive attitude of the respondents for the enforcement method where speeders are stopped by the police, rather than for automatic (radar) enforcement.

Positive opinions about speed enforcement using *cameras* are also found by Corbett (1995).

In a New Zealand survey, Perkins (1990) found that the new *demerit points* regime for speeding was either acceptable or not severe enough for 80% of respondents.

Helliar-Symons et al. (1995) report positive attitudes with respect to the introduction of Chevron *road markings* at two locations on the M1 motorway in the United Kingdom. Lundkvist et al. (1991) also measured a positive attitude with respect to road markings. A section of a 13-metre wide road had been changed, which meant that the road was now marked with 5.5-metre wide lanes and 1-metre wide shoulders. The lanes and shoulders were separated by a continuous 30-centimetre wide line, without changing the total width.

3.4.　Attitudes with respect to the speed of others

People hold opinions about the speeds of others, and they believe others also hold opinions about the speed at which they drive. The latter is discussed in 'subjective norm'. The attitude people have about the speed of others has rarely been determined. It is clear, however, that one's own speeding behaviour influences the assessment of others' speeding behaviour. Manstead et al. (1991) found that people who rarely or never speed themselves estimated the number of people who regularly speed to be lower than those people who admitted that they themselves often drove too fast. The first group underestimated the number of speeding offenders; the latter overestimated that number.

Quimby et al. (1989; 1991) determined that over a ten-year period, public concern for road safety has increased. This is shown by public opinion about the behaviour of other drivers, particularly with regard to driving under the influence, tailgating and speeding.

Local inhabitants often demand a lower speed limit and a lower speed in their own neighbourhood (Cairney, et al. 1994). They also argue in favour of stricter police enforcement (Carthy et al., 1993b).

Herrstedt (1988) reports the high satisfaction of the residents of three Danish towns for the measures applied to ensure that through traffic drives at lower speeds. The measures included a recommended speed of 40 km/h, rumble strips, gates consisting of changed road surfaces flanked by trees and lamps, cycle tracks, track crossings, side and central islands, staggerings and parking sections·

It is striking to note that Jones (1989) found that people have a sense of territory in their local area that may mean they ignore local regulations that are felt to be there to control through traffic.

Another aspect of speed to which residents have an attitude is the noise caused by traffic (Jraiw, 1990), and other kinds of nuisance like fears about traffic accidents or about the safety of children playing outside, pollution or vibration (Nishimura, 1988)·

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3.5. Attitudes and other variables

3.5.1. *The road*

As already described, the attitude with respect to speed choices is dependent on the type of road one is driving on. It seems as though driving pleasure contributes less to the attitude with respect to speed, the more one drives on roads where a lower speed limit applies. The motives fun and boredom weigh considerably more heavily for motorways than for lower ranking roads (Pol et al., 1994). People also hold pronounced opinions about speed limits on various roads.

3.5.2. *Person and country*

Parker et al. (1992a; 1992b) showed that youth have a less negative opinion about the consequences of driving too fast. There was no difference in the strength of conviction for the consequences. People who tend more towards offending estimate the probability of the negative consequences of speeding at a lower level (Parker, 1994).

Kossmann & Pfafferott (1996) concluded from SARTRE-data that European young male drivers have more fun in speeding and are more inclined to violate speed limits.

In addition, differences in attitudes were found between business drivers and others. De Waard & Rooijers (1992) found that business drivers had a more positive attitude towards higher speeds than other drivers.

Söder et al. (1993) found differences in the appreciation of an 80 km/h speed limit on a particular road between people who claim they exceed the limit and people who claim to keep to the limit. The first group has a more negative assessment of the limit. These speeders are also characterised by their young age and by the fact they drive more kilometres per year.

Adams-Guppy & Guppy (1995) also found differences in attitudes with respect to speed between business drivers who reported that they often exceeded the limit and those who said they did not. The former judged speeding to be less hazardous and attached more value to being on time for appointments. A comparable result was found by Jorgensen & Polak (1993): People for whom saving time plays an important role drive considerably faster than others.

These groups also differ in their assessment of speed regulations, more specifically: narrowing the road and making overtaking impossible (i.e. separating lanes). The speeders had a more negative opinion about such measures.

Rooijers (1989c) questioned two groups of lorry drivers, a group that regularly drove more than 5 km above the 80 km/h limit, and a group that stayed below that limit. The first group was more negative about the 80 km/h limit. It is interesting to note that this group was not controlled for speeding as much by their employer.

Carthy et al. (1993a) found that drivers prefer a higher limit in urban areas than non-drivers.

Rooijers (1989b) also investigated differences between four groups of motorists: 1) private drivers 2) commuters by car 3) business drivers with a private car 4) business drivers with a company car. The first group drives

least fast and has the most positive attitude with respect to speed limits, police enforcement, and the most unfavourable attitude with respect to speeding. The latter group holds exactly the reverse views. The other two groups are found between these two extremes. Veli-Pekka (personal report) suggests the possibility that differences in punishment could play a role.

There are major differences in attitude with regard to speed and speeding offences in European countries. Rothengatter (1993) noted a difference in the assessment of the severity of speeding offences between Ireland, Norway, Spain and the Netherlands. Norwegian motorists believed speeding in a residential areas to be more serious than motorists from the three other countries. This also applied to driving faster than 110 km/h in an 80 km/h zone. People also thought differently about the negative consequences: 'getting caught'. This likelihood is considered greater in Norway with regard to residential areas, but greater in Spain with regard to 80 km/h zones.
The same questions were put to policemen. In Spain, they regarded speeding offences in residential areas with a limit above 20 km/h to be more serious than the drivers. In Norway, motorists had a more negative opinion about driving 80-110 km/h on an 80 km road than policemen.

SARTRE (1994a; 1994b) also found considerable differences. The claim 'Enjoy driving fast' was confirmed by 25% of the respondents in Ireland, and in Denmark by 52%. The other countries were between these two extremes. It is striking to note that these two countries were also the most extreme in their response to the question of how important they felt the car's 'performance' to be. 69% of the Irish found this quite to very important, as against 15% of the Danes.
With regard to desired limits for various types of road, we also see major differences between countries. 30 km/h is the favourite limit for residential areas in the Netherlands (68%) and eastern (66%) and western (56%) Germany. In Hungary, not one motorist was in favour and in Portugal only 7%.
With respect to the limit in towns, we also see significant differences. 90% of the Dutch drivers is in favour of 50 km/h or less, as against 28% in Hungary. A limit on main roads between towns of 80 km/h or less is considered desirable by 10% of motorists in France and Spain, as against 64% in the Netherlands. A limit of 100 km/h or more on these roads is desired by 24% in Belgium, the Netherlands and Denmark, as against 57% in Austria.
In the western part of Germany, 30% considered a limit on the motorways undesirable, as against 0% in the Netherlands and the UK.
A European harmonised limit of 50 km/h in towns was considered acceptable by about 90% in Germany, Sweden and Ireland as against 40 and 49% respectively in Hungary and The Czech Republic. The 120 km/h limit on motorways was regarded favourably by about three quarters of motorists in Denmark, Ireland and the Netherlands, against about one third in Austria, the western part of Germany and France.
Countries also vary in the difference between the desired limits for residential areas and motorways. In Germany, people demand a very low limit in residential areas, but a high or no limit on motorways. In Ireland, people demand a reasonably low limit on motorways, but a relatively high one in residential areas. In France, a high limit is desired at all locations.

The European harmonised speed restricter was received favourably in Ireland (62%), France (59%) and the UK (55%), and less favourably in Hungary (20%), Switzerland (29%) and Denmark (31%).

Probably the most important lesson that can be learned from these large differences between groups of people, and countries is that a general approach of information campaigns will not work. Segmentation is important. A more tentative conclusion is that the resistance towards measures will decline the more the measure is general. European measures are preferred above national measures. And experience with a measure could increase the popularity of it.

3.6.   **Influencing attitudes with respect to speed and speeding measures**

Rothengatter (1988; 1994) is highly sceptical about the possibility of reducing speed by influencing attitude. He thinks particularly that neither the consequence, i.e. driving pleasure, nor its evaluation can be influenced. This is in accordance with the conclusions of the OECD report (1994). In 46 studies, hardly any relationships were found between attitudes and behaviour in traffic. The conclusion of this study is that the attempt to change in behaviour by means of influencing attitudes is virtually impossible.
However, many studies did not measure attitudes, and others did it not in a proper way. In our review of the relation between attitudes and speed-behaviour, many studies showed a relation.
Some studies report interventions without effect on attitudes:
Spolander (1989) hardly found any effect with an extensive and varied campaign conducted in Sweden.
Nolen & Johansson (1993) found no effect on attitudes of local anti-speeding campaigns in three Swedish towns.
Rooijers (1991) found no effect for the highly varied anti-speeding campaigns held on three Amsterdam streets regarding attitudes to speed limits on those streets.
Parker (1994) describes an experiment in which a video is shown where the negative consequences of speeding in a residential area are shown, viz : a fine, an accident, and a threat by pedestrians. This video was not effective in changing the attitude and intention of motorists.

Other studies report minimal or larger effects on attitudes :
Johansson (1987, cited in Spolander, 1989) notes a minimal change in attitude following an anti-speeding campaign involving all types of elements . This concerns in particular the consequences of air pollution as a result of speeding.
Chesham et al. (1993) describe an attempt to influence the attitudes and behaviour of novice motor cyclists by means of information campaigns . They note a minimal change in attitude, but no change in thinking or behaviour .
Senior et al. (1993) was able to improve drivers' attitudes to not speeding in a 30 mph residential zone, through the use of certain persuasive anti-speeding messages .
We have already mentioned the very large effect of the introduction of a 30 km/h measure in Graz on attitudes towards the measure (Sammer, 1994) .
Menting & Steyvers (1996) report results of a computer programme for speeders . "Goal of the programme is to make speeders aware of the negative implications of their behaviour and to change their attitude towards

speeding". The effect of the programme was compared with the effect of leaflets. "It was found that the general attitude towards speeding was changed most in the computer programme condition; subjects became more negative towards speeding and various related aspects".

3.7.   Supplementary points of view: the strength of attitudes

Petty & Krosnick (1995) offer a working definition of the concept of attitude strength: "the extent to which attitudes manifest the qualities of *durability* and *impactfulness*". Two aspects of durability are: *persistence*: the degree to which the attitude remains unchanged, even if it is not challenged, and *resistance*: the degree to which the attitude can bear opposition. Impact is also manifested in two ways: attitudes can influence *information processing and assessments*. Furthermore, attitudes can control *behaviour*. Their book deals with a number of variables that can influence the strength of the attitude. A number of these variables have not often been encountered in the literature of traffic psychology. The weak link often found between attitude and behaviour could have something to do with this. Some examples:
Attitudes can be more or less *accessible*. Accessibility is defined as the strength of the connection between the attitude object and its evaluation, and is determined here, for example, by measuring the response time when an evaluation is requested (Fazio, 1986). More accessible attitudes are stronger: it can be expected that they exert a greater influence on behaviour. Accessibility can be enhanced by eliciting the attitude. If one is positively inclined towards moderating speed, then a campaign aimed at moderating speed could be effective, and could strengthen the attitude. However, such a campaign could be hazardous for those people who have a positive attitude towards speeding: their attitude could also be made more accessible by the same campaign. A partial confirmation can be found with Holland & Conner (1996). An anti-speeding campaign mainly had effect on motorists who were already driving slowly. Young men proved to have stronger intentions to speed at the end of the campaign, while young women actually became less inclined to do so.
Accessibility is not synonymous with extremity. That is to say that even extreme attitudes can vary markedly in strength, and therefore in their relationship to behaviour. The practice, to at all times look mainly for the correlation between extremity and intention, or behaviour, is ignored in this case.
Attitudes can be more or less *ambivalent*. People can give the attitude-object a positive and a negative assessment simultaneously (Eagly & Chaiken, 1993). This leads to less stability: greater variability. One aspect of this is the feeling of confidence that one has about his belief. Vogel & Rothengatter (1984) have processed this in the determination of beliefs.
Attitudes can be more or less *important* for people (Erber & Hodges, 1995). The more important, the more powerful. If you have to drive many kilometres, then your attitude with respect to speed will be more important, whether you had a positive or negative stance to speeding. If you are very involved in your neighbourhood, then the attitude with respect to the speed limit, or to travelled speed can be a more important issue, hence the attitude is strengthened. The behaviour of other road users becomes more important once you have children who could be confronted by it.
Attitudes can vary in *consistency* (Chaiken et al., 1995). In this view, attitudes can develop on the basis of affective, cognitive or behavioural

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responses to attitude objects. The ultimate evaluation of the attitude object can be based on one or several of these experiences. The evaluation can be more or less consistent with the cognitive experience (evaluative-cognitive consistency) and with the affective experience (evaluative-affective consistency). With this consideration, a number of interesting viewpoints are brought to the fore.

