Driving Violations

*Investigating Forms of Irrational Rationality*

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Abstract

Several aspects contribute to road crashes and one important part is the ‘human factor’. This information is interesting but insufficient unless we also try to understand what is meant by the term. Three different features have been defined: errors, lapses and violations and the latter, which is a deliberate act, has been found to be the main contributor to road crashes. The crucial issue is therefore to understand what motivates drivers to commit an act, which puts both themselves and others at risk. The aim of this thesis is to explore the motives behind this behaviour through the use of an extended version of the theory of planned behaviour (TPB). Four different studies were carried out: The first study is qualitative, investigating the intention to violate. The second one assesses speeding in an urban area and dangerous overtaking. In addition to variables within the model, descriptive norms and past behaviour are included. The third study explores what particular beliefs are responsible for the behaviour. The fourth study uses the TPB to predict intention to speed on a rural road and assesses some underlying factors, such as ambivalence and gender. The results of the thesis show that the theory explains 33 to 53% of the variance in intention to violate and that descriptive norm and past behaviour significantly increase the explained variance. Descriptive norm is also related to risk and past behaviour is not only related to intention but also to the variables within the model. The results show that drivers’ beliefs can distinguish between intenders and non-intenders. With regard to attitudes the general conclusion is that the main difference lay in the effect of positive outcomes. Although in a more ‘risky’ situation the behaviour is more controlled by a denial of negative consequences. Finally, the results indicates that in the context of driving violations an expressed low level of control over the behaviour could be interpreted as a form of denial of responsibility rather than an inability to control their own actions. Implications of the current findings for the development of intervention programmes are discussed.

Keywords: theory of planned behaviour, driving violations, risk-taking, speeding, dangerous overtaking

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List of Papers

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals.


II. Forward, S. The theory of planned behaviour: The role of descriptive norms and past behaviour in the prediction of drivers’ intention to violate. *Transportation Research Part F: Traffic Psychology and Behaviour* (submitted)


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Introduction

The European Commission (2007a) estimated that in 2006 transport crashes in the EU killed about 42,953 citizens, corresponding to 87 fatal accidents per million inhabitants (European Commission, 2007b). Hence, the need to reduce the number of people killed and seriously injured has been recognized widely.

In 2001 a White Paper including a European policy on transport was published by the European Commission (2001). In this paper the EC stated that persons killed on the roads should by 2010 be reduced by 50%. The paper argues that “a modern transport system must be sustainable from an economic and social as well as an environmental viewpoint”. Targets have also been set in some individual Member States and the most ambitious one has been implemented in Sweden. In 1995 the ‘Vision Zero’ was established and in 1997, after a resolution was passed in Parliament, it became the foundation for road safety operations in Sweden. Broadly speaking the Vision Zero states that no one should be killed or seriously injured (Swedish Road Administration, 2006).

To reduce road crashes traffic officials and researchers often refer to the “3 E’s approach”, (Education, Enforcement and Engineering). Education targets the road user and tries to change the attitudes and behaviour of individuals through various forms of communication, enforcement refers to legal actions such as traffic enforcement and engineering measures how to improve transport infrastructure, To achieve greatest effect the 3 E’s should be used in combination. However, this is not always the case and in an independent review of road safety in Sweden it was acknowledged that Sweden has made substantial improvement to the road network, vehicular system and work-related safety (Breen, Howard & Bliss, 2007). However, work aimed at the road user has been less successful:

“The promotion of the road-using public of their shared responsibility in complying with systems, standards and rules has been less successful” (Breen et al., 2007, p. 21).

This is also in line with a study by Levin and Forward (2007) which concluded that the application of Vision Zero has up until now been mostly concerned with improving the road environment and the vehicle whereas the third component, humans, has not been as prominent. This is perhaps not so surprising if we consider that according to the Vision Zero the driver him/herself would only be partly blamed for road crashes. Instead it is road system, the vehicle or the environment in which the driver operates which are at fault. Indeed the shift of responsibility from the road user to the system designer plays an essential part in the Vision Zero. It would then be the responsibility of the system designer to ensure that mistakes made by the road user, which was regarded as inevitable, would not result in serious or fatal injuries (see Swedish Road Administration, 2006). Although road users are perceived as less than perfect they are however expected to follow stated laws and regulation. To further ensure that this is done various measures have been introduced to help the drivers, such as alcohol ignition interlocks and seat belt reminders. As a reminder of speed limits the use of road safety cameras has also increased substantially. Despite these joint efforts the last year accident statistics presented some disappointing results since the first main target for the Vision Zero to reduce deaths by 50% by the year 2007 failed. During 2007 471 people died, which is only marginally lower than 1996 when 508 people died and far from the aim of 270 (SCB, 2008). The reason for this is complex but one, which is the topic of this thesis, is that no real attempts have been made to influence road user behaviour.

However, this is by no way unique for Sweden and in a fairly recent report published by the European Transport Safety Council (ETSC, 2003) no references are made to measures aimed directly at behavioural change. In a Memo from the European Commission it is stated that actions encouraging road user behaviour in most Member States are “regrettable” (European Commission, 2007c). There
are many possible reasons for this state of affairs but one could be that changing people are seen as more complex and long term whereas other measures are believed to have short term effects. A second reason could be that professionals, at least in Sweden, responsible for traffic safety usually have a technical background (Levin & Forward, 2007; Forward, Antonsson, Forsberg, Thoresson & Nyberg, 2008). According to the latter study this was also something which made the officials to feel very uncomfortable when dealing with educational measures. A third reason could be that some of the attempts made at changing road user behaviour through education have failed (Mayhew & Simpson, 1996). So instead of improving the methods used some have abandoned the whole idea (O’Neill & Mohan, 2002). A fourth reason could be that researchers specializing in how to influence and change people failed to get their message across to decision makers. A fifth reason could be that research has focused too much on describing the behaviour but less on how to distinguish what actually predicts the same.

Whatever the reason, in order to reduce the number of road crashes, a broad array of appropriate measures are needed, including those aimed at changing road user behaviour. By being more prescriptive it would be possible to clearly establish the link between motivational constructs and unsafe driving practices. Subsequently this would also provide important information, when measures aimed at changing behaviour should be developed.

Of course, implicit in the above is that a theoretical approach is needed. A theory is not only able to explain the behaviour but can also help in predicting its occurrence. That is providing insight or account of how or why such factors relate to each other and if they affect behaviour. Furthermore, a theory provides us with a guide, which can be tested and replicated. If a theory cannot be tested, it can neither be confirmed nor rejected, thereby rendering it of little use for understanding behaviour. Estes (1993) stated that a model needs to be denoted by something he calls sharpness, that is: “the model must capture aspects of a situation that are believed to be important in a simple enough form that unambiguous empirical implications can be derived and disparities between predictions and observations will be instructive” (p 10.). The challenge for researcher specializing in traffic psychology would be to use a theory in a systematic manner and then communicate the results in a believable and clear manner to people from other disciplines. The general aim of this thesis is to apply a theory which has been empirically tested on numerous occasions within mainstream psychology but also in later years been applied to describe and predict driver behaviour, namely the theory of planned behaviour (Ajzen, 1985). The author will present this theory and then critically analyse its contribution to psychology in general and traffic psychology in particular. As in any theory it should be correctable and dynamic, thus the inclusion of further constructs will be assessed. Finally the implications for any interventions will be discussed.

In order to understand road user behaviour this thesis will start by discussing ‘human factors’ and how they have been investigated within traffic psychology. The underlying idea behind the use of educational measurement, in its broadest sense, is to change behaviour indirectly by focusing on those factors believed to predict the same. One factor which has received more attention than any other is ‘attitudes’. However, the discussion about the relationship between attitudes and behaviour has been rather controversial and some negative results have been used as a reason for not focusing on measures aimed at changing attitudes. This thesis will therefore look at this concept in some depth and argue that the controversy does not lie in its inability to predict behaviour but merely in ineffective ways to measure the same.