- With the determination of attitudes with respect to speed, more is dependent on *cognitive* considerations than on *affective* considerations. Although the notion of driving pleasure has been applied for some time, other emotions and moods are not dealt with as much. As stated, the standard way to determine salient beliefs by asking groups of respondents is less suitable for tracing emotions and moods associated with the attitude object (Parker, 1995). Recently, we are also encountering other emotions: for example, guilt (Parker, 1994; 1995). In this latter publication, she formulates this as follows: "Affective factors, or how the behaviour makes you feel may turn out to be just as important as how you weigh up the functional pros and cons of the behaviour."
Böhm & Pfister (1996) performed a study into choices for certain prizes that could be won. They were well able to distinguish between emotional and instrumental evaluations of the prizes. These choices were however determined by the emotional assessment. The moral is that it is useful to ask explicitly about anticipated emotions, and to distinguish these from more instrumental ones.
- Praschl et al. (1994) experience a discrepancy between arguments and emotional feelings regarding car traffic, even when one is asked after emotional arguments. E.g. 76% of all drivers admits anxieties about increasing air pollution. 50% agrees with the statement: "I am anxious to be innocently hit by an accident in traffic". They suppose, however, that these are not sharply felt emotions. Concerns about finding a parking space (uttered by 33%) probably is a more extremely felt emotion.
The same study stresses the importance of repression or reduction of cognitive dissonance. The authors think this the most important explanation of the discrepancy between attitudes and behaviour. Drivers are very concerned about environment, but they deny their own contribution to pollution.
- Chaiken et al. (1995) claim that *persuasive communication* should take this into account. An attitude with a strong cognitive foundation is perhaps more easily swayed by arguments than an attitude with an affective foundation.
- A *neutral position* towards an attitude can mean that one is neither cognitively, nor affectively influenced. It could also mean, however, that positive and negative aspects keep each other in equilibrium, or that affective and cognitive elements exert opposite influences.
- If someone is asked about their attitude, then one generally asks for an assessment which, at the time it becomes relevant and the behaviour is required, is less important. There can be many reasons for this. People find it difficult to predict the emotion to be experienced. Drunkenness makes people forget their good intentions. The enjoyment of speeding is only relevant at the time it occurs. In addition, other consequences could become far more important (e g the opinion of the co passenger).

3.8. Consequences for influencing behaviour and for the questionnaire

3.8.1. *Influencing behaviour*

It is possible to change attitudes by convincing people of the *consequences* of behaviour or by influencing the *evaluation* of consequences. This may depend on the position of a target group regarding these aspects. Youth tend to be less negative in their opinion about the negative consequences of speeding. A third possibility, even though there is little known about this at present, is making an attitude *accessible*. With the wearing of seat belts and driving under the influence, an approach is applied where people commit themselves by making a public promise. This is a way to make the already existing attitude more accessible and could contribute towards safe behaviour. Recently, one region in the Netherlands started a campaign where a number of municipal councillors and other important citizens publicly promised to behave themselves with respect to speeding. This was the start of a campaign where drivers were asked to participate and advertise their own involvement by putting a sticker on their car.

It could be that posters and other less appealing communication do have an effect regarding the accessibility of existing attitudes, but do not lead to such a pronounced change in attitude. There is a risk that the same communication can increase the accessibility of both positive and negative attitudes.

Most people are very positive about speed measures. Adding generality to the measure, makes it still more attractive. Perhaps adding the stamp 'Europe' could turn the last opponents into supporters.

However, opposition need not be an argument against a measure: introduction of a measure and experience with it can change attitudes dramatically.

The argument that others have been turned into supporters after introduction can be used in campaigns.

It is to state the obvious that segmentation of target groups is necessary. As regards attitudes towards own speed, special attention is asked for young drivers and business drivers with company cars.

3.8.2. *Questionnaire*

A way of questioning must be developed that will reveal affective motives. Four solutions have been offered:
- explicitly asking for feelings and emotions;
- free associations regarding feelings;
- involving subjects in short stories;
- answering questions during or shortly after concrete experiences (e.g. logbooks).

Those four ways of questioning can be applied to attitudes towards own speed, speed of others, and speed measures.

Regarding speed measures, besides assessing attitudes, it seems necessary to ask for experience with the measure. There are indications that experience with speed limits influences attitudes. Two examples are: the difference in attitudes towards the presence of speed limits on motorways between German

drivers, and drivers in other countries; and the change in attitude towards the 30 km speed limit in Graz before and after the introduction of the measure.

As regards attitudes towards speed of others, own speed and speed measures, segmentation is important. Characteristics to be assessed are age, gender, car ownership (no, private, or company car), goal of trip (business or other). Different kind of roads must be distinguished too. A distinction must be made between attitudes towards speeding, and attitudes towards not speeding.

An important aspect of speed measures is the generality, or even the European application. This aspect must not be forgotten in the questionnaire. The foregoing paragraphs suggest important motives for speeding, and important speed measures. They will not be repeated here.

4.   Subjective norm

4.1.   Norms and values

The studies about norms with respect to speeding are mainly concerned with the perception of social norms (subjective norms), not with personal or moral norms, with the exception of the study by Parker et al. (1995). Subjective norm is generally understood to mean the influence of what someone thinks someone else, who is important to that person, thinks of speeding. Of course, one also has a personal standard with respect to speeding, but this concept tends to be classified under attitude. Part of what people think others believe to be important, right or wrong, forms part of the conscience through the upbringing: it then becomes a force in its own right, independent of the opinions of others. This subjective norm: "I should not do this, I should do that", could even assume the form of values: "No-one should do this or that; everyone should do that". The role of these values should not be underestimated. They are often associated with strong emotions, and sometimes do not quite belong in the category of the emotion theory (Frijda, 1986) because the immediate personal interest that plays a role in emotions is less apparent here. Anger about the behaviour of others on the road can be caused by being personally obstructed, but also because others do not adhere to the values you hold. What you believe others think about your behaviour can also be very important and emotional.

People's belief of what important others think about certain behaviour can, logically, agree with, or actually contrast to the attitude ("I like speeding, but my friend hates it"). The theory does not predict the ultimate result: that is a matter of empiricism.

Subjective norms related to speeding intentions or behaviour have been investigated several times. With speed choices, the opinion about what other road users think can play a role, as can the driver's notion of what family and friends, the government or their passengers think about it.

4.2.   Adapting to the speed of others

If one asks for reasons for speed choices, people often refer to their adaptation to the speeds of others. One could act in this case in response to feelings of safety or otherwise (unadapted speed leads to unsafe feelings because others drive closer to your bumper and you are constantly overtaken, going along with the group gives a sense of security). People also act on the basis of subjective norm: the people surrounding you are important now, and they seem to approve of this speed. The possibility of this latter type of motive is shown by research into the role of imitation in behaviour in traffic. There is evidence (Mullen et al, 1990, Zaidel, 1992) that people emulate others, whether or not this promotes safety, whether or not those others behave dangerously or safely and whether or not this leads to a gain in time (Echterhoff, 1989).

In social psychology, research is performed into group processes whereby majority and minority standpoints are confronted with each other. If a majority holds a certain standpoint, this type of group process leads to an increase in this majority, but also to a strengthening of the standpoints of the

majority and the now markedly reduced minority. In addition, the minority can only support its standpoint now by moving to the edge of the social margin. Here one could consider the effect of the theory of 'social impact' (Nowak et al., 1990), whereby the influence of others on the individual is determined by the strength, the directness and the number of others. These principles tend to work particularly if the information is processed peripherally (Petty et al., 1988), i.e. if it is not a particularly important topic for the person concerned. The theory predicts that polarisation occurs, whereby the minority is reduced and the majority grows, until a certain equilibrium is reached. The relationship is therefore also determined by the distribution of opinion upon commencement of the communication process. With an equivalent distribution, the direction of the outcome is unpredictable. It can be anticipated that people therefore adapt to the speed of others. A small group will drive faster or more slowly. This is particularly the case if reasonably intensive communication occurs. Translated to conditions on the road, this means that there is much traffic. This could perhaps explain that on the busy motorways, the speed is more homogenous than on less busy motorways (T. Heijer, personal report).

Connolly & Åberg (1993) have a comparable imitation model where there are two groups that either always or never speed. The remainder will start to drive faster when a certain threshold with respect to speeding is crossed. This threshold will differ from person to person and can also be situation-dependent. A possible prediction from this model is that enforcement can only have a lasting effect if more than 50% no longer drives too fast. The authors obtained results which confirmed another prediction from this model: freely driving cars adapt their speed to that of the cars in front. They found this on a 30 mph-road.

4.3.   Acquaintances, friends and family

People who are often on the road sometimes carry a photo of the family or their partner on the dashboard. This can activate subjective norms and hence influence behaviour. It is not known whether this is in fact the case. It has been shown a few times that subjective norms play a role in the making of speed choices.

Parker (1994) found that those who claimed they drove too fast within the built-up area (limit 30 mph) also reported that they did not receive much disapproval for such behaviour from partners and friends. Vogel & Rothengatter (1984) found that 60% cared much to moderately for the opinion of this category of others, but that less than one third of these family and friends disapproved of driving faster than 110 km/h on a 100 km/h road. This means that the influence of this category falls below that of the police. In another study (Parker et al, 1992c), it is reported that younger motorists experienced more approval from important others for speeding than older motorists. Which of the references were of particular importance here (police, friend of the same sex, partner, family or other drivers), cannot be determined from the article, but it is important to note here that age also exerts an influence on subjective norm.

4 4.   Government

A separate category of others is represented by the government, including the police. Feelings deterring people from speeding or in fact stimulating them to

do so are in the case of most other important persons feelings of embarrassment, fear of disapproval or boosting of one's self-esteem through approval. With the police, fear of material punishment is the issue. It is generally assumed that an increase in the subjective probability of getting caught can lower speed (Mäkinen & Syvänen, 1990; Goldenbeld, 1994). Apparently, the police are an 'important other party', who should be taken into account. This was also found to be so by Vogel & Rothengatter (1984). The police was the principal reference. Unfortunately, only 59% thought that the police in fact disapproved of driving over 110 km/h on a 100 km/h- road. More people believed that the government disapproved of this behaviour, but the government was in fact a less importance reference.

The importance of the police as reference is reinforced by their ability to punish and also their expertise. The frequency with which one could come across the police also influences their importance.