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1 In this thesis the word theory is used to describe something which is both explanatory and predictive as opposed to a model which is only descriptive (see http://en.wikipedia.org/wiki/theory).
Road crashes and human factors

Research has demonstrated that the majority of road crashes are caused by human factors and in this context Sabey and Taylor (1980) are often quoted, suggesting that 95% are partly due to this factor and 65% wholly. However, this is not very useful information unless we also try to understand the same. Research has defined different types of human factors and the most promising, thus far in the author’s view, has been the one presented by the Manchester Team (Reason, Manstead, Stradling, Baxter & Campbell, 1990). They divided human failures into three different groups: error, lapses and violations. Errors could be failure to see an oncoming vehicle or misjudgements of its speed. Lapses could include failing to put in the right gear when starting the car or to put the foot on the accelerator instead of the brake. Violations describe behaviours like speeding or overtaking another vehicle when the visibility is poor. Although all the different factors contribute to accidents, research has been able to demonstrate that the effect of violations are greater (Gras, Cunill, Sullman, Planes & Aymerich, 2004; Parker, West, Stradling & Manstead, 1995a; Reason et al., 1990; Rutter, Quine & Chesham, 1995; Sullman, Meadows & Pajo, 2002). The remedies needed to alter these human failures would be very different. A driver who commits errors might need further training, enhancing his/her ability to make better judgments. A driver who commits lapses is generally a novice driver who has not established the right routines for driving and would probably need more practice. Violations nonetheless are different from errors and lapses, since they are deliberate and can be understood in terms of social and motivational factors, such as the persons’ attitudes and norms. In this case driver training can further exacerbate the problem by increasing their feelings of control. To reduce the number of violations the focus needs to be on the motivation behind unsafe driving practices and it is those which need to be challenged and changed. The understanding of attitudes of road users can then be seen as a first step to develop more effective remedies.

Attitudes

Numerous attitudes have been assessed over the years and, as new social questions emerge, additional ones are explored. Examples include: attitudes toward smoking and drinking, education, political parties, ethnic groups and toward a host of social issues, such as traffic safety, nuclear power, global warming, etc.

What exactly is an attitude? The word attitude was first recorded in the 17th Century and stems from the French word *attitudine* meaning disposition and posture. Initially it was a technical term used in art to describe the posture of a figure in a statue or painting. In the next century attitude was being used in more general terms describing the posture of the body and its mental state. Much later, in 1862, Herbert Spencer introduced attitude into the vocabulary of social psychology in an attempt to understand human behaviour (Fishbein & Ajzen, 1975). During the early 20th Century the attitudinal concept engendered great interest, exemplified by the research of Allport who found a hundred different definitions of attitude in 1935. Allport’s conclusion was that, despite this enormous quantity, some resemblance could be noted in so far as they referred to a learned predisposition of an individual to respond either favourably or unfavourably to an object or class of objects (in Fishbein & Ajzen, 1975). According to Augustinos and Walker (1996) the object, or object of thought, could be specific or intangible. The attitude towards drinking and driving is an example of a specific object whereas the attitude towards democracy describes an abstract and intangible object. However, some would argue that this definition was too narrow proposing a multi-component description of attitudes (e.g. McGuire, 1969; Summers, 1977) incorporating the ancient trilogy of thinking, feeling and doing. Summers (1977) described this in modern terms as cognitive, emotional, and action tendency. Cognitive refers to the belief about an object but also a belief about how the object shall be treated. The emotional component refers to the individual’s feelings which are evoked by the attitude object. The action tendency refers to behavioural readiness to respond to the object. Based on the
The relationship between attitudes and behaviour

During the sixties the consistency between attitudes and behaviour started to be questioned (Fishbein, 1967; McGuire, 1969; Wicker, 1969). Wicker (1969), who reviewed over 32 studies, concluded: “it is considerably more likely that attitudes will be unrelated or only slightly related to overt behaviors than that attitudes will be closely related to actions. Product-moment correlation coefficients relating the two kinds of responses are rarely above .30, and often are near zero” (Wicker, 1969, p. 65). He also found that attitudes did not explain more than 10% of the variance. He therefore concluded that there was very little evidence to support the existence of stable attitudes which influence behaviour (Wicker, 1969). For some people this conclusion came as no surprise but for others who regarded attitudes to be an important concept it was very challenging (see Ajzen & Fishbein, 2005). It was not the first time evidence had been published questioning the relationship but this time it was more difficult to ignore since it was based on an integrated review (Ajzen & Fishbein, 2005). One of the responses from investigators was to reconsider the relationship, or concluding that attitudes were of little value for the prediction of behaviour (Ajzen & Fishbein, 1977).

Shortly after Wickers publication Fishbein and Ajzen published a review of 750 articles related to attitudes and opinions (Fishbein & Ajzen, 1972). They discovered 500 different ways to measure attitudes and were therefore not surprised that research in this field was both confusing and contradictory. Fishbein and Ajzen (1972) concluded that the controversy surrounding the concept was due to this lack of a common definition and therefore a pseudo problem. What was needed in their opinion was a serious reorientation: “It is painfully obvious that what are required at this point in time are not additional studies of this type but rather a serious reconsideration of basic assumptions and thoughtful theoretical reanlyses of the problems confronting the field” (Fishbein & Ajzen, 1972, p. 532). The need for a more theoretical approach and the use of systematic and comprehensive techniques was also the response from the scientific community to Wickers conclusion (Gordon, 1989). This in turn generated several explanations for the low empirical relationship between attitudes and behaviour. One argument put forward was that the link between attitudes and behaviour was influenced by the person performing the behaviour. For instance, greater consistency was found if attitudes were formed through direct experience, if the person was inclined towards monitoring their own reactions rather than others (i.e., low self-monitoring) and if they had a vested interest in the matter (see Augoustinos & Walker, 1996; Fiske & Taylor, 1991).

Another line of reasoning referred to the aforementioned trilogy: thinking, feeling and doing. Advocates of this multi-dimensional approach argued that the inconsistency was due to the use of a single score measuring attitudes. Instead of only measuring feeling, or affect, an assessment of thinking and doing had to be carried out (see Ajzen & Fishbein, 2005). However, according to the review by Fishbein and Ajzen (1972) the multi-dimensional approach was rarely tested and in the absence of empirical support they concluded that the constructs should be investigated separately. Instead of describing the three components as part of attitudes they treated them as three different types of responses: beliefs, attitudes and intentions. Indeed, this was also very similar to Fishbein (1967) who proposed a uni-dimensional view of attitudes where beliefs and intentions were regarded as determinants or consequents of attitudes.

Another reason for the poor relationship between attitudes and behaviour was stressed by Ajzen and Fishbein (2005) who pointed out that the problem with previous studies included the mistake to predict specific behaviours from general attitudes and vice verse. To solve this problem the principle of compatibility was suggested. This implies that both attitudes and behaviour needs to be measured at the same level of specificity, that is, very specific or at a more general level. That is the same target at which the disposition is directed, the particular action or actions involved, the context in which the action occurs and the time of its occurrence (i.e. Target, Action, Context and Time). For example if a
study of speeding should be conducted then the target was driving, the action speeding, the context might be speeding in an urban area and the time could be around noon. With this high level of specificity then, according to Ajzen and Fishbein (2005), the correspondence between attitudes and behaviour should also be high.

Single behaviours are typically invalid or poor indicators of a more general attitude but this cannot, according to Fishbein and Ajzen (1974), be taken as evidence for the attitude – behaviour inconsistency. To understand this, it is important to distinguish between single and multiple-act criteria. In order to increase the relationship, a principle of aggregation has been advocated. According to this principle, neither single-act criteria nor the tendency to perform a specific behaviour over time are representative of general traits or attitudes. Only multiple-act criteria, or repeated observations of different behaviours, are sufficiently general to reflect such a broad underlying disposition.

This was also demonstrated by Fishbein and Ajzen (1974) in their study of 100 self-reports of religious behaviour. In support of the hypothesis the results demonstrated that the prediction of single actions from global attitudes was largely unsuccessful. The average correlation between attitudes toward religion and single behaviours was about 0.14. In marked contrast, the same global measures of attitude correlated highly and significantly with the aggregate indices of religious behaviour. Furthermore, application of the principle of aggregation has demonstrated that it is appropriate to postulate broad attitudinal dispositions that are stable over time, providing reasonably accurate prediction of multiple-act behavioural indices (Ajzen & Fishbein, 2005; Fiske & Taylor, 1991).