4.5. Passengers

It has been thought that passengers, the public in general, activate the dominant response. If one tends to drive quietly, the public would tend to reinforce this behaviour, while if one tends to speed, this would be further strengthened by the public.

Baxter et al. (1990) have shown, however that people adapt to what they believe their passenger(s) think about speeding. A study has shown that young men carrying a male passenger drive faster than when they are alone in the car. Young women in fact drove more slowly with a female passenger. Fildes & Leening (1989) found that cars carrying two persons drove more slowly than cars without a passenger. Cars carrying more than two persons in fact drove faster. One can guess about the social processes influencing behaviour in these cars. Schulze (1990) has offered descriptions of how young drivers ride together. This leads to hazardous situations, both due to the fact that youth does not recognise the characteristics of a heavily loaded vehicle, and also due to the distractions a full car causes. But subjective norm also plays an important role: based on what people believe others expect of them (and they often do have pronounced expectations), they are encouraged to perform hazardous behaviour.

4.6. Perception and reality

What people believe others find important does not necessarily have to agree with reality. Fildes & Leening (1989) found that people who drive much too fast believed that others also drove much too fast. The researchers assumed that in this way, speeders legitimised their own behaviour. Slow drivers assessed the speed of others more realistically.

Parker (1994) also indicates the 'Overestimate of consensus': offenders think that a great many others offend. But also the 'Underestimate of consensus': non-offenders underestimate the number of people who do not offend.

It is not always clear in this regard whether this estimate influences the person's own behaviour, or whether the estimate is used to gain other psychological advantages, such as: "Others do it too, it can't be that bad after all", or: "Look at me, I am better than everyone else". Whether influencing these estimates can influence behaviour cannot be predicted, therefore, but it can be expected that by querying these types of convictions, it is possible to stimulate new mental activity, offering an impulse for change.

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Dangerous thoughts

Harré et al. (1996) interviewed students (average age about 16 years) of whom more than 70% had driving experience, about possible dangerous thoughts. Three of these relate to subjective norm: (1) Anti-authority: the tendency to distrust and rebel against adult views or rules; (2) Conformity: the extent to which students conformed to any perceived unsafe driving norms; (3) Macho: the tendency to believe that they had superior driving skills, which they enjoyed displaying. Male students score higher on these and other dangerous thoughts. They also drove faster, particularly outside the built-up area. But otherwise, no consequences were reported for these dangerous thoughts.

4.7.   Attitudes and norms

Attitude theories often say nothing about the interaction, or weighing up between subjective norms and attitudes. They assume that sometimes one weighs more heavily, sometimes the other. Empiricism will have to show what happens. Unfortunately, it is not true to say that for something as general as 'driving too fast', a fixed consideration can be made that can also apply to everyone.

Vogel & Rothengatter (1984) asked about the subjective norm and attitude with respect to speeding on a particular 100 km/h-road, about the intention to speed and about reported behaviour. Preferred speed could be predicted on the basis of intention and intention on the basis of attitude and subjective norm. The weight of the attitude with respect to speeding was three times the weight of the subjective norm. While Rothengatter assumed on the basis of these and other studies that attitudes were of particular importance to speed choices, Parker (1995) believed that the subjective norm overrode everything. The former based his study on speed on motorways and 80 km/h roads, the latter on roads inside the built-up area. This could explain the discrepancy. In the second case, you have to relate more to others than in the first case, and you are also less anonymous; in addition, the notion of 'home' is more rapidly activated here: after all, people live in such a neighbourhood themselves and know how annoyed their own family would be by people racing through local streets. In Berlin, the price of houses located in a woonerf area have risen sharply following adaptation of the infrastructure (personal report, Pfaf-ferott).

Sutton & Eiser (1990) found in a study into attitudes with respect to use of the seat belt that the subjective norm weighed relatively more strongly with respect to attitude if one drove in more hazardous situations. This explanation is probably not relevant in this case: in general, people believe higher order roads are more hazardous (this is where people more often put on their seat belts).

The moral is that information should distinguish between different types of road (inside and outside the built up area) and different situations (more or less hazardous): each emphasises different factors that influence the choice of speed.

4 8 .   Attitudes, subjective norms and emotions

It should not be forgotten in all this that people are asked about their attitudes and subjective norms. It therefore concerns reasonably deliberate considerations. With the formation and activation of attitudes and subjective norms, all kinds of emotional processes are involved that are probably not easy to make consciously. This concerns positive and negative feelings with respect to the consequences of speed choices, feelings with respect to the interests of others, the anticipation of the consequences of one's own behaviour for the feelings of others and it concerns conflicting feelings; both within attitudes and within subjective norms, and between these motivating forces. Introspection about emotions is difficult, certainly for the uninitiated. Only by being very alert while driving it will become obvious what feelings really play a role. While one person may for example have a feeling of competence when overtaking: "Look at me", another might have an apologetic feeling "Sorry, you're really driving too slow for me". Yet another feels nothing with respect to the person he is overtaking. A lot of traffic still has to pass over the M1 before we obtain an insight into these actual emotional influences, let alone find ways to enable these feelings to exert a somewhat positive influence.

4.9.   Imposing norms

People allow themselves to be influenced by what others think about their speeding behaviour. The other side of the coin is: people influence others in their speeding behaviour by approval and disapproval. In the field of speed control to date, people have mainly looked at the possibility of influencing one category of others: the police. Much of the enforcement literature relates precisely to how the police can exert its influence as effectively as possible. Again, two aspects can be distinguished: how can the police become a more important reference. This can be achieved by their presence, both in a controlling and punishing sense. The other aspect, i.e. the opinion of the police, is clearly little understood. Many people are not convinced that the police believe speed control is important.
In the field of driving under the influence, a number of experiments have been carried out, where members of the peer group were given the task to exert their influence. The same was tried, not entirely without success, with those supplying alcohol. The results are encouraging. Also in the field of wearing seat belts, there are examples of successful campaigns: mutual influencing of driver and passengers. In the field of speed control, no campaigns are known where it was attempted to have friends, family, passengers and other drivers exert an influence. In the Netherlands, an experiment was performed to change the speeding behaviour of couriers (Siero et al. 1985). The managers explained that they attached great importance to a moderate speed. The drivers had always thought that it was in fact important to deliver the mail rapidly. It was possible to break through the routine by explaining the opinion of the managers and describing the various advantages for the driver himself and for the company. We already saw that employers who control their lorry drivers for speeding have less hurried lorry drivers, who also tend to be less positively inclined towards speeding (Rooijers, 1989c).
In an indirect manner, social influencing is achieved by collective feedback signs placed along the road. By driving properly, a motorist can exert an

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influence on the reported result, which in turn can exert an influence on other drivers (Phillips & Maisey, 1989; Levelt, 1994).

Stories about aggressive behaviour of people on the road are often accompanied by measures taken by other drivers to combat this. In fact, it is they who then demonstrate aggressive behaviour, namely an action in response to frustration, elicited by someone else who could have prevented this frustration. The frustration can relate both to the direct infringement of personal interest: if someone continues to drive too long along a narrowed road without moving aside, then the frustrated party indeed has to wait longer, but the frustration can also, as we have seen, represent a frustration of values where one's own interests are not directly affected: "People should not do that". In any case, it is difficult to imagine a reaction in response to someone else speeding which would both make sense and be safe. It is therefore necessary to think about group pressure on the road that is not based on frustration. Collective feedback is something like that: reporting the percentage of drivers that does not drive too fast.

4.10. Consequences for influencing behaviour and for the questionnaire

4.10.1. *Influencing behaviour*

There are indications that speeding behaviour on different roads and perhaps also in various hazardous situations can be influenced in a different way, depending on the references. An initial suggestion is that on higher order roads, the police is a more important reference than on lower order roads, but the problem is that people are not that convinced that the police is serious about speeding. The importance of the police can be enhanced by the likelihood of being caught. The opinion about the attitude of the police can not only be improved by the risk of getting caught, but certainly also through publicity and example. The image of 'speed' is probably associated with the behaviour and equipment of the police on motorways. A second suggestion is that on higher order roads, the social component plays a subordinate role with respect to attitudes, and on lower order roads, a superior role.

It is of great importance to change the image of the police. It should be clear that they disapprove of speeding on higher order roads, while on lower order roads they should also become a more important reference (the policeman on the beat!).

Subjective norms also appears to be influenced by age. There are indications that if they speed, younger motorists experience more approval from important others than older motorists do. It is feared that this perception has a reasonable level of truth where it concerns the peer group. This can be tackled by reducing the role of subjective norm, and by making group pressure less acceptable: "You should decide for yourself!". Emphasis should be placed on increasing self-esteem by taking one's own decisions, despite the opinions of others. Another way is to counteract the positive opinion with respect to speed through group processes, and so arrive at better opinions together.

The important role of subjective norm with respect to lower order roads can be used in various ways. In communication, the family must be considered, the importance of the children, personal interest once one gets out of the car, quality of life, the nuisance imposed on the neighbours. In short, making the discomfort and the danger to neighbours and family problematic.

Also, it is time to motivate people other than the police to exert pressure. If it has been found that people allow the perception of the opinion of others to play a role, then this perception can be influenced by appealing to the target group, but also by reinforcing the actual influence exerted by those important others. Companies can influence the speed behaviour of their employees, especially when driving company cars. The disadvantage by loss of time is made good by the advantage of less costs by damage and loss of labour. Employees often wrongly think that their employers prefer high speeds. Strengthening the role of subjective norm can also help to reinforce its weight with respect to attitudes. This could be an added advantage.

Adapting to the speed of others is very often conceived as positive, safety promoting. Keeping the prescribed speed, against all the other road users, would stimulate dangerous overtaking, and cause aggression. Driving instructors, policemen and responsible politicians utter this voice. It will become a tough job to change these convictions.

4.10.2. *Questionnaire*

Three domains regarding social influences can be distinguished:
- The influence of important references.
- The influence on the speed of others.
- The adaptation of speed to the speed of others.

The questionnaire should devote attention to these three fields.

5. Perceived behavioural control

5.1. Controllability

The prediction of intention, and of behaviour is often improved by adding a factor called perceived behavioural control: the conviction that one can perform the behaviour. A positive attitude will not lead to an intention and performance when one is convinced that performance is impossible.

At the other hand, the conviction that a positively valued behaviour is easily performed can contribute to the intention, and to the performance. It is not said that the perception is based on a correct estimate. In traffic, drivers sometimes have wrong conceptions about their own skills. Sometimes it seems necessary to convince people that they are capable of taking safe decisions, sometimes it is better to convince them that they overestimate their own skills.

5.1.1. *Too little perceived control*

People sometimes think that they have no control over speed behaviour, or that they are not aware of the speed limit.

Research performed by Parker et al. (1992c) showed that the conviction that one can control speed correlated in a marked negative sense with the intention to speed. People who intend to speed, more often are convinced that they cannot control their speed. This conviction adds much to the declaration of the intention, outweighing attitude and subjective norm. There was also a contribution to the prediction of the intention to tailgate and overtake dangerously, but this was smaller. Parker et al. (1992a; 1992b) found that youth think more often that they are unable to control speed than older drivers.

In addition, it was shown that young drivers and men find it more difficult not to break traffic rules than the elderly and women. Women found it easier to control their speed than men. Men found it easier to control their following distance.

Several times, one of the causes of speeding given is that one is unaware of the limit, or unaware of the own speed. Fildes et al. (1989) found, however, that while 17% may not have known the limit, this in fact bore no relationship to the speed driven.

5.1.2. *Too much perceived control*

People could be erroneously convinced that they are very experienced drivers, which can lead to hazardous behaviour in traffic.