Further attempts to increase the link between attitudes and behaviour have resulted in a wide range of “other variables” being investigated. These “other variables” were supposed to have an effect on behaviour that goes beyond the effect of attitudes. However, the problem was that the variables suggested were poorly defined and had not been systematically tested (Fishbein & Ajzen, 1975). In contrast to the advocates of “other variables”, which implied that attitudes was only one of many predictors of behaviour, Ajzen and Fishbein (1977) claimed that its role was much more important and that the critique may be unwarranted. Alternatively Fishbein and Ajzen tried to narrow down the field by incorporating only a small number of variables into a single theoretical framework which could be empirically evaluated. Thus, instead of trying to establish when attitudes were related to behaviour, and when not, this approach started to theorize the relationship (Augoustinos & Walker, 1996). The most prominent theory in this field was the theory of planned behaviour (TPB; Ajzen, 1985) and its predecessor, theory of reasoned action (TRA; Fishbein & Ajzen, 1975), which included additional variables but also argued that attitudes had an indirect effect on behaviour via intention.
Theoretical models of behavioural intentions

Historical background
In 1967 Fishbein published a paper where a theory later known as the theory of reasoned action (TRA) was starting to take form. Based on Dulany’s (1961) theory of propositional control, a theory of behavioural prediction was proposed questioning the assumption that attitude was a major determinant of behaviour. In contrast to the multi-dimensional approach, which stated that affection, cognition and conative components were part of attitudes, Fishbein (1967) argued that they were independent phenomena. Instead of predicting behaviour directly attitudes were said to predict intention which in turn predicted behaviour. Thus, in an attempt to resolve the attitude – behaviour dispute he suggested the following:

“1) considering a limited set of variables that function as primary determinants of behaviour, and 2) analyzing the relations between these variables and traditional methods of attitude.” (Fishbein, 1967, p. 491)

In 1969 the model was described as “Fishbein’s model” but this time it was stressed that it only intended to predict intention and not behaviour per se. “Although the model can, and in fact does, lead to extremely accurate behavioural predictions, it will only do so when, and if, the experimenter selects an appropriate behaviour intention” (Ajzen & Fishbein, 1969, p. 415). A schematic representation of the model was presented in 1975 which in fact did not include behaviour (Fishbein & Ajzen, 1975). In an article from 1976 the relationship between intention and behaviour was very clearly formulated as a response to a critique of the model by Songer-Nocks². “Since intentions are viewed as the immediate determinants of behaviour, the model can also be used to predict and explain behaviour. However, we have repeatedly pointed out that the intention-behaviour relation must be studied in its own right since a variety of factors can influence the strength of the obtained relationship between a measure of intention and a measure of behaviour.” (Fishbein & Ajzen, 1976, p. 584). By 1980 the model incorporated behaviour (Ajzen & Fishbein, 1980). This was also the first time when the term theory of reasoned action appeared in a published article. According to this model attitudes but also subjective norms were identified as important antecedents of intentions which in turn predict behaviour.

Almost from the onset the TRA had a great impact on research investigating the attitude – behaviour relationship. In 1979, Bentler and Speckart proclaimed that Fishbein and Ajzen had “advanced a major theoretical statement on attitude – behaviour relations” (Bentler & Speckart, 1979, p. 452). In 1984, Liska argued that its major achievement was its ability to classify a vast range of variables into only three major categories and to impose some structure into attitude research. The TRA did not try to predict all kinds of behaviour instead it restricted itself to those which were under volitional control (Fishbein & Ajzen, 1976). However, the focus on volitional behaviour was something many regarded as a limitation and rather restrictive, leaving out many important behaviours. Some would even argue that it was wrong to distinguish between volitional and non-volitional. For instance, Liska (1984) pointed out that this distinction was fairly artificial since most behaviour ranges from behaviour requiring few skills to behaviours requiring a great number of skills. In order to make the TRA more representative, and as a response to the criticism, In 1985 Icek Ajzen proposed a new expanded version called the theory of planned behaviour (TPB). This model considered behaviours which were volitional but also valid for behaviours where imperfect control existed.

The Theory of planned behaviour (TPB)

The TPB predicts that overt behaviour is a function of behavioural intention which in turn is a function of attitude, subjective norm and perceived behavioural control. A schematic representation of the model is presented in Figure 1.

![Figure 1. Theory of Planned Behaviour (Ajzen, 2005)](image)

Intention has a central role within the TPB and is generally regarded as a sufficient immediate cause of behaviour. However, perceived behavioural control can also have a direct effect on behaviour if the behaviour is not under complete volitional control and when this perceived notion of control truly reflects reality (Madden, Scholder Ellan & Ajzen, 1992). In situations with high actual control the variable is expected to be less significant. The broken arrow, in the figure, between perceived behavioural control and behaviour implies that it is not always crucial but that it can act on behalf of actual control. Theoretically the importance of attitude, subjective norm and perceived behavioural control is estimated by the use of multiple regression analysis or a structural equation analysis. These constructs, also described as global or direct measures, are determined by three belief-based or indirect measures namely: behavioural beliefs, normative beliefs and control beliefs. The differences between global measures and belief-based measures has been described as follows; “the global measure focuses directly on the concept in question, the belief-based measure focus on the presumed determinants from which the concept can be inferred” (Ajzen & Driver, 1991, p. 188).

Behaviour refers to an observable act and intention refers to the respondents’ willingness to perform the behaviour. The theory states that the stronger the intention to perform the behaviour, the more likely it is that it will be executed (Ajzen, 1991). However, the model also postulates that a number of factors helps to strengthen this relationship. Firstly it is important that both are measured at the same level of specificity according to the principle of compatibility and secondly intention needs to be stable. For instance, new information presented before the behaviour is emitted can weaken the relationship. However, the principle of compatibility does not only apply to intention and behaviour, instead it is permeating the use of the whole model. Two to three items are usually used to measure intention. *I plan to do, I will do* (Ajzen & Driver, 1992) and *I tend to* (Ajzen, Brown & Carvajal, 2004) or, as suggested by the guide how to construct TPB questionnaire, a combination of all three (Ajzen, 2006). If a measure of behaviour is included in the study then this information is usually collected at some later stage through the use of self-reports. In the guides from 2006 Ajzen suggests three different ways to collect self-reported behaviour. The first asks how many days in the past month the behaviour have been carried out, the second uses a Likert scale with seven different options, ranging from *Every*
day to Never. The third method proposed is to ask the respondents to estimate how often they have carried out the act in the past month. The response is made on a bipolar scale ranging from Never to Every day. However, this method runs the risk of bias since reported behaviour might not be the same as actual behaviour. Ideally the behaviour should be observed on more than one occasion. The results are then aggregated across occasions and contexts. However, this procedure is both time consuming and expensive and is therefore rarely used. More recently Ajzen (n.d.) also suggests that past behaviour can be used as a measure of future behaviour although he also acknowledges that “the correlation may be inflated making it more consistent with intention” (see frequently asked questions - www-unix.oit.umass.edu/~aizen/faq.html).

Direct measures of intention

The model includes three direct measures of intention; attitude, subjective norm and perceived behavioural control. Attitude describes the respondents’ positive or negative evaluation of the behaviour. As opposed to some previous work dealing with attitudes towards an object, or class of objects, the TPB is concerned with attitudes toward the act itself (Ajzen & Fishbein, 1970; Fishbein & Stasson, 1990). A measure of attitude is typically obtained by asking the respondent to rate pairs of adjectives in response to a statement (i.e., “For me to walk on a treadmill for at least 30 minutes each day in the forthcoming month is”). At times the scale includes instrumental (i.e., harmful-beneficial, useless-useful) and affective attitudes (i.e. enjoyable-unenjoyable and boring-interesting). In Ajzens’ latest guide from 2006 a third measure of good and bad presenting an overall evaluation is included as a measure of attitudes (Ajzen, 2006).

Subjective norm deals with the impact of the social environment on behaviour. It is described as the individuals’ perception about other people’s reaction to them performing or not performing a certain behaviour. A reaction sometimes described as a form of social pressure (Ajzen & Fishbein, 2005; Albarracin, Fishbein, Johnson & Muellerleile, 2001; Fishbein & Stasson, 1990). This would then be followed by compliance if the individual accepts their influence. A measure of subjective norm is obtained by asking the respondent to judge people’s approval or disapproval. In a study on ‘willingness to pay’, respondents were asked: “Most people who are important in my life think I should engage in this activity”. This was then followed by a 7-point rating scale ranging from unlikely to likely (Ajzen & Driver, 1992). Subjective norm can also be a combination of three items; two measuring injunctive norm (i.e., perception of what ought to be done) on one measuring descriptive norm (i.e., perception of what others are doing) (Ajzen, 2002a; 2006; Ajzen et al., 2004).

The TPB posits that an act can only be performed if the person also has access to a number of different factors (e.g., skills, opportunities, resources). To actually assess these factors may be difficult but the theory asserts that it can be measured indirectly via a person's belief about how easy or difficult the performance of an act is likely to be, that is, perceived behavioural control. If the perception is accurate then it can serve as a proxy for actual control (Ajzen, 2005). This is then described as perceived behavioural control and refers to a person’s perception about his/her own capability to perform an act. In general it should capture if the respondent feels confident about his/her ability to perform the behaviour. This factor was in 1991 described by Ajzen as most compatible with Bandura’s notion of self-efficacy and in 2002 as quite similar to the same (Ajzen, 1991, 2002b). In hindsight Ajzen argued that it might have been wrong to call this variable perceived behavioural control: “This would suggest that it refers to control of the outcome of the behaviour, rather than, the degree of control over performance of the behaviour itself” (Ajzen, 2002b, p 4).

A direct measure of perceived behavioural control includes two different types of control; capability, previously known as self-efficacy, and controllability. These two items are assessed by different questions but theoretically they are dealt with as a unitary factor and should be correlated (Ajzen, 2006). Capability deals with the ease or difficulty of performing the behaviour. For instance “For me to walk on a treadmill for at least 30 minutes each day in the forthcoming month would be”. This is then rated on a 7-point bipolar scale from impossible – possible. Controllability refers to perceived control over its performance and can be assessed by the following statement: “It is mostly up to me whether or not I walk on a treadmill for at least 30 minutes each day in the forthcoming
month” and then rated on a 7-point bipolar scale from strongly agree – strongly disagree (Ajzen, 2006). The items are then averaged to provide a measure of perceived behavioural control. Although Ajzen appears to be in favour of a unitary factor he would still argue that it is up to the investigator to decide if the items should be separated or not (Ajzen, 2002b).

The direct measures included in the TPB are described as three different constructs and should therefore correlate more strongly with intentions than with each other. Nevertheless, it is quite possible that a behaviour believed to please others (subjective norm) also could be evaluated as favourable (attitude). However, by the same token, it is also possible that a behaviour which would not please others would still be regarded as very attractive. The relative importance of the different constructs could vary and has to be established empirically. The most frequently used method is an interpretation of beta weights derived from a multiple regression analysis. The factor with the greatest beta weight is interpreted as being of greatest importance (Trafimow & Fishbein, 1994).

However, the goal of TPB is not only to predict behaviour – it also wants to present a deeper understanding of the same, something which makes the antecedents of attitude, subjective norm and perceived behavioural control especially important.

Indirect measure of intention

People can hold a great many beliefs about any given object, but they can only attend to a relatively small number, perhaps eight or nine, at any given moment. The model makes no prior assumption about the nature of these beliefs. Instead pilot studies, asking the respondent to list their beliefs about an object and the consequences, are used on each occasion to elicit relevant beliefs. These beliefs may be directly related to intention and therefore the theory can be tested using either direct or indirect measures (Ajzen & Driver, 1991).

A person’s overall attitude is determined by the respondent’s beliefs about the attitude object (Ajzen & Fishbein, 2000). Theoretically this is described as a combination of behavioural beliefs and outcome evaluation, where the first describes the consequences of performing the act and the latter how these consequences are evaluated. In accordance with the expectancy value model (EV) an attitude is the outcome of a number of beliefs regarding the expected value of the attitude object. Thus, a belief in positive outcomes generally suggests a positive attitude (Albarracín et al., 2001). The expectancy component describes the probability that the attitude object possesses the anticipated attributes. The value component refers to the evaluation of the same attributes (Eagly & Chaiken, 1993). The terms “object” and “attribute” should be understood in its broadest sense. For example a person may believe that walking (the attitude object) increases well being (the attribute). According to the EV model, behaviour is engaged in if the sum total of these beliefs suggests that it will have positive outcomes.

To form an aggregate measure of an attitude all behavioural beliefs are multiplied by an evaluation of those outcomes, the resulting product is then summed across the number of salient beliefs. Behavioural beliefs can be assessed using the following statement: “My walking on a treadmill for at least 30 minutes each day in the forthcoming month will lower my blood pressure”. This is then rated on a 7-point bipolar scale from extremely unlikely –extremely likely. Outcome evaluation is assessed asking: “Lowering my blood pressure is” followed by a 7-point bipolar scale extremely bad – extremely good (Ajzen, 2006).

It could therefore be argued that a decision to act is reasoned, although this would not imply that they always are reasonable, or as Ajzen and Fishbein (2005) stated: “they may be inaccurate, biased, or even irrational” (p. 193). The implication of a reasoned action is that once formed all the variables within the model are assumed, “to follow in a reasonable and consistent fashion” (Ajzen & Fishbein, 2005, p. 194). Furthermore, it is not suggested that people carry out these elaborate computations before an attitude is established. It only suggests that the formation of attitude may be modelled in this manner (Ajzen & Fishbein, 2005).

It is also quite possible for an attitude to be activated automatically, that is without conscious intent or cognitive effort (Bamberg, Ajzen & Schmidt, 2003). For instance, an attitude can be activated automatically when it is discovered that a new object can be linked to other objects to which a
judgement already has been formed. Thus, by a process of association attitudes towards new objects are being established (Fishbein & Ajzen, 1975). This would then imply that attitudes rather than behaviour could influence the formation of new beliefs (Ajzen & Fishbein, 2005). The perceived outcome of behaviour would then be interpreted and evaluated in the same light as similar behaviours encountered in the past. Indeed, not only attitudes but also subjective norms can work backwards in the manner just described.

The indirect measure of subjective norm is normative beliefs. Normative beliefs describe social norms and stand for the person's belief that significant others’ think that the individual should or should not perform the behaviour. According to Ajzen (2006) the following questions can be used to measure normative beliefs:

“My family thinks that
I should : I should not
walk on a treadmill for at least 30 minutes each day in the forthcoming month”.

The main difference between subjective norm and normative beliefs is that the first asks about “most others” whereas the latter are more specific, assessing each referent separately.

Normative beliefs are then related to motivation to comply in so far as the latter modifies the first. Motivation to comply refers to the individual's general motivation to comply with the expectations of particular referents and is independent of the behaviour in question. Motivation to comply can be assessed by asking: “When it comes to exercising, how much do you want to do what your family thinks you should do? This is then scored on a scale from not at all to very much (Ajzen, 2006). The relative importance of normative beliefs and motivation to comply may vary between individuals, situations and behaviours. An aggregate measure of subjective norm is calculated in the same way as behavioural beliefs and outcome evaluation, that is, normative beliefs are multiplied by motivation to comply and then summed across the number of salient beliefs.

Indirect measures of perceived behavioural control are control beliefs strength and control belief power. Control beliefs strength indicates the perceived likelihood (or frequency) of a given factor being present. Control belief power assess if these factors have the power to facilitate or impede the performance. These factors could be internal (e.g. self-efficacy and skills) or external (e.g. opportunities and constraints). External facilitators can also be other people but here Ajzen (2002b) clearly states that it only deals with a person’s own power to secure help from others. The items used to capture these factors should be carefully selected by some form of pilot study. For example, the results from a pilot study might indicate that being in a hurry would make speeding more likely. In the survey respondents are then asked to indicate on a 7-point scale if they are more likely to speed if they are in a hurry. In the guide from 2006 control belief strength is assessed by a question about demand: “I expect that my work will place high demands on my time in the forthcoming month” followed by a rating scale from strongly disagree to strongly agree. Control belief power is assessed by a question about ease or difficulty “My work placing high demands on my time in the forthcoming month would make it…” followed by much more difficult to much easier. To form an aggregate measure of perceived behavioural control the two control beliefs are multiplied and then summed across the number of salient beliefs.

The theory recognizes the importance of background factors, such as: personality, mood, emotions, education, age, gender and past experience. However, they are not included in the model and if they affect behaviour it would be via beliefs. Ajzen and Fishbein (2005) stated:

“Whether a given belief is or is not affected by a particular background factor is an empirical question. In light of the vast number of potentially relevant background factors, it is difficult to know which should be considered without a theory to guide selection in the behavioural domain of interest” (Ajzen & Fishbein, 2005, p. 197).

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3 In an early version of the Theory of Reasoned Action both personal normative beliefs and normative beliefs were included (Ajzen & Fishbein, 1969). Personal norm was later dropped since findings suggested that it was an alternative measure of intention (Ajzen & Fishbein, 1973).
Background factors are therefore seen as a complement in so far as they could deepen our understanding of what determine behaviour, but should not be part of the reasoned action approach (Ajzen & Fishbein, 2005).