The overestimation of the own skills in comparison to those of others can be the result of a positive self-estimation or a negative estimation of others. An English study (McKenna et al., 1991) noted that there is particularly question of exaggerated self-estimation. This conclusion is based on the fact that the estimation of others was not negative, but finished up somewhere on the middle of the scale. There are furthermore differences in the overestimation of one's ability for various elements of the driving task, including some related to adapted speeds. Here again, there are differences between men and women.

In general, men overestimate themselves more strongly than women, but this is largely attributable to differences in experience. Drivers had to estimate their own ability in different scenarios.

It was interesting to note the difference in opinion about the only scenario for the 20 in which weak road users were mentioned: giving room to cyclists and horses (sic!). Here, the influence of the sexes continued, also taking into account experience. In this case, women overestimated themselves more. This scenario also demonstrated the greatest difference between what women think they can do in comparison to other drivers. The general opinion, overestimation of one's ability leads to hazardous behaviour, should perhaps be qualified here. It could be that women in general take more heed of weaker road users and actually want to emphasise this fact. Perhaps this overestimation of self is in fact an expression of awareness of this concern.

5.2.   Attitudes and perceived behavioural control

In the literature about influencing health, emphasis is placed on the importance of the sense of control when it comes to eliciting negative attitudes. If one considers behaviour or its consequences as being very negative, then one can go two ways with these negative emotions. If one sees the means to avoid danger, then one will respond adequately. This is what is referred to in emotion theory as problem-oriented 'coping'. If one sees no means of avoiding danger, then one will deal with the negative emotions by applying mechanisms such as denial and resistance. This is called emotion-oriented 'coping' and is of course inadequate, if not counterproductive, at least with regard to achieving the desired behaviour. On the other hand, this method of coping does offer people psychological gain.

5.3.   Attitudes, subjective norm, perceived behavioural control and anticipated remorse

If one adds perceived behavioural control to the influence of attitudes and subjective norms on intention, then the predictive value can increase markedly. Manstead & Parker (1995) offer an overview of the various variables that play a role in the Theory of Planned Behaviour and apply this to four types of offences: driving too fast, driving under the influence, tailgating and dangerous overtaking. With regard to speeding, this related to exceeding the limit on 30 mph-roads. The attitude had a minimal predictive value for the intention, the subjective norm a greater predictive value, but the perceived behavioural control had the greatest predictive value of all. Together, they predicted 47% of the variation in intention.

Parker (1994) investigated the effect of various videos on attitude and intentions with respect to speeding. The four videos were developed such that they emphasised different aspects, namely: behavioural convictions (increased chance of an accident, fine), normative convictions (emphasis on convincing passengers), perceived behavioural control (ability to offer resistance to temptation and pressure exerted by others: one does it independently), and anticipated remorse (due to the fact that one does something really wrong, whether or not awful consequences are associated with it). The four videos each exerted a positive influence on attitude with respect to speeding, the regret and the subjective norm video most markedly of all. The influence on intention did not achieve significant results.

5.4. Consequences for influencing behaviour and for the questionnaire

5.4.1. *Influencing behaviour*

It is important to counteract overestimation of oneself, more than to convince people that others are better drivers than they might believe. On the other hand, it is essential to convince people that they can do something about preventing the awful consequences of speeding, by not only driving more slowly, but also by adapting better to the possibilities offered by the driving task and hence preventing situations where the consequences of speeding become uncontrollable. Many people apparently believe that speeding is unavoidable. They must learn that adapted speeds are an effective way of avoiding unpleasant consequences, and that they themselves are able to put this into practice.

Perhaps people report their inability to comply in order to hide their unwillingness to cooperate. This can occur particularly with socially undesirable behaviour. In this case, communication about 'own ability' of course has little effect. But speeding does not score very highly on the scale of social undesirability, thereby increasing the veracity of the reported inability.

5.4.2. *Questionnaire*

If it is true that drivers regularly are unaware of their speed, or of the speed limit, and that this is a factor in speeding, then this certainly suggests a way to influence behaviour by information. Questions about awareness are in order.

6.   Emotions, affects, moods

While 'attitude' as described above is a fairly calculating affair - people weigh up advantages and disadvantages rationally - all kinds of feelings can also play a role. The question in that case is not: does one have a favourable or unfavourable attitude towards a certain choice of speed, but: what emotion are you experiencing now, and what does it make you do, or: what emotion do you anticipate during and after the activity? With this prediction, you ask yourself what feeling you will have in the future, but emotions are mainly a topical matter: "What do I feel right now?" Frijda (TV interview, 1993) formulated it as follows: "Emotion is now, and reason is emotion later" - Various authors have pointed out the importance of affects for the choice of speed.

Rothengatter (1988) compared the motivating effect of risk and of pleasure, and emphasised the role which the latter factor plays. Manstead & Parker (1995) were one of the first to apply the relationship between the more instrumental convictions and affective evaluations to behaviour in traffic. They emphasise that the standard method of detecting salient beliefs should be expanded. Aside from questions into the advantages and disadvantages of behaviour, the affective evaluations should be enquired about: what do you like about speed, what don't you like, or hate, about driving fast? The results of the two methods did not overlap at all. With the second approach, the feelings that people experienced while driving emerged.

In a meta analysis of 87 evaluated road safety mass media campaigns, Elliott (1993) concluded that emotional campaigns have a greater impact than information (rational) campaigns but only when the base level (knowledge, attitude, intention, self reported or measured behaviour etcetera.) was less than 40% (e.g. less than 40% knows about something, does not exceed the speed limit et cetera.).

There are many studies where parameters are measured amongst motorists while driving, parameters that are very likely to relate to emotions, or which are known to also occur together with emotions. Their relationship to emotions, and the analysis in terms of emotions, is rarely discussed. Usually, the question of workload is used as the connecting theme (De Waard, 1995) - This chapter will stress the emotion as 'state'. The next chapter treats personality characteristics, and emotion can also be seen as 'trait'. But in both chapters both views come up.

6.1.   Aspects of emotions

Emotions can be described in brief through the following steps (Frijda, 1986; Lazarus, 1991):

-   We observe an *event* (outside ourselves, or in our head) - We note our speed, for example, and see that we are driving much faster than the others; we think that those others are well aware of this fact and are impressed by it. The essential matter is our interpretation of the event, not what is actually happening. It could very well be that those others find us extremely stupid and weak. Recently, an important representative of the Dutch Motorway Police replied to people's accusations that motorway police often speed. He replied that these policemen have to supervise more people than just the group immediately around them. Here we see clearly

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that this man has a different view of speeding policemen than other road users do.

- We *judge* this event, or its consequences, as favourable or unfavourable for an *interest* (primary evaluation). Our interest can be self-interest, for example. The fact that these others are impressed by us can enhance our feeling of self-worth. This leads to a positive emotion. Which emotion exactly depends on what we also ascertain: who is the cause, was it accidental or deliberate and what can we do about it, et cetera (secondary evaluation). It depends on who is the cause of the increased sense of self-worth. If this were another person, then 'gratitude' is likely. Now that it is ourselves, 'pride' seems the most obvious. If one is startled by one's own speed, then probably the interest of 'physical integrity' has played a role. People are alarmed if they believe their physical integrity is threatened.

- Now there follows an irresistible urge to do something: *action tendency*. People wish to avoid an unpleasant situation or to end it. They wish to perpetuate the positive situation. An important characteristic of this action tendency is that it has *control precedence*. This means that all interest in other matters, all thought about other matters becomes irrelevant, and all attention becomes focussed on the one thing: the event that is the cause of the emotion, and the actions that should follow in response. For example, if one wishes to continue racing, one can be quite blind to the dangers and the consequences. Angry reactions to the speed of others are similar in character: people are sometimes prepared to do very dangerous things in order to restrict the speed of the other party.

- Meantime, much is also happening in a *physiological* sense: sweating, heart palpitations, hormones. These responses serve to assist the actions to follow: a preparation, for example, for 'fight or flight'. Emotional speeding is accompanied by physiological phenomena. This can be regarded in part as a preparation for possible essential actions.

- Also, *changes in behaviour* could follow, and *expressive* actions. Overtaking another road user with associated pride is encouraging: one reinforces the behaviour. Also, one uses facial expressions and movements to convey emotion. An expressive response to someone else's speed can be a warning gesture, but also an angry raised finger.

- During the entire process, it is possible to intervene, to *regulate*. The control precedence does not go that far that the process cannot be interrupted, even if it was only for the new emotions demanded by the control precedence, e.g. a hazard that suddenly arises. Also, people have learned to control themselves, learned not to give in to some emotions, learned to express their emotions in certain ways. People can also change their interpretation of the event. "Are these others really impressed?". Also, the evaluation can be altered: "Am I really the cause of what is happening, or are these others driving very slowly?".

- During the entire process, *feelings* play a role. People feel their heartbeat increase, but most of all - and this is probably essential - people experience pleasure or displeasure, signalling that an interest is in question with the observed event. This feeling primes the action tendency. On the other hand, the action tendency can also determine which emotion one experiences (Frijda et al., 1989).

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6.2. Speed-determining emotions

Not much is currently known about speed-determining emotions, but this will certainly increase in the years to come, now that research into emotion is taking off. Emotions can play a role in at least three ways. In the first place, emotions motivate behaviour (action tendency) at the moment the emotion is present. In the second place, emotional experiences can determine or change the attitude with respect to speed. An angry employer who inspires fear will in future give 'arriving on time' a higher precedence for the attitude with respect to speed. Thirdly, attitudes, as we have seen, consist in part of anticipated emotions.

Some examples follow below.

6.3. Guilt and pride

6.3.1. *Structure of guilt, remorse and pride*

When one feels guilty, one feels responsible for something one has done to another person. Remorse can also relate to something one has done to oneself. Firstly, there is question of an action with a morally negative value. Secondly, this action is ascribed to personal intentionality: one was free to act differently. Thirdly, the negative evaluation not only applies to the action, but also to the person responsible for the action: not only the act is wrong, but I, the culprit, am bad. It is precisely this latter step which seems to distinguish between a feeling of guilt and the realisation that one is guilty (Frijda, 1986). Later, Frijda (1989) poses questions with regard to intentionality. He noted that guilt often occurred in situations where people had unintentionally caused harm to others.

Guilt exerts its effect once something has already happened. All kinds of action tendencies can arise with the ensuing behaviour: suffering, remorse, penance, contrition. Sometimes, the emphasis lies with the culprit: you loathe yourself and want to efface yourself; alternatively, the focus is on the negative consequences of the deed. One useful response for road safety is: "I'll do better next time".

Before the event, anticipation of all the trouble that can occur is important: anticipated guilt and anticipated remorse. This can lead to an adaptation of behaviour so as not to damage yourself or others.

Guilt can only occur if one has a conscience: an internalised parental disapproval.

6.3.2. *Guilt and traffic*

First, you can ask yourself if people can be discouraged from depressing their accelerator more than they should. Some studies show that fear of guilt or remorse can apply a brake to behaviour (Twisk & Levelt, 1997). This is called anticipated guilt. The word 'fear' is added, because this is probably the emotion which leads to the action tendency of taking it easy. People want to ensure that they do not have a feeling of guilt later, if, through their own fault, they cause harm to someone else. They also want to avoid a feeling of remorse, the feeling one has done something which does not stroke with one's conscience.

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The opposite of guilt and remorse is the 'internalised' parental approval if one does what one believes to be right. This is a sense of pride or competence (Lake et al., 1995): you have followed your conscience and resisted temptation. You can be at ease with yourself driving slowly in a residential area or giving pedestrians right of way on a crossing. Here again, two forms of emotion exist: you are proud to have concern for the welfare of others and you are proud to follow your conscience.