Measurement of TPB-variables

The semantic differential scale developed by Osgood and his colleagues in 1957 is a popular way to measure attitudes in contemporary research. This scale has been employed by Ajzen and Fishbein (1980) who argued that attitudes are the same as the person’s evaluation of the attitude object. However, they also recognized that a bi-polar evaluation of attitudes was rather simplistic, but stressed that it captured its most essential parts (Ajzen & Fishbein, 1980). This scale is also called bi-polar since the respondent is asked to consider a scale including two extreme positions, (i.e., good - bad). The ratings from this scale are usually scored - 3 to + 3. However, the TPB also use a unipolar scale (i.e., not at all angry - very angry) rated from 1 to 7. The ones chosen over the years have varied and as Ajzen puts it:

“There is nothing in the theory, however, to inform us whether responses to these scales should be scored in a unipolar fashion (e.g., from 1 to 7, or from 0 to 6) or in a bipolar fashion (e.g., from -3 to +3).”
(Ajzen, 1991, p. 192)

According to Ajzen, either type is equally justifiable, although in the aforementioned article he believed it reasonable that behavioural beliefs should be scored using a unipolar scale and evaluation on a bipolar scale. The criteria used to determine the scales would appear to be the one which produce the strongest correlation (Ajzen, 2006). With regard to normative beliefs and motivation to comply the first is usually measured by a bi-polar scale and the latter by a unipolar one (Ajzen, 1991; Ajzen & Madden 1986; Ajzen, et al., 2004). Control beliefs and perceived power could be either bipolar or unipolar depending on the behaviour under investigation (Ajzen, 1991).

It is fairly common place to assess the reliability of direct and indirect indices through the use of an alpha reliability coefficients test. With regard to the direct measures it is expected that the value should be high but the same does not apply to indirect measures. The latter, as opposed to the first, are selected through the use of a pilot study and it has been argued that individuals’ beliefs are not necessarily consistent (Ajzen & Driver, 1991).

Validity usually refers to if the instrument measures what it is supposed to measure. Validity can be referred to as internal or external: Internal validity deals with the basic question of causal inference. "Causal inferences are internally valid only when the observed change or difference can be attributed or isolated by the investigator" (Neale & Liebert, 1986). In order to establish the internal validity one must ensure that the conditions compared are the same, and that they have been treated in the same way. External validity deals with the broadening of findings: if the results can be generalized to a wider population and if it will apply to more than one environment.

Validity of a test can be categorized in different ways and with regard to the TPB its predictive validity is especially pertinent. The model is used to predict future events and a test of its predictive validity is if a future criterion corresponds to the one being measured by the model (Rust & Golombok, 1999).

Empirical studies evaluating the theory of planned behaviour and its underlying constructs

The model’s ability to predict intention has been tested in a great number of studies. The results from a meta-analysis found that attitude and subjective norm explained 33 to 50% of the variance (Ajzen, 1991; Armitage & Conner, 2001a; Sherran & Taylor, 1997). When the model added perceived behavioural control, a further improvement of 5 to 12% was noted (Armitage & Conner, 2001a; Sherran & Taylor, 1997). Within the area of transportation psychology the TPB has been applied to a
range of road user behaviours, such as: drink and driving (Parker, Manstead, Stradling, Reason & Baxter, 1992a; Åberg, 1993), speeding (Elliott, Armitage & Baughan, 2003; Elliott, Armitage & Baughan, 2005; Letirand & Delhomme, 2005; Parker et al., 1992a; Wallén Warner & Åberg, 2008), dangerous overtaking (Parker et al., 1992a), overtaking on the inside, cut across traffic, weave in and out of traffic (Parker, Manstead, & Stradling, 1995b), close following (Parker et al., 1992a), modal choice (Bamberg et al., 2003; Forward, 2004; Verplanken, Aarts, van Knippenberg & van Knippenberg, 1994), and lane discipline (Parker et al., 1995a). It could therefore be concluded that the model’s predictive ability has been remarkable covering a broad spectrum. In the discussion which follows each construct will be discussed in some more detail trying to establish if it is clear and consistent in its application.

Attitudes

The argument that attitudes are not very good predictors of single behaviour unless they are very specific have received empirical support (e.g., Budd, Bleiker & Spencer, 1983; McCarty, Morrison & Mills, 1983; Schlegel, Crawford & Sanborn, 1977). The importance of attitudes in its prediction of intention has also been demonstrated in a large number of studies (see Ajzen, 1991). The results from a meta-analysis on exercise behaviour showed that the impact of attitude was over two times stronger than that of subjective norm (Hausenblas, Carron & Mack, 1997). With regard to speeding the indirect measures of attitudes have in different studies been found to predict intention (Elliot et al., 2005; Parker et al., 1992b; Wallén Warner & Åberg, 2008). However, only a few studies have tested the multiplicative assumption underlying the model (i.e. outcome belief $B$ outcome evaluation). Elliot et al. (2005) presented evidence in favour of this assumption whereas others have been against it (Sutton, McVey & Glanz, 1999; Traffimow & Finlay, 2002).

The role of affective and cognitive attitudes has been discussed. Triandis (1980) argued that affect refers to the direct emotional response which can be cognitive in nature, describing the experience as pleasant or unpleasant but more immediate than the purely cognitive one, which focuses on the present. Abelson, Kinder, Peters and Fiske (1982) suggested that affective experience often contributed more strongly to attitudes than cognitive ones (cited in Eagly & Chaiken, 1993), and that categories associated with high level of affect were more readily accessible than others (Feldman & Lynch, 1988; Zajone, 1980). In general, the early version of the TPB did not provide a clear distinction between affective and cognitive responses to a behaviour. However, studies have found that it is useful to distinguish between affective beliefs and those of a more cognitive and instrumental kind (Ajzen & Driver, 1991, 1992; Lowe, Eves & Carroll, 2002; Mumery & Wankel, 1999; Stradling & Parker, 1997; see also Ajzen, 1991 for a discussion). From a theoretical point Ajzen (1991) would not argue against a separation of affective and cognitive beliefs although the evidence he presents suggests that the predictive power of the model would not increase. In an article from 2005, Ajzen and Fishbein discussed both models and with regard to attitude they concluded that attitudes ought to include both instrumental and experiential aspects and that any measure of attitudes should include both components. Nevertheless, and in agreement with Ajzen (1991), they would still be in favour of treating attitude as a unitary concept rather than as a multi-dimensional one distinguishing between affective and cognitive responses.

Any further argument in favour of treating attitudes as a multi-dimensional construct is related to the notion of ambivalence. Although an attitude towards an object can be described as positive or negative, it is quite possible for the same person to evaluate an object as both positive and negative. In this instance the attitudes can be described as ambivalent. An increasing number of studies have found that people hold ambivalent attitudes towards a range of different behaviours; pro-environmental behaviour (Costarelli & Colloca, 2004), eating habits (Berndsen & van der Pligt, 2004), smoking (Lipkus, Pollak, McBride, Schwartz-Bloom, Lyna & Bloom, 2005), condom purchase (Dahl, Darke, Gorn & Weinberg, 2005), capital punishment (Newby-Clark, McGregor & Zanna, 2002), abortion (Newby-Clark et al., 2002) and gay and lesbian rights (Craig, Martinez, Kane & Gainous, 2005). It has also been demonstrated that ambivalence moderated the attitude-intention and attitude-behaviour relationships (Conner, Povey, Sparks, James & Shepherd, 2003; Cooke & Sheeran, 2004; Povey,
Wellens & Conner, 2001; Sparks, Harris & Lockwood, 2004). A low level of ambivalence was then shown to be a stronger predictor of intention and behaviour. Ajzen (2006) discussed ambivalence and argued that it was quite possible for a person to hold both positive and negative beliefs. Indeed, that is also the reason why the theory does not suggest that the combination of items measuring beliefs should produce a high internal consistency. However, this would not suggest that attitude should be treated as a uni-dimensional construct.

Subjective norm

The influence of peer group pressure and social norms on subjective behaviour has been demonstrated in a number of studies (Akers, Krohn, Budd et al., 1983; Lanza-Kaduce & Radoosevich, 1979; Oei & Kerschbaumer, 1990; Parker et al., 1992a; Pomazal & Brown, 1977; Wallén Warner & Åberg, 2008). The underlying mechanism that governs the relationship between norms and behaviour would, according to Akers et al. (1979), be that friends provide social reinforcement or punishment and serve as models to imitate. In some studies subjective norm has been found to be the most important factor in explaining drivers’ intention to follow closely behind another car (Parker et al., 1992a) and the intention to drink and drive (Åberg, 1993). However, a number of studies including two different meta-analyses (Armitage & Conner, 2001a; Hausenblas et al., 1997) have indicated that subjective norm presents itself as the weakest link. Although this does not necessarily refute the theory since it proposes that the weight of subjective norm may vary with the type of behaviour, it does raise some questions.

Different explanations have been proposed to explain this anomaly. Ajzen (1991) concluded that social factors might be less influential than personal factors. The effect of subjective norm also depended on whether the person identifies him- or herself with the target group or not (Boldero, Sanitioso & Brain, 1999; Terry, Hogg & White, 1999). Boldero et al. (1999) studied gays and safe sex and found that people with strong gay-community identification were more influenced by subjective norms than others. Another reason would be that only a minority of people are under normative control (Finlay, Trafimow & Jones, 1997; Latimer & Martin, 2005; Trafimow & Finlay, 1996). Latimer & Martin (2005) found that subjective norm only helped to explain the behaviour of people who are concerned about the disapproval from others. In addition to this it has been argued that not only people but also behaviour could be under normative control (Finlay, et al., 1997; Trafimow & Finlay, 2002). This is also consistent with a number of studies who have found that subjective norm was an important predictor of performing different health related behaviours (Finlay, Trafimow & Moroi, 1999; Finlay, Trafimow & Villarreal, 2002) whereas it was less important when the behaviour was considered to be habitual and/or low in arousal (Fredricks & Dossett, 1983; Rutter & Bunce, 1989). In a study by Akers et al. (1979) it was pointed out that the effect of significant others might vary according to how familiar the person is with the behaviour. They found that regular users of alcohol and marijuana responded more to a direct reinforcement of the drug and that the effect of significant others had lost their effect. Andrews and Kandel (1979) argued that social support was not needed when the behaviour had been established but suggested that it was important in the beginning. Another explanation of the reduced effect of subjective norms used the theory of self-determination (SDT). According to this theory intentions based on attitudes were more important since they are an expression of oneself whereas normatively controlled intentions were not (see Godin, Conner & Sheeran, 2005). Thus pressure from within was stronger than pressure from others.

The multiplication of normative beliefs and motivation to comply has also been questioned. In general the combination has received rather weak support (Ajzen, 1991; Miniard & Cohen, 1981). For instance, it has been found that it suppressed the correlation between direct measures of subjective norm and belief-based measures (Ajzen, 1991) and that the effect of subjective norm on intention was due to normative belief and not motivation to comply (Ajzen & Driver, 1991; Budd, North & Spencer, 1984a; Davidson & Morrison, 1983; Doll & Orth, 1993). These observations have many times resulted in that motivation to comply has been entirely ruled out (e.g.; Beck & Ajzen, 1991; Bentler & Speckart, 1979; Budd et al., 1983; Charm, Piliavin & Callero, 1988). However, Ajzen and Fishbein (1980) pointed out that by excluding motivation to comply from the equation we are left with information about the person’s
perception of the social pressure without knowing anything about the individual’s need for social approval. In their mind this would not be sufficient to predict subjective norm.

Perceived behavioural control

The first widely published experiment of the TPB was carried out by Ajzen and Madden (1986) investigating students’ class attendance. In this study perceived behavioural control was assessed by the ease or difficulty to perform the behaviour. The results demonstrated that perceived behavioural control contributed significantly to the prediction of intentions over and above attitude and subjective norm. The role of the perceived behavioural control was also tested and it was predicted that if people have complete control over their behaviour the inclusion of this variable becomes superfluous. In accordance with the prediction, the inclusion of perceived behavioural control did not add to the models predictive power if the behaviour was perceived to be high in control. When the behaviour was perceived as low in control the TPB performed significantly better than the TRA. Other studies have found that by adding the control factor the predictive power of the model increased when assessing behaviours such as: dishonest behaviour (Beck & Ajzen, 1991); weight loss (Schifter & Ajzen, 1985); voting behaviour (Netemeyer & Burton, 1990); and driving violations (Elliott et al. 2003; Parker, et al. 1992a; Wallén Warner & Åberg, 2008).

Indeed, in the study by both Parker et al. (1992a) and Wallén Warner & Åberg (2008) perceived behavioural control was the most important construct in the prediction of the intention to speed. However, despite the large support given to the new variable, different authors criticise it for its lack of clarity concerning its meaning (Fishbein & Stasson, 1990). For instance, Leach, Hennessy and Fishbein (2001) later question that ‘perceived ease’ indicate perceived behavioural control. Instead they would argue that self-efficacy as defined by Bandura was quite different from PBC and that it was more related to attitudes than perceived behavioural control. This has also been supported by Kraft, Rise, Sutton, and Raysamb (2005) and Yzer, Hennessy and Fishbein (2004). In the study by Yzer et al. (2004) a factor analysis was carried out and the results demonstrated that perceived ease was more related to attitudes than perceived behavioural control. In addition to this they were also able to demonstrate that it was affective attitudes rather than instrumental ones that provided this relationship. Furthermore, the unitary nature of PBC has been questioned. Evidence in favour of a distinction was that the internal reliability of the items was rather low (see Leach et al., 2001), that they form two separate factors (Armitage & Conner, 1999; Manstead & Eekelen, 1998; Sparks, Guthrie & Shepherd, 1997; Terry & O’Leary, 1995) and that they make a unique contribution towards the prediction of intention (Armitage & Conner, 1999; Manstead & Eekelen, 1998, Sparks et al., 1997; Terry & O’Leary, 1995). With regard to its predictive power, evidence so far seems to suggest that self-efficacy is more important than controllability (Armitage & Conner, 1999; Manstead & Eekelen, 1998, Sparks et al., 1997; Terry & O’Leary, 1995). It has therefore been argued that it is quite possible for a person to feel few external barriers (control factor) but at the same time lack confidence in his/her ability to carry out the behaviour (self-efficacy) (Leach et al., 2001; Terry & O’Leary, 1995).

In the paper published in 2002, Ajzen raised different issues with regard to perceived behavioural control, including self-efficacy and controllability (Ajzen, 2002b). This in turn was a response to the expressed uncertainties with regard to perceived behavioural control which, according to Ajzen (2002b), impeded progress. In this paper he made it quite clear that perceived behavioural control was not the same as self-efficacy, only similar. As opposed to self-efficacy as defined by Bandura (1982) the variable did not deal with control over the behaviour itself rather control over outcomes of events. As a response to Leach et al. (2001) Ajzen (2002b) stated that attitudes and perceived behavioural control, as indexed by questions about easy-difficult, are quite distinct. The first one dealt with an evaluation of perceived outcomes of the behaviour and the other with perceived ability to perform the behaviour (Ajzen, 2002b). This was also consistent with Trafimow and Duran (1998) who found that the two factors were distinct from each other. Despite this, and perhaps in an attempt to further clarify matters, Ajzen (2002a) suggested that the direct measure of self-efficacy should be rated on two different scales; impossible - possible and definitely true - definitely false, instead of easy – difficult and in 2006 self-efficacy was replaced by capability (Ajzen, 2006).
Ajzen (2002b) also appeared to be quite open to the suggestions to distinguish between self-efficacy and controllability. Accordingly, the factors could be treated as unitary or as two separate ones, the choice depending on the purpose of the investigation (Ajzen, 2002b). Furthermore, in an article by Ajzen and Fishbein (2005) it was concluded that the nature of the two factors was unclear but despite this, evidence would suggest that their internal consistency was high.

With regard to the indirect measures of perceived behavioural control only a few studies have included these measures. Instead Ajzen (2002b) found that the direct approach is more commonly found. When both measures have been used the results have only partly supported the notion that indirect measures should correlate well with the more global or direct one (Ajzen, 2002b).

The role of intention in the prediction of behaviour

The theory states that it is most likely that behaviour will be performed if the intention is strong to perform the same (Ajzen, 1991). If the constructs within the TPB have been appropriately measured then it is believed that intention “should be able to predict specific behaviours with considerable accuracy” (Ajzen & Fishbein, 2005 p.188). Although only a few studies have used the TPB to assess the role of intentions in predicting behaviours the evidence presented so far have been able to support the relationship (for instance, Albarracín et al., 2001; Armitage & Conner, 2001a; Bagozzi, 1981; Budd et al., 1983; Grube, Morgan & McGree, 1986; Prestholdt, Lane & Mathews, 1987; Sheppard, Hartwick, & Warshaw, 1988; Warshaw, Calantone & Joyce, 1986). Furthermore, results from meta-analysis have reported an intention-behaviour correlation ranging from .45 to .62 (for a review see Ajzen & Fishbein, 2005). Ideally measures of behaviour should be obtained through the use of observations. However, this is rarely done and as Rothengatter (2002) pointed out within in the area of traffic psychology this procedure is “difficult, costly, and sometimes simply impossible due to ever more restrictive privacy regulations” (p. 254). As a consequence the results tend to be based on self-reported measures, past or future. This could be a problem since self-reported measures can be subject to errors, such as social desirability and response consistency effects (Terry et al., 1999). However, as demonstrated by Åberg, Larsen, Glad and Beilinson (1997) their might be some exceptions. Åberg, et al. (1997) was able to show that self-reported speeding behaviour and more objectively measured driver speed was related. Perhaps the distortion is more prevalent when measuring socially undesirable behaviours and as will be discussed in Chapter 3 speeding tend to be viewed as an acceptable behaviour. Despite the fact that the prediction of observed behaviour is very rare there are at least two studies which have been able to confirm the relationship between behaviour and intention (e.g., Elliot et al., 2003; Wallén Warner & Åberg, 2006). In the study by Wallén Warner and Åberg (2006) drivers’ speed was measured using a GPS during a period of up to four weeks. The results showed that the model was able to explain 28% of the behaviour.