There are a number of conditions that must be fulfilled for someone to be able to feel guilt and hence anticipate this emotion. With each condition, it will be indicated how education can contribute to fulfilling this condition.

1. People must *acknowledge the event* which can lead to another person sustaining damage. A street full of parked cars can be hazardous to small children. Motorists will not see children if they cross in a somewhat inexperienced manner. This 'event', driving through a street with parked cars, has the potential to harm others. This applies to many traffic situations, and people can be taught to deal with these.

2. People have to apply the correct *attribution*: "I am the cause". The correct attribution is often lacking. People expect that children or other road users are the cause of the situation where the other sustains damage. They think, for example, that the child can avoid crossing dangerously. They will have to learn how this works. Obstruction by others is often considered as obstruction to be avoided by others, the response being anger and behaviour that can harm others. This harm is then not attributed to the person committing the act, but to the person 'provoking' it.
   If people have learned to understand that many obstructions are due to others not being able to help themselves, then guilt will occur if one considers the other guilty but responds inappropriately. Therefore, it may be possible to elicit anticipated guilt.
   Example: a car that drives slowly so that those driving behind are held up. All kinds of attributions and cognitions are possible:
   (1) Old people that can't drive any longer should stay off the road. These kinds of thoughts can be prevented by showing that while these old people might drive more slowly, this rarely leads to loss of time; furthermore, this is the only possibility -also when it is our turn later - to stay mobile.
   (2) Someone who is incompetent. Here one can think: "It is probably a stranger who is unfamiliar here, just as I am in a strange city".
   With these changed cognitions, one prevents frustration, anger and aggression. Anticipated guilt is created in response to aggressive behaviour.
   Information about reasons for others driving slowly or ineptly, or other obstructions committed against my person can put this process into motion.

3. People must have a well developed *system of norms*. This is in the first place a general educational problem. But it can still happen that parents who raise their children well and attempt to pass on their norms are in the wrong. Other road users are sometimes seen mainly as enemies or as obstructive or annoying objects. Understanding for the interests of other road users as demonstrated by educators can make the fate of others important to children. Educators should equate important traffic rules with

moral norms. There are no rules of the game, where if you cheat you can buy off your guilt if detected; it relates to behaviour which is inherently right or wrong, regardless of the consequences; it concerns a personally experienced behaviour. The event should namely appeal to a personal interest, if it is to elicit an emotion with the associated action tendency (Frijda, 1986; Smith & Lazarus, 1993). It has been shown that the more one sees a traffic rule as a personal norm, the more the intention to trespass the rule declines (Parker et al., 1995).

There are also developments in the application of traffic laws which are leading to a new norm. A Dutch bill states that cars are responsible for the harm done to cyclists, even if the cyclist has trespassed a rule. Motorists can be very indignant about this new rule, and will usually not feel guilty in such a case (comparable to situations in the past, when people hardly felt guilty about drunk driving). With much effort, it is perhaps possible to make this a truly personal norm that can have effect in the presence of anticipated guilt.

4. People have to learn which *affects* are at play here: that guilt is appropriate when a norm has been trespassed, while a pleasant sensation results when one follows the rules or resists the temptation. Guilt is to do with feeling personally responsible for the harm you have caused another. Anticipation of this unpleasant feeling can keep people on the 'straight and narrow'. The pleasant feeling when resisting temptation can relate to a feeling of competence: "I can control myself". But also a feeling of: "Ain't I being nice to other road users". Traffic educators must be stimulated to introduce these three affects: guilt about trespassing the rules and endangering others, a feeling of competence that one is able to keep to the code of conduct despite the temptation not to do so and pride about altruistic behaviour. It has been shown that children who can recognise that someone else feels good by resisting temptation can also offer more resistance to temptation themselves (Lake et al., 1995).

It has been shown that the more one anticipates remorse about a traffic offence, the more the intention not to transgress increases (Parker et al., 1995). This affect and the previously cited personal norm has an effect on intention over and above the effects of attitudes with respect to the offence, over and above the effect of what significant others think about it (subjective norm) and over and above the effect of the conviction that one is able to commit or prevent the offence. Parker (1994) has also demonstrated that by twice showing a simple video aimed at the display of remorse with respect to speeding in a residential area, the attitude with respect to such speeding can already be influenced.

6 4. Fear

Attitude research has shown that one includes the estimated probability of an accident in the attitude with respect to speed. Whether this means that one does not depress the accelerator as much for reasons of fear is not known to me, but it seems likely. Feelings of lack of safety seem to play a considerable role. This could be in an anticipating sense: people do not even consider acting this way, but also while driving: people suddenly feel unsafe. For example, if one passes an accident, speed is reduced in response; when driving into a fog bank, one quickly slows down.

6.4.1.   *The structure of fear*

The basis of fear is formed by 'hazard' and 'threat' (Smith & Lazarus, 1993). People are confronted with an event that is relevant to their well-being, and is in conflict with this feeling. People estimate that psychologically, they can alter little when the event occurs: they can neither change the own interests, nor the interpretation of the event.

This evaluation leads to a behavioural impulse to protect or withdraw oneself (if one thinks that the harmful consequences can be reduced) or to freeze or flee (if one expects to avoid danger by doing so), or to collapse (if one thinks resistance is useless). Emotion is accompanied by physiological phenomena and facial expressions: gastro-intestinal activity, frightened face, accelerated heart beat. With unavoidable danger, trembling occurs.

The greater the interest (the prevention of physical injury represents a greater interest than the avoidance of a fine) and the greater the relevance of the event to the interest (driving 10 km too fast is less harmful to a financial interest than driving 30 km too fast), the stronger the emotion.

The more self-respect is threatened, and the more unrealistic the situation is estimated to be at first, the stronger the fear (Sonnemans, 1991).

Fear is both a trait and a state. The degree of fearfulness in people's psychological make-up is largely genetically determined (Oord et al., 1996). If one anticipates a threatening situation, then the effect on fearful people will be stronger than on those with a higher fear threshold (Mogg et al., 1994), or in any case the response will be different. When threatened, fearful people show more attention to frightening stimuli, not less.

6.4.2.   *Fear and traffic*

It is likely that fear in relation to driving behaviour can arise from a threat to various interests (Levelt, 1997). The consequences will vary. People can be afraid of a threat to their:
- physical integrity. People can be afraid to sustain physical injury.
- self-respect: people can be afraid to lose face towards a passenger or fellow road user, or people can be afraid to be found a nuisance.
- moral integrity: anticipated guilt about harm caused to others and about loss of moral self-respect by doing things that conflict with their conscience.
- personal material integrity: fear of damage to the car, fear of being fined.
- interests of friends and family: fear of harm coming to them or losing them.

6.4 3.   *Fear-inducing information campaigns*

There is some literature about fear-inducing information campaigns in relation to traffic. A good overview of fear-inducing information campaigns is given by Eagly & Chaiken (1993).

The theory states that there is an inverted u-shaped relationship between the fear aroused and the effect of fear-inducing information campaigns, or the message acceptance. If the fear elicited is too great, the effect declines because attention diminishes: people do not want to see it, or the concentration is lost. Also, aggression toward the communicator can occur: people reject him/her and the recommendations given. If neither recommendations, nor own responses can reduce the emotion, then defensive

avoidance can occur, where people refuse to think further about it or trivialise the threat.

My supposition is that the point of return is never reached, because the ethical and artistic limits in the pub lic media are not exceeded (as does occur with videos (e.g. 'Faces of death') and some video games and movies). Even though there is an increase in the frightening quality of media products, people's tolerance adapts to this level.

As long as the fear is not converted to dis gust, the message is not at risk. The fear can also be contained by the realisation that the threat stops once the film stops, and by the rea lisation that "'t is only a media event".

There are two advantages associated with fear-inducing information campaigns:

1. As long as the top of the curve has not been reached, people will try to solve the problem (problem-solved coping). People will therefore tend to accept the message.
2. Negative feelings lead to more cognitive elaboration: people will look for solutions, and not resort to superficiality. People are more likely to listen to the content of the arguments.

The following should be taken into account:
- The *quality* of the fear-inducing event.
  * The event must be relevant to an interest.
  * This should be a personal interest for the spectator.
  * Formulated differently: the threat must be taken seriously and one must feel susceptible to the threat.

- The *people* at whom the information campaign is aimed. Those who enjoy 'Faces of death' will be attracted by frightening images. This relates to a small group of adolescent boys who will be less inclined to accept the message.
  The event that is presented must be known to the public and relate to them. An event in which a motorist is the focus or where it concerns drink driving is too far removed from the experience of 12-year-olds.
  The interest that is appealed to must be the interest of the public. For some 16-year-old boys, the consequence of drunk moped riding is something which can touch on their personal interest, while for 14-year-old girls this may be the fate of a passenger riding on the back of a moped.

- The *nature of the information campaign*: Possibilities should be offered to solve the problem: there is a solution, and you are able to solve it ('response efficacy' and 'personal efficacy', Beck & Frankel, 1981, in Eagly & Chaiken, 1993).

65. Anger

Increasing attention has been devoted to 'road rage'. This is an angry reaction if people feel they are being obstructed or reprimanded. At this moment there is one study known where drivers are asked explicitly about their experiences with regard to road rage (Joint, 1995). Another study asks about aggressive behaviour (Slotegraaf, 1993). In this type of study, the emotion of anger is present in the respondent, who reacts to something he finds frustrating, or in the other road user, at least that is how it is seen. Roszbach (1991) has

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already indicated that studies into aggression on the road give different definitions of the term 'aggression'. Here we are talking about aggression resulting from anger. Anger and irritation are rarely seen in traffic psychology studies.

6.5.1. *The structure of anger*

The essence of anger is that the other is to blame (Smith and Lazarus, 1993). One experiences an event as being important to an interest, in a negative sense. Something is responsible for that. Of course, it depends on the significance one attaches to an event, the evaluation given. Anger is a response to a frustration that could have been avoided and can be attributed to someone else. However, if this other person is more powerful and able to cause more offence, then fear is more likely to be the response than anger, according to Frijda (1986). Achmed (1992) suggests that anticipation also plays a role. Aggression is stronger if the infringement is more unexpected. Lazarus (1991) emphasises the effect on the ego identity: an insult. This not only concerns the frustration of a goal; the perpetrator has no respect.

The action tendency is characterised by a specific orientation towards the other party and by internal fuming (Frijda et al., 1989). This can shift to carefully developed plans which could be of long duration and are aimed at restoring the ego identity.

Anger is also expressed when the damage does not affect our person as such, but rather the society in which we live (Lazarus, 1991). This can explain why anger is manifested if rules are transgressed, even when we are not personally affected. A just world also forms part of our identity.

6.5.2. *Anger in traffic*

Although anger in traffic is a frequent occurrence, and aggression can be the result of anger, 'anger' and 'irritation' are not often mentioned. It has been asked how irritable one finds oneself in traffic. Less experienced drivers consider themselves more easily offended than more experienced drivers. Outrage or resentment was noted amongst lorry drivers against other road users and against the traffic rules (Kiegeland, P. et al. (1990); Kiegeland, P., 1991; Frieling et al., 1990).

A 'driving anger' scale has been developed (Deffenbacher et al, 1994) for situations that could give rise to anger. Sub-scales relate to aggressive gestures, illegal driving behaviour, presence of police, slow driving, lack of courtesy and road blocks.

Sadalla (1994) investigated the stress resistance of drivers. For this purpose, he also defined hostility-anger as a 'trait'. Other studies report that this characteristic occurs quite frequently amongst drunk drivers (Farrow, 1989). With studies into drink driving, this characteristic is measured more often (Farrow & Brissing, 1990).

It is assumed that congestion arouses anger and tension (Solomon, 1990). Attempts have been made to predict under what circumstances the public would become angry if road pricing were introduced (Lave, 1994).

Anger as a result of the speed or slowness of others and anger leading to changes in speed have rarely been investigated, but are likely to exist; everyone knows examples of such incidents.

The Driver Stress Inventory (Matthews et al., 1996) is intended to determine motorists' vulnerability to the stress response while driving, such as frustration, fear and boredom. This questionnaire also asks about the response to the speed of others. The authors distinguish 5 stress factors: thrill seeking, aggression, dislike of driving, hazard monitoring and proneness to fatigue. Under the heading 'Aggression' we encounter responses such as: "It annoys me to drive behind a slow moving vehicle" Under 'Thrill Seeking': "I get a real thrill out of driving fast". The importance of this scale is shown by the links found between aggression and the need for excitement on the one hand, and accidents and fines on the other. All factors apart from proneness to fatigue have significant associations with offences, speeding and errors, as reported by the motorists themselves. Personally reported errors do relate to the measured proneness to fatigue.

The question is posed whether men and women vary in their anger: are women less often angry, or do they express their anger less? Are they less often angry because there are fewer situations which could give rise to anger? Do hereditary characteristics play a role? Van Goozen et al. (1994b) indicated that there are not yet adequate replies to these questions. Matthews et al. (1996) in any case finds that there are differences between men and women in relation to a few factors, especially thrill seeking, dislike of driving and fatigue proneness; and not concerning aggression, therefore.

The phenomenon of reactance can also be described in emotion-theoretical concepts. Eagly and Chaiken (1993) treat the theory of Brehm. This theory asserts that when individuals perceive their freedom to engage or not engage in some behaviour as threatened or eliminated, they experience reactance, a state of motivational arousal that leads them to attempt to restore their threatened or lost freedom. In this description an actor, who purposefully frustrates us, is only implicitly present, but it is clear that reactance can be considered as anger. The concept of reactance is mostly applied in the context of coercive persuasion. Coercive persuasion could be counterproductive because of produced resistance. Praschl et al. (1994) give examples of reactance regarding restrictive measures of car use. 51% of the drivers is opposed to further legal restrictions, 37% does not like to satisfy the requirements, only 5% sees prominents as good examples.

6.6. Boredom and enjoyment of speed

6.6.1. Structure of joy

Joy relates to the achievement of, or progress towards something we desire (Lazarus, 1991). Lazarus adds that this is only manifested if the existential background is positive. There should be a good anticipation for the future. The action tendency is activity, wanting to stand upright, laughing. Frijda (1994) sees the function of this emotion as a mobilisation towards consumption, or a release of energy following efforts made, or activity mobilised by the appraisal of increased competence and accessibility of the environment caused by the success. The enjoyment of speeding is often contrasted with boredom: an emotion characterised by inactivity, elicited by the absence of interesting stimuli, where people feel they can do nothing to change their situation.

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6.6.2. *Boredom and pleasure in traffic*

Attitude studies rarely investigate emotions. One exception is the question of whether people enjoy speeding and find boredom annoying. As we have already seen, this is the case with 'high sensation seekers'. The question is whether this applies under all circumstances, and also what emotion precisely plays a role in this. Regarding the latter: it probably relates to a feeling of competence. People enjoy accomplishing something very difficult and risky. The same applies to mountain climbing, parachute jumping, etc. Therefore, it is not as much enjoyment of the danger intrinsically, but control of that danger. Mountain climbers in fact go to great lengths to keep the situation controllable: thorough preparation, extreme caution, etc.

The question is whether the enjoyment of control, the competence of speeders is experienced under all conditions, or primarily on the motorway where it is possible to speed. Would people also experience this feeling in a 30 km/h zone or in a situation where fellow road users keep one's speed down? In such situations, do people look for other challenges? An attitude study has shown that arguments such as driving pleasure and inability to tolerate boredom are more often cited with regard to motorways than with lower order roads, and that it plays a more important role if the speed limit rises from 100 to 120 km/h (Vogel & Rothengatter, 1985). Whether the urge to speed because one enjoys it goes hand in hand exactly with the intolerance of boredom is not yet clear for that matter.

6.7. Consideration for others

There are circumstances under which people slow down to take into account children in prams and the handicapped who are about to cross the road (Harrell, 1992; Pancer et al., 1979). It could be that there is an underlying emotion at play here: consideration or compassion. Harrell points to the standard of responsibility which could be aroused, according to Berkowitz (1972). Meeting this standard is considered to be rewarding. Also, people anticipate social disapproval if they do not comply with this standard. For that matter, children are not given special consideration (Howarth, 1985; Thompson et al., 1985). These studies in any case seem to indicate that motorists want to be rewarded for slowing down or stopping. A friendly gesture of acknowledgement by pedestrians can perhaps help in this case.

6.8. Moods

6.8.1. *The structure of moods*

Moods are states of mind in which the object or the cause is much more sweeping and relates to life as a whole. Therefore, it is not an observed event that is evaluated, but life overall. Affect, appraisal and action readiness are object-directed by emotions (Frijda, 1994). With moods, this direction is lacking. Frijda proposes that moods lower the threshold for the corresponding emotion. An irritated mood leads more quickly to anger. While emotions are shorter in duration (which is not always the case), moods last longer. Often, emotions also lead to the onset of a particular mood.

The question is whether emotions and moods are frequently present in life. Watson and Clark (1994) suspect that the majority of life is spent in a non-

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emotional condition. Perhaps this applies less to driving. Arnett et al. (1997) determined that only 31% of trips are driven in a neutral mood.
Moods are very important, they appear to influence:
- attention (Sedikides, 1992);
- information processing (Byrne & Eysenck, 1995);
- memory (Eich, 1995a; b; Matt et al., 1992);
- (social) appraisals (Forgas, 1995; Mayer, 1992);
- assessment and taking of risks (Maule & Hockey, 1996; Constans & Mathews, 1993);
- persuasive communication (Abele & Rank, 1993; Bless, 1990; Bohner & Apostolidou, 1994; Petty, 1993; Wegener & Petty, 1995; Sinclair et al., 1994);
- prosocial behaviour (George, 1991).

Much research has also been conducted into how moods can be influenced. Some examples:
- stress (Marco & Suls, 1993; Stone et al., 1995);
- cycles (Monk et al., 1992):
  . menstrual cycle (Cockerill et al., 1994);
  . day and week (Egloff et al., 1995; Hill & Hill, 1991; Pies, 1992; Wells & Read, 1996);
- caffeine and nicotine (Hughes & Boland, 1992);
- lighting (Knez, 1995);
- temperature (Anderson & Deneve, 1992; Anderson et al., 1995);
- colours:
  . of the interior (Ainsworth et al., 1993);
  . of paper (Jacobs & Blandino, 1992);
- music (Bouhuys et al., 1995);
- exercise (Cash et al., 1994; Dua & Hargreaves, 1992; Pierce & Pate, 1994);
- gender (Clay et al., 1996);
- food (Wells & Read, 1996).

This selective summing up is intended to indicate that 'mood' is becoming an important subject in psychology, that all kinds of influences on moods are at play from which it can be expected that they also occur in traffic and that moods have an influence on all kinds of processes that are also at play in traffic.

6 8.2.   *Moods and traffic*

It seems as though emotions in traffic are important in relation to the 'precedence of control': everything is put aside, due to some hazardous and some favourable action tendencies. Hazardous: e g. in a state of anger, favourable: e.g. with manoeuvres in emergency situations. Moods are important because they are able to influence all processes. Little research has been performed into the influence of moods on behaviour in traffic, however, and hence not on speed choices either. This is clearly an omission.
There are two exceptions to this statement:
Arnett et al. (1997) asked 95 students (aged 17-18) to keep a logbook for a period of 10 days of their journeys by car, leading to over 2300 trips. During each trip the mood was described, the presence of passengers, the time of day, use of the seat belt, alcohol consumption and whether the speed limit was

exceeded. The moods which were asked about and reported included: anger (3%), excitement (7%), sadness (2%), stress (12%), happiness (20%), fatigue (25%) and neutral (31%). In particular, the angry mood exerted a strong influence on speeding (more than 10 mph too fast). Women and men did not differ in the frequency of anger, nor in the relationship between anger and speeding. Harré et al. (1996) also found no difference in reported anger and frustration while driving.

Depressed moods are also said to lead to 'depressive realism'.

McKenna & Lewis (1991) tried to discover whether a depressed mood could remove or reduce the illusion that one is a more skilled driver and less vulnerable than can be determined objectively. They put people into a depressed mood but could find no effect from the study.

6.9. Consequences for influencing behaviour and for the questionnaire

6.9.1. *Influencing behaviour*

Information and education campaigns in fact often elicit or influence emotions as a device to reach the public. The above outline of process variables can however be used to link this approach more systematically to the theory.

People *interpret an event*. This interpretation can be influenced. While they may think that they drive too slowly and will be late, if they knew how little time is gained by driving faster, they would no longer interpret a reduced speed as leading to a late arrival. If they are angry at the higher speed of another driver because this is interpreted as recklessness or a lack of standards, they could learn that sometimes, people do drive fast because there really is an emergency, or the other party might not be aware that he is actually speeding. This sometimes happens to ourselves, too. The fact that the other person is driving so slowly is not necessarily due to stupidity. He is perhaps no longer able to drive at that speed, while the car is the only way to stay mobile, something we ourselves would also like to maintain in the future. Perhaps the slow driver is a stranger who is unfamiliar in the area. This can happen to ourselves, too. The difference in interpretation which evidently exists between whether it is a child on the edge of the pavement or an animal or handicapped person, suggests a solution in the direction of information about the 'animal and handicapped' characteristics of a child. This makes it possible to create an emotion of concern or altruism, with the action tendency of slowing down, also when a child is about to cross the road.

The question is whether people can also look for emotions by looking for relevant situations. Emotions at first glance seem very automatic, unconscious and hence not susceptible to influence, but entering into situations is often a conscious choice. I, as pedestrian, approach a zebra crossing assertively with the emphatic will to make that car stop, knowing that this will lead to satisfaction or frustration with the associated emotions. As motorist, on the other hand, I carefully approach a zebra crossing, enjoying the possibility of giving way to a pedestrian.

One can also look at *self interest* in another way, or see the damage or gain to self interest in a different light. Why should I be angry if the other speeds? He is not hurting me. To the contrary, he shows how competent and normative I am myself: I can keep my speed under control. My anger can in this way

change to pride. Also, other interests can assume greater importance. The person who speeds for reasons of driving pleasure can get the fright of his life as a result of an accident, so that in future, the interest: 'competence' is no longer in question, while the interest: 'physical integrity' has priority. The stimulation of interests occurs, for example, with fear-inducing information campaigns: one emphasises the enormous damage that can result from a particular action.

Offences are often considered to have little importance. Measures such as automatic speed control, with a fine sent via the post, reinforce the opinion that speeding is just a game. One could emphasise the moral importance of an offence, so that other emotional responses are given an opportunity. The interest of not speeding can also be reinforced in a moral sense (prevent harm to others and follow one's own conscience) and in the direction of reinforced ego identity (I determine what I do myself).