Conclusion

It could be concluded that the TPB and its predecessor TRA are both clear and consistent in their application and that they have introduced some order into the measurement of attitudes. Both theories have been tested and proved valid on numerous occasions in most fields of psychology including transportation psychology. They have been shown to be able to predict intentions but also future behaviour. They describe antecedents of the behaviour in a simple enough form, two very important conditions defining a sound theory. Nevertheless some questions have been raised and this applies to all constructs. For instance, the relationship between intention and behaviour has not always been supported and the constructs measuring perceived behavioural control have caused some concerns. In most cases the questions have been answered well and at times the inconsistency could be found in the misunderstandings and an inability to treat the models as suggested. This has then been resolved by author’s clarification. At other times adjustments to the models have been made to better reflect empirical findings, something which is especially true with regard to the TPB and perceived behavioural control. However, it could be argued that these adaptations prevent falsification although for Bagozzi (1992) these changes are one of its strengths: “the theory has shown remarkable resilience
over the years by undergoing change. This too, is a tribute to its power and versatility” (Bagozzi, 1992, p. 178). In 1970, Ajzen and Fishbein discussed the need to solve some of the model’s theoretical and methodological problems and in that context expressed a wish: “Our hope is that these questions are interesting and relevant enough to stimulate additional research” (Ajzen & Fishbein, 1970, p. 487). Without doubt this wish has certainly been fulfilled many times over and even today, 38 years later, they still generates a great deal of interest. However, despite their success they still leaves about half of the variance unexplained and as any good theory it should enable the inclusion of further constructs. Thus in an attempt to further improve the model’s predictive ability research is persisting in the search for additional variables.

### Additional variables not included in the model

Variables not included in the model are supposed to act indirectly on behaviour although from a theoretical perspective Ajzen (1991) has always been open to the addition of variables. That is if they can increase the variance after the initial variables have been considered. In a more recent paper it was stated that additional variables should be dealt with caution and only be added to the theory after “careful deliberation and empirical exploration” (Ajzen & Fishbein, 2005, p. 201). In this section the addition of descriptive norm, personal norm and past behaviour to the model will be discussed in some more detail.

#### Descriptive norms

Descriptive norms measure an individual’s belief about other people’s behaviour. It has been described as something which *is* done rather than as is the case with subjective norms something which *ought* to be done (injunctive). Deutsch and Gerard (1955) added that it represents something which was seen as normal, regardless if it was morally correct or not. Fishbein (1967) argued that both injunctive and descriptive norms could be described as normative pressure. In the most recent description of both the TRA and the TPB it was suggested that a direct measure of subjective norm should also include a measure of descriptive norm (Ajzen & Fishbein, 2005). However, they still suggested that it was part of subjective norm and not distinct, something which has been challenged by a number of studies (e.g. Cialdini, Reno & Kallgren, 1990; Conner & McMillan, 1999; Deutsch & Gerard, 1955; Grube et al., 1986; Rimal, Lapinski, Cook & Real, 2002) and at times descriptive norm have been a better predictor of intentions than subjective norm (Rivis, Sheeran & Armitage, 2006).

In a meta-analysis based on 14 studies descriptive norms were generally successful and increased the variance with 5 percent over and above the variables already in the model (Rivis & Sheeran, 2003). Nevertheless, in the same meta-analysis some conflicting findings were also reported. For instance, descriptive norms have been successful in predicting intention to diet, binge drink, play the lottery but not to eat healthily and use a condom. Various attempts have been made to better understand when and in what way descriptive norms influence behaviour. Rivis and Sheeran (2003) for instance argued that descriptive norms would be more important when assessing those behaviours which carry some form of risk. The argument was that a risky behaviour was more salient and that it was in those situations when we are more influenced by others (Rivis & Sheeran, 2003). Another argument concerned the reference group and that descriptive norms will have an impact in situations with strong identification (Astrom & Rise, 2001; Grube et al., 1986). Grube et al. (1986) demonstrated that perceived peer smoking had a significant effect although the effect of perceived parental smoking was non-significant. The result suggested two things; one that perceived behaviour of others was distinct from subjective norm but also that the normative belief was multi-dimensional, one for parental influence and another for peer influences. A third explanation has been proposed, arguing that descriptive norm was stronger in younger rather than older people (Rivis & Sheeran, 2003). A fourth explanation was presented by Chassin, Presson, Sherman, Corty and Olshavsky (1984) in their study of adolescent smoking. The results showed that descriptive norm was more important for initial, and never for heavy smokers. During the transition from no smoking to smoking the perceived behaviour of others but also
tolerance for deviance, locus of control and agreement with friends were important. Chassin et al. (1984) concluded that before a behaviour was established it was more dependent on the immediate environment rather than of attitudes and beliefs about smoking. In another study by Grube and Morgan (1990) a variable called "perceived social support" was examined. Perceived social support measured both perceived disapproval of others and the perceived behaviour of others. The result revealed an interactive effect between attitudes and social support. The frequency of smoking, drinking and drug use among a group of adolescents was greater if both social support and attitudes were favourable. Further tests indicated that this interaction was mainly due to the effect of perceived behaviour of others. Three possible explanations of the result were provided: 1) an availability proness model (e.g., having friends who abuse increase the availability of these substances); selective friendship (e.g., friends with similar behaviour patterns may be sought out); and a rationalization process (e.g., adolescent users may overestimate the use of others). Finally, Rimal et al. (2002) who examined the link between descriptive norms and behavioural intentions was able to demonstrate that perceived benefit was an important factor. If the benefits were perceived as high then they were also more influenced by other peoples’ behaviour. It was therefore concluded that the perceived behaviour of others was not sufficient reason for change. Before making the effort to change some perceived benefits have to be derived from the experience. This would also be in accordance with the TPB which states that behaviours are based on a combination of factors.

Studies on driver behaviour have also looked at the effect of descriptive norm although the term used has been different (e.g. perceived behaviour of others and perceived consensus) and generally not in combination with the TPB. For instance, Connolly and Åberg (1993) found that drivers adjusted their own speed according to the speed of nearby drivers, implying that speeding had a contagious effect. Rothengatter (1988) suggested that drivers wanted to behave as other drivers. In addition to this, Manstead, Parker, Stradling, Reason and Baxter (1992) investigated if drivers sought consensus for their chosen behaviour. They found that drivers who regularly carried out different behaviours defined as violations and errors tended to overestimate the percentage of other drivers who would do the same. In contrast, the group defined as ‘irregulars’ underestimated rather than overestimated consensus for their own position.

Personal norm

Personal normative beliefs can be described as social norms which have become internalized. It measures a sense of moral responsibility, what the individual feels that he or she ought to do. It is measured using a scale which indicates if the subject should or should not do certain things. In contrast, the question about subjective norm asks what other people, important to them, think they should or should not do.

In an early version of the TRA personal normative belief was, in addition to normative beliefs, included into the model (Ajzen & Fishbein, 1969). Subsequent research revealed that in many situations personal norm was essentially the same as intention (Ajzen, & Fishbein, 1970) and in 1973 it was therefore excluded from the model (Ajzen & Fishbein, 1973). However, Budd and Spencer (1984b) disputed this arguing that if personal normative beliefs only acted as an alternative to behavioural intention then it would not significantly add to the prediction of intention. In order to avoid this conceptual confusion it was suggested that personal norms should be defined as what a person should do, given no real-world constrains. In their study, predicting undergraduates’ intention to drink alcohol, personal norms added to the prediction over and above the effect of attitudes and subjective norms. This is also consistent with a number of other studies who found that personal norms made a significant contribution to the prediction of intention (Beck & Ajzen, 1991; Davies, Foxall & Pallister, 2002; Gorsuch & Orberg, 1983; Harland, Staats & Wilke, 1999; Miniard & Cohen, 1983; Triandis, 1980). Beck & Ajzen (1991), for instance, showed that it had an effect, but modest, on the intention to lie, cheat and shoplift. In a study by Parker et al. (1995b) personal norm was assessed together with "anticipated regret" which can be described as the "value of consequences" (see Triandis, 1980). The results demonstrated that this additional factor contributed substantially to the prediction of intention to commit driving violations.
Past behaviour and Habit

According to the TPB past behaviour relates to intentions for future use but the effect is indirect and is mediated by the variables already included. Despite this, Fishbein and Ajzen (1975) recognized the effect of habit very early on and that it may interfere with the intention-behaviour relationship. However, from their point of view the measurement of automatic responses was not very interesting. Despite this, a large number of studies have persisted in adding past behaviour to the model finding a direct relationship between present behaviour and past behaviour (e.g., Bentler & Speckart, 1979; Charnig et al., 1988; Hom & Hulin 1981; Mullen, Hersey & Iverson, 1987; Rutter & Bunce 1989). In the study by Bentler and Speckart (1979) a measure of past behaviour significantly improved the predictive power of the TRA. In a subsequent experiment by Budd, et al. (1984a) the revised version by Bentler and Speckart was used to predict seat-belt use. The result supported the model and for short journeys it accounted for a further 9% of the variance, and for long journeys, it accounted for a further 7% of the variance in behavioural intentions.