Aside from determining the emotional relevance of the event, the event is also evaluated on the basis of *one's estimation of personal competence* in dealing with the situation (Frijda, 1986). An important aspect of this is controllability, the feeling that the course of events can be influenced by one's own actions. The illusion of controllability often plays a role in traffic. You think you can teach the other a lesson, you believe that the other party can see your emotion, you think that he will be impressed by your competence. These are often misconceptions. The other party is only irritated by my actions and will learn nothing. He is not even aware I am angry: he cannot even see my face. The other person is not at all impressed by my high speed, to the contrary: he despises me or pities me. Information can put this secondary evaluation on another track, so that emotions leading to speeding or anger about the speed of another motorist can be given a new twist.

One can also try to influence the *action readiness*. If one is plagued by boredom, then the radio may offer solace, instead of the accelerator. A speed limiter makes the automatic response - foot down - unusable. The expression of emotion is subject to rules. People learn to show their emotions - or hide them - in the presence of certain other parties (Zeman & Garber, 1996). One reason can be: to optimise mutual social interactions. Perhaps that traffic education can apply this motivation.

Regulation is an often used method. The urge to drive very fast disappears the moment other emotions are brought into play: fear of a fine, for example. Fortunately, the need to keep pushing forward if someone coming from the opposite direction is stupid enough to overtake in an impossible location - "I'll teach him" - is often a momentary urge (if the lesson does not succeed, you will not live to tell the tale), overtaken by the fear for one's own life, with the associated action: braking or swerving. We learn not to use the car as weapon, although this is an obvious response if we are angry. Still, we read about it sometimes in the paper: occasionally someone is run over when feelings of revenge or anger take the upper hand. Recently, a 19-year-old boy recounted that his driving instructor had taught him how to deal with a 'tailgater': "brake hard, then he will have to pay for the damage". Usually, however, we are taught acceptable expressions of emotion, which regulate our initial impulses.

To this point the question of what to do with emotions in traffic. A therapeutic principle can be the advice "Don't drive under the influence of emotions" (Thurber, 1994). In this article, she offers a number of valuable

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tips about how to cope with your emotions, with reference to the book by Berger (1988). One step further removed is the advice: do not drive if you are in an emotional state. A friend of mine drove three cars total loss in the period of one year: his marriage was on the rocks.

6.9.2. Questionnaire

In the above, suggestions can be found for the method of research and for the content of the questions posed.

To single out emotions and moods which play a role in the choice of speed and with responses to the speed choices of others and to speeding measures, it is advisable to be as close as possible to the situations experienced. This is possible by letting people imagine these situations, by offering descriptions of 'true to life' events. Another way is the logbook method, e.g. as used by Arnett et al. (1997). The advantage in this case is that it can also be determined whether existing emotions and moods are transferred to the traffic situation, or whether these are elicited by traffic experiences.

There are many emotions and moods which are shown to be related to speed and speeding measures. Some good candidates are:

- Guilt and remorse. With the first, the emphasis is on what one does to others, with the second, on the transgression of standards.
- Pride because we adhere to our own standards, despite what the world around us asks of us, or because we feel superior to others.
- Pride because we are humane enough to take into account the interests of others: altruism.
- Fear due to anticipated guilt, or anticipated remorse. Fear due to the risk of physical injury, or due to potential material damage. Fear for loss of face. Fear of family and friends getting hurt.
- Anger. Anger about others' mistakes, about hindrances posed by others, about restrictions due to speed-controlling measures. But also anger unrelated to the traffic event that exerts an influence on driving, reduces attention or leads to someone wishing to 'defuse' their anger: the irritated mood.
- Pleasure, joy. The exact reason underlying the pleasure of speeding is still unclear to me. Perhaps it is a general enjoyment of life, perhaps more specifically control of the car in difficult circumstances.
- Boredom also proves to be a motivating force to introduce change into a situation, although the action tendency is often quoted to be inactivity.
- Concern for vulnerable people can play a role, or the good feeling associated with altruistic behaviour.
- Positive and negative moods and calmness versus excitement are often already present when one steps into a car or are a response to emotional events occurring while on the road.
- Fatigue. Arnett et al. (1997) found this to be an often occurring mood. What this leads to in relation to speed is not clear to me.

All these emotions and moods can be related to the objective of the trip, the type of road, the speed limit and the presence of passengers and other road users, and other traffic on the road.

7. Personality traits

Personality variables play an important role in behaviour in traffic, certainly when it comes to speeding. Hall & West (1994) suggest that personality variables are responsible for speeding: that you can predict accidents on this basis. In this chapter, the characteristics of 'sensation seeking' in particular will be discussed. In addition, 'aggression' will be considered. 'Fearfulness' was discussed in the chapter about emotions.

7.1. Sensation seeking

People differ in the degree to which they look for or need stimulation. This characteristic is termed 'Sensation Seeking' by Zuckerman. It seems to be a largely hereditary, biologically anchored characteristic (Zuckerman, 1994). Four factors are distinguished, of which two are relevant as motives for speeding behaviour. One is determined by the urge (or precisely the resistance) to become involved in exciting, risky activities such as alpine skiing and motor cycling (Thrill Seeking). Another is the (in)tolerance to boredom (Boredom Susceptibility). It has been shown several times that people high on the scale tend to drive faster. A recent study (Homant et al., 1994) shows that policemen who are high on this scale of sensation seeking perform more car chases that ultimately lead to damage.
Differences in speeding found between men and women and between youth and the elderly are ascribed to differences in this characteristic. Women and the elderly score lower than men and youth, respectively, and are therefore expected to drive more slowly. They are less susceptible to boredom, after all, and have less need for risk-seeking activities. Actually this is not a true representation of the facts. It concerns exciting activities, where people try to control the danger; however, many exciting activities are inherently risky.

Whether differences in the sexes indeed lead to speed differences as a result of this characteristic is actually uncertain. Recently, an English study showed that young women drive faster than young men. This was attributed to the fact that the position of women in society is changing, implying that speed differences should be considered more in the light of influences of the social position, rather than in hereditary characteristics (Baxter et al., 1990).

Lajunen & Summala (1995) looked for a relationship between various personality variables on the one hand, and answers to questionnaires about behaviour and attitudes in traffic on the other. They did not find a relationship between scores for the four sensation-seeking factors and scores for the factors of the Montag Driving Internality and Driving Externality Scales (MDIE), the Driving Behaviour Inventory (DBI) and the Driver Skill Inventory (DSI). In these questionnaires, relatively few questions actually relate to speed, and therefore do not clarify much about possible relationships between sensation seeking and speeding.

Yu & Williford (1992) found that risk-seeking driving (7 questions that related mainly to speeding or not stopping) could be predicted in advance by the score on a sensation seeking scale. Age exerts an influence on sensation seeking (the younger, the higher) and also directly on risk-seeking driving.

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They found this amongst a group of 878 respondents who were either in prison due to alcohol-related offences or in alcohol-treatment institutions .The age is not reported.

Furnham & Saipe (1993) found that sensation seeking is more closely correlated to fines for hazardous, non-alcohol related behaviour on the road than to accidents. The hazardous behaviour consisted amongst other things of speeding offences. Age was negatively correlated with thrill seeking (not with boredom susceptibility) and with fines .The age range was from 19-61, with an average age of 28.

Sensation seeking scales are in part based on questions about risk-seeking behaviour. It is therefore clear that if one searches for a relationship between this measured personality trait and reported risk-seeking behaviour, then this relationship will be found. For this reason, Arnett (1996) developed a scale which did not enquire about risk-seeking behaviour. This scale also showed strong correlations with risk-seeking behaviour, including driving under the influence, driving faster than 80 mph, driving more than 20 mph over the limit, car racing and overtaking in prohibited areas .

While personality traits seem to be less susceptible to external influence, the manner in which they are expressed in behaviour differs from one person to another and may depend strongly on the occasion, for example: without a car, it is not possible to speed. But people can also choose various ways to satisfy the need for exciting activities. One will concentrate on parachute jumping, the other on motor cycling. Zuckerman (1994) also suggests that a strong emotional experience can influence needs, based on this personality trait. Perhaps after a serious accident following one of these exciting activities, one is less inclined to look for this kind of thrill. Another aspect of this personality trait is that the need for exciting experiences becomes less as one gets older. This may explain the finding by De Waard et al .(1992) that older people have a less positive attitude towards driving over 120 km/h .

The size of the group of speeders for reasons of sensation seeking cannot be given, but it can be assumed that amongst speeders overall, there are a number who do so because their personality leads them to seek excitement for pleasure, or because they cannot tolerate boredom. One indication can be found in results from the PROV survey (Pol et al., 1994). Speeding on motorways was found enjoyable by 20%, while 5% do it because they are bored. The former response indicates a need for exciting activities, the latter implies an intolerance to boredom.
Moe & Jenssen (1993) calculate that 25 to 30% of young male motorists belongs to the group of high sensation seekers, as against 5 to 10% of young women. These people have more confidence in their own skills, find the activities less dangerous, are more often arrested for traffic offences and are more often involved in accidents.

One question is whether high sensation seekers estimate risks differently from low sensation seekers. Heino et al. (1996) indicated that in comparison to sensation avoiders, sensation seekers maintain considerably shorter following times when driving behind another car. The two groups assessed the hazard associated with this voluntary following task at a speed of 110 km/h as being equally great, while the physiological degree of effort showed no difference

either. When the two groups were asked to maintain a short following distance, however, the following time dropped and the hazard experienced increased. The effort did not increase significantly. The drop in following time and the increase in the observed hazard is stronger amongst the sensation avoiders. Sensation avoiders also showed far more effort with the prescribed following task than with the voluntary following task. For sensation seekers, this effect was not significant. This is to be expected: the difference in following times between the two tasks was far greater for the sensation avoiders.

These findings seem to confirm the suggestion that sensation seekers do not look for danger but for the control of danger. They consider a more difficult task to be just as hazardous as sensation avoiders' evaluation of an easier task.

Horvath & Zuckerman (1993) compared two models. With the first model, sensation seeking influenced the risk assessment (high scorers estimated the risk at a lower level). This led to more risk-seeking behaviour. In the second model, sensation seeking led to risk-seeking behaviour, after which experience with this behaviour led to a lower risk assessment. The second model performed somewhat better. The authors propose that people assess the degree of risk before they first perform an activity. High sensation seekers will regard the activity as less risky. But once people have experience with the activity (actively or through observation), the level of sensation seeking can determine the interpretation of the activity. High sensation seekers can demonstrate a progressive reduction in the risk experienced and an increased reliance on their ability to prevent negative outcomes, while low sensation seekers remain concerned and unsure about the outcome. In this case, the 'high' sensation seekers will be more likely to repeat their experiences, while the 'low' ones will not do so. It could also be that while observing, 'low' sensation seekers have a more selective attention for the negative consequences of the behaviour of others, while the 'high' ones focus more on the pleasure or the reward of the activity.

Thuen et al. (1992) distinguish risk seeking and safety seeking as two, albeit negatively correlated, separate factors. Safety seeking was positively related to a health-promoting lifestyle, and negatively related to health-threatening behaviour. Risk seeking was positively related to all health-threatening behaviour, and also to physical activities.

Because a considerable group of speeders belong to the group of sensation seekers, and their speeding is motivated by this personality trait, it would seem appropriate to add questions that can place people on this scale.

7.2.   Aggression

The personality trait which underlies aggression is the inclination to express anger. This relates to the tendency to assess events in a way which corresponds to anger, i.e. unpleasant events are considered to be someone else's fault (Frijda, 1994). On the other hand, it is also a tendency to respond in a way which typifies anger: namely, aggressively.

Arnett (1996, 1997) investigated the contributions of sensation seeking and aggression on reckless behaviour. He also considered the significance for five types of hazardous driving: driving under the influence of drugs or alcohol, driving faster than 80 mph, driving more than 20 mph over the limit, racing

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another car and passing another car in a no-passing zone. Aggression is measured using an 8-item scale. In the initial study, Arnett studied 133 17-to 18-year-olds. Sensation seeking and aggression both related to the five reckless behaviours on the road (correlations between R=.23 and R=.37). Sensation seeking and aggression correlated at R=.31. Boys scored higher than girls on sensation seeking and aggression. In another part of the study, adolescents scored higher on both characteristics than adults, while adult men and women only differed in sensation seeking.

In a second study, he used a group of 346 18- to 23-year-olds. Boys reported more reckless conduct in traffic with all five types of behaviour than girls. Sensation seeking was again related to all forms of reckless behaviour in traffic; this also applied to aggression, except for driving under the influence. There was no significant relationship between sensation seeking and aggression. Boys scored higher on sensation seeking than girls, but they probably did not differ in aggression.

Arnett used these results to explain the developmental basis of reckless behaviour. Sensation seeking is stronger during adolescence.

The difference between boys and girls with regard to reckless behaviour is attributed to aggression-related hormonal changes which occur during puberty, in particular the rise in testosterone and the drop in serotonin.

It is in any case important that reckless driving behaviour amongst youthful drivers relates both to sensation seeking and to aggression, two characteristics which have hardly or no relationship to each other. There is a relationship between this personality characteristic and dangerous behaviour in traffic and, as we saw in the chapter on emotions, when youthful drivers feel angry, they tend to speed.

It is interesting to note the observation by Arnett that in the USA, there are well supported national figures regarding reckless drinking behaviour, the use of marihuana and reckless sexual behaviour, whilst there are no comparable figures on reckless behaviour in traffic: the principal cause of death amongst 16- to 24-year-olds.

Hemenway & Solnick (1993) find relationships between self-reported aggressive expressions in traffic, such as rude gestures and fights, and risk-seeking behaviour such as speeding and going through a red light. Belligerent people drive too fast, drive through a red light, drive under the influence and have far more accidents than the average driver. Whether this actually concerns a personality variable is unclear.

Often, a relationship is found between aggression and alcohol consumption (Workman & Beer, 1992). This then of course also has consequences for hazardous driving behaviour, namely driving under the influence (Donovan, 1993; McMillen et al., 1992a; b). Donovan (1993) found a relationship between, on the one hand, the factor aggression/hostility (based on questions about physical and verbal aggression) and driving under the influence. McMillen found that motorists who were arrested for driving under the influence after they had had an accident or were taken off the road scored higher on a hostility scale than others who were arrested for driving under the influence and motorists who had never been arrested (even if they did drive under the influence at times). The causal relationships are not clear in this type of study.

7.3. Consequences for influencing behaviour and for the questionnaire regarding sensation seeking

7.3.1. *Influencing behaviour*

There are people - they are found amongst the fastest drivers on the motorways - who speed to dispel boredom and for the kick it gives them. Personality traits are difficult to influence. These people do not look for danger, but for excitement. They seek out difficult tasks, and part of the enjoyment is in the control of these difficulties. Also included in this group are those who cannot tolerate boredom. They make the driving task more difficult and hence less tedious by driving faster. Whether the supply of alternative exciting activities (alpine skiing instead of speeding, racing on a circuit track instead of on the road) can reduce speeding behaviour on the motorway is unclear. After all, satisfying a need can have an addictive effect. It is not clear either whether these people also belong to the faster drivers on lower order roads, but perhaps driving fast on these roads is less satisfying for this group. The PROV survey (Pol et al., 1994) found that the percentage of drivers who drive too fast on these roads because they enjoy it, or for reasons of boredom, is far smaller than on the motorways. It is not known whether an alternative can be offered for the speeder on lower order roads, e.g. driving on the safest type of road: motorways.
High speed on motorways is primarily hazardous if it leads to short following times, essential rapid stops or lane changes. It is unsure whether these people should be permitted to drive at such high speeds, but such that the risk is diminished, namely: racing when it is quiet on the road, or by cutting back the short following times and fast approaches. However, if these short following times and a rapid approach to the car in front represent the stimuli that give the kick, then it becomes more difficult. Where it concerns control of the vehicle at high speeds, possibilities for communication may be available.

Using the example of smoking, Zuckerman shows that *risk information* is likely to help change dangerous habits. Smoking is related to this personality trait, particularly amongst men, and it has been indicated that the percentage of high sensation seekers that smoked in the early 1970s has halved in ten years' time (Zuckerman, 1994).
Perhaps this will also happen with drink driving. Sensation seeking is related to the consumption of alcohol (Barnea et al., 1992; Earlywine et al., 1992; Kraft & Rise, 1994) and also to driving under the influence (McMillen et al., 1992a; 1992b; Mann et al., 1987). In the Netherlands, a drop has been measured in the level of driving under the influence, particularly young motorists, who on average score higher for sensation seeking than older motorists, are found to drive less often under the influence of alcohol (Mathijssen, 1995). It is possible that risk information, information about accident consequences and about the probability of being caught by the police have led to a drop in this expression of the personality trait. Social pressure as a positive factor is also a possibility.
The conclusion is that the effect of this personality trait on risk-seeking behaviour is not an immutable law of nature. Risk information, police enforcement and social pressure can all help.

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Sensation seekers drive faster and more dangerously than sensation avoiders, and estimate the hazards at a lower level. However, many questions still remain unanswered. Do these effects manifest themselves as prominently in residential areas as on motorways? Are these effects reinforced by the public, or to the contrary? Does police enforcement make the situation more exciting in a positive sense, or is the opposite true? Are sensation seekers receptive to all kinds of risk information with regard to speed? Does this characteristic exert an influence on the assessment of the speed of others, and on the assessment of speeding measures?

7.4. Consequences for influencing behaviour and for the questionnaire regarding aggression

7.4.1. *Influencing behaviour*

Many positive things can be said in relation to the personality characteristic of sensation seeking: it is a dynamic force which drives people in all kinds of fields. Whilst these activities may have deleterious consequences, they are not specifically aimed at such an outcome. Perhaps the same can be said of the personality characteristic of aggression, as measured against the hormonal level. Usually, however, we mean an unpleasant characteristic with only negative consequences.

If we refer to the TV violence debate, then we see that it is assumed that the consumption of TV violence makes some groups of viewers more aggressive, or less sensitive to the consequences of violence. Also, the TV offers examples which these aggressive persons can model themselves on. The lesson which can be drawn from this is that the restriction of aggressive models can combat aggressive behaviour. TV offers a wide range of these types of examples (Greenberg & Atkin, 1983). If you were to watch TV in the USA for one hour a night for the period of one year, then you would see 2700 examples of irregular driving (including in particular what we call aggressive driving) and 250 examples where people are put in danger. Whether and how the aggressive expressions in traffic which result from this personality trait can be further tackled is as yet unclear. However, there is a related experience. A policeman in a small town succeeded in preventing aggressive actions by a group of youngsters by offering them the possibility to motorcross in an organised way. This could prove that moving aggression to safer outlets is possible. However, another explanation could be that a good relation with a policeman strenghtened the influence of perception of social norms. This man became an important referent, and so, his negative opinion about aggressive acts could do its work.

7.4.2. *Questionnaire*

Now that it has been demonstrated that aggression also has consequences for speed, it could be considered to include this aspect in the questionnaire. The studies cited offer examples of how this characteristic can be determined.

8.   Concluding remarks

This literature study is being conducted in order to prepare for interviews about the acceptability of speeds, and speed measures to drivers and vulnerable road users, and in order to provide suggestions for information campaigns.

Each chapter has been rounded off with recommendations regarding the content or form of the questionnaire, and regarding subjects for information campaigns.

The theoretical model normally used in traffic psychology to trace attitudes and motives, and to develop information campaigns is the Theory of Planned Behaviour. Therefore, this report has taken this theory as point of departure. It has tried to answer the questions: what can we learn from the data gathered within this framework? What are the methodological restrictions? What relevant subjects are difficult to treat within this framework.

This report contains many recommendations regarding methodology and questionnaire. Which recommendations will be followed is dependent on many factors such as restrictions of time and money, preferences of experts based on political circumstances in different countries, the wish to follow a new or a more traditional avenue.

8.1.   Methodology

Regarding the methodology, the most important restriction has been found in the statistical treatment of variables. In this field, some recommendations are given, which are not free of obligations. If one wishes to apply variables based on the products of variables, one must first ensure that one is dealing with ratio scales. If this is not possible, then it is better to move away from indirect measures of attitudes and subjective norms.

At the other hand, the normal way of gathering information within this model tends to pass over some important issues by stressing rational thoughts. Feelings and emotions, influencing own speed and attitudes towards speeds and speed measures, can better be traced by free associations about feelings, direct questions about feelings and emotions, logbooks, or involving interviewees in stories. A combination of methods is worth considering.

8.2.   Information campaigns

Some recommendations deserve special attention. E.g . that potential relevant factors are not always discovered by questionnaires or other forms of research, and that factors which have turned out not to be of importance can become important. Another point is that emotional appeals should be used more often .

Seemingly discrepant recommendations are that on the one hand segmentation of target groups is important, but that on the other hand measures applied to all road users, preferable to all European road users, have the best change o f success.

In general it can be said that most road users are positive about speed measures, and, at least sometimes, are still more positive after experience with a measure.

In campaigns, more use can be made of three groups of important referents: the police, family and neighbours, and employers.

Stimulating awareness of own speed and current speed limits can give people more control over their speeds.

Emotions aroused by own speed, and speed of others, and leading to dangerous speeds and other dangerous traffic behaviour, can be prevented by changing interpretations of events, stressing other interests, and by influencing action tendencies.

Guilt, pride, fear and altruistic feelings are emotions, which can be utilised in information campaigns.

Risk information, police enforcement, and social pressure can help to overcome dangerous driving caused by sensation seeking.

8.3. Interviews

Two final remarks will follow, one about the order of questions, and one about the content.

As regards the order of questions: Risser (personal report) recommends a logical order, as follows:

1. Assessment of processes by experts and by involved citizens: What is the problem?
2. Explanation: Why is it a problem? Criteria, attitudes.
3. Description of one's own behaviour, one's own contribution to the problem. How is one's speed established?
4. Explanation: motives, concerns.
5. Technical reasons, presupposed motives of others.
6. What necessity for a change is felt, acceptance of present situations.
7. What changes are necessary in the eyes of involved people?
8. What changes are suggested, what changes are considered promising?
9. One's own preparedness to support changes actively, or even to change one's own behaviour. Acceptance of measures.

As regards the content of the questionnaire: The different chapters contain a number of subjects for relevant questions. Many are based on the main stream of studies in this field. E.g. that speed is motivated by fun, and by considerations of time, money, compliance, opinion of important others, and awareness of speed and speed limits. Also, that motives vary with characteristics of the road or neighbourhood, and with the sort of car ownership.

At the other hand, some newer approaches have been treated, e.g. that emotions and personality characteristics motivate speed decisions, opinions about the speeds of others, and opinions about speed measures.

Factors of importance in information campaigns, described in the preceding paragraph, can easily be translated into subjects for the questionnaire.

In addition, special attention is asked for the following: an important, and accepted motive for speeding is the adaptation of speed to the speed of others. Mapping this conviction is needed to take preventive action.

It is good to inquire about emotions and anticipated emotions like guilt, pride, fear, anger, boredom, and joy, and to assess the important elements of them: perception and interpretation, appraisal of the relevance of the event to one's concern, the role of others or the self, the expected development, and the action tendencies. When the method of investigation comes very close to the

experienced situations of speed, or speeds of others (logbooks etcetera), then questions about moods as motives are possible.

As regards personality characteristics such as sensation seeking and aggression: questions can be asked about outlets for speeding.

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