After the introduction of perceived behavioural control it was argued that this variable should mediate the effect of past behaviour (Ajzen, 1988). Although some consistent findings have been presented (e.g., Quine & Rubin, 1997) a fairly large number have shown that past behaviour still has a direct effect on both intention and future behaviour (Bagozzi & Kimmel, 1995; Bamberg et al., 2003; Beck & Ajzen, 1991; Bunce & Birdi, 1998; Norman & Smith, 1995; Rivis & Sheeran, 2003; Sutton et al., 1999). In the study by Norman and Smith (1995) it was the only variable which made a significant contribution to the final regression equation. In addition to this a meta-analysis reported by Conner and Armitage (1998), showed that past behaviour increased the model’s predictive ability by another 7%. As a response to the discussion about past behaviour, Bamberg et al. (2003) offered three explanations: Firstly, the relationship is due to a methodological artefact. Both past and later behaviour might share the same method variance. Secondly, people might be prevented from changing their behaviour due to circumstances beyond their control. The results would then be that past behaviour explained behaviour over and above intention and perceived behavioural control. Thirdly, the effect of past behaviour was an effect of the model’s failure to include important additional factors, a residue picked up by past behaviour. However, even if the third explanation is true Ajzen and Fishbein (2005) would argue that past behaviour would not have the same status as the other constructs within the model since it cannot be used to explain future behaviour. To merely state that the behaviour has been carried out in the past is not an explanation as to why it has been emitted. Furthermore, it was believed that even routine behaviour usually included some degree of conscious cognitive regulation (Bamberg et al., 2003).

As can be seen from the previous discussion the definition of past behaviour is not always consistent and the word habit is sometimes used to describe the same. To clarify this it is important to distinguish between past behaviour and habit since the first is not necessarily the same as the latter unless it has been repeated regularly. Kimble and Perlmuter (1970) described a process which went from involuntary to voluntary to involuntary. If the behaviour has been repeated frequently the highly practiced act gradually recede from consciousness and become more and more automatic, that is, involuntary. This was also consistent with Ronis, Yates and Kirscht (1989) who argued that a behaviour which has become habitual is mostly guided by environmental cues which in turn elicit a more or less automatic response. If this was true then the very foundation of the TPB is being challenged, namely that behaviour is based on reasoned actions. Not surprisingly this was also something that both Ajzen and Fishbein have discussed at some length (e.g., Ajzen & Fishbein, 2000).

In a study by Bamberg et al. (2003) the argument that habitual behaviour was automatic and not based on reason was also tested and then challenged. The study assessed the use of public transport, before an intervention to increase its use had been introduced. Past behaviour explained both intention and behaviour. In fact it increased the prediction with 17% over and above the variables within the model. However, in the after study the effect of past behaviour lost its effect. Bamberg et al. (2003) concluded that past behaviour was only important when predicting relatively stable behaviour. A conclusion consistent with a meta-analysis studying condom use, a behaviour regarded as relatively unstable (Albarracin, et al., 2001). Furthermore, Bamberg et al. (2003) argued that since this relatively habitual behaviour has changed it would also suggest that the performance was not purely automatic. Similarly
Ajzen and Fishbein (2000) concluded their discussion about past and habitual behaviour as follows: “There is little evidence that complex sequences of behaviour occur automatically or habitually without cognitive intervention. Complex social behaviour seems to be cognitively regulated, even if only at a low level of conscious awareness and it is, in this sense, reasoned in nature” (Ajzen & Fishbein, 2000, p. 21).
The motivation behind driving violations

Introduction
Research within the area of transportation psychology is generally not conducted within a broader theoretical framework and is therefore not easily integrated into a more general framework (Huguenin, 1997). If attitudes are being measured it is usually in isolation and/or without the rigorous methodology proposed by Ajzen (Rothengatter, 2002). However, this pattern is gradually changing and as shown in Chapter 2 both the TPB and the TRA have been used to predict driving violations.

The aim of this chapter is to present an overview of research into driver behaviour. Firstly it will review literature on perception of risk and risk taking behaviour in general. Thereafter it will look at the link between demographic factors and behaviour. Finally, it will present findings from studies examining specific traffic violation including: speeding, seat-belt usage, drink driving and dangerous overtaking giving special attention to those variables included in the TPB.

Perception of risk
Risk is usually defined as a chance of loss (Ben-Zur & Reshef-Kfir, 2003). If a volitional behaviour is carried out despite negative consequences it can be described as risk-taking. A distinction needs to be made between objective and subjective risk. Objective risk is the chance of being involved in an accident based on accident statistics. Subjective risk is the person’s own estimate of accident risk both to him- or herself and others. Studies have found that cognitive processes underlie the decision to take risks. Those who are deciding to participate in a risky behaviour perceive more positive benefits from the same and less negative ones (Ben-Zur & Reshef-Kfir, 2003). This would also be in accordance with the expectancy value model and the TPB which states that behaviour is engaged in if the sum total of different beliefs suggests that it will have positive outcomes. Subsequent research has started to investigate biases in risk perception. For instance, the perception of risk depends on who is carrying out the act. Although drivers are aware of the risks involved in violating, they do not believe that they themselves are at risk (Williams, 2003). It would then appear that drivers hold beliefs that minimize the perception of personal risk (Brown & Cotton, 2003). This was also confirmed by Ben-Zur and Reshef-Kfir (2003) who in addition to perception of benefits found that the use of avoidance coping strategies including denial, determined the decision to take risks. In some instances perception of benefits could be a reflection of self-deception although in others it could be a true reflection of their own personal experiences (Brown & Cotton, 2003). Despite the fact that a large number of road crashes occurs the chances of one individual to be involved is rather small. Thus, Wagenaar and Reason (1990) argued that even reckless driving was mostly carried out without causing a road crash and that it was this day-to-day experience which affected driver behaviour.

In general drivers’ subjective risk is the result of an assessment of the objective risk but also an assessment of his/her driving skills (Groeger & Brown, 1989). Indeed, drivers perceived themselves as being both safe and skilful with less chance of being involved in an accident as compared to other drivers (DeJoy, 1992; Svensson, Fischhoff & MacGregor, 1985). To perceive oneself as superior does not necessarily result in unsafe driving. However, there is evidence to suggest that a driver’s perception of him- or herself consists of two components; the ability to handle the car (i.e., control of the car and the traffic situation) and the ability to drive safely (i.e., accident avoidance skills) (Spolander, 1983a; Lajunen, Corry, Summala & Hartley, 1998). It is those who perceived themselves to be superior in handling the car that was more likely to violate.
Although we can expect that at least some of these drivers were biased in their judgments very few studies have assessed the validity of self-evaluation. However, Freud, Colgrove, Burke and McLeod (2005) examined a group of elderly drivers who had been referred to an evaluation because of suspected unsafe driving. Of those who perceived themselves as the same or better than other drivers 38% were judged unsafe. There is also some evidence to suggest that involvement in a car crash does not necessarily lower their perceived driving skills (Svensson et al., 1985; Ulleberg, 2002). This might be explained by something Sinden (1992) called the super-man complex. This described a driver who suffered from self delusions, believing that they were safe drivers when in reality they may be dangerous. Self delusion serves a function in that it helps the person to protect his or her own self-concept and maintain high self-esteem.

It could therefore be argued that beliefs in positive outcomes and perception of self as superior when it comes to handling the car can help to minimize the perceived risk.

Perception of risk and risk-taking behaviour

A low level of perceived risk has also been related to a number of different risk taking behaviours such as speeding (Adams-Guppy & Guppy, 1995; Brown & Cotton, 2003; Iversen, 2004; Ryb, Dischinger, Kuféra & Read, 2006) and drink driving (Iversen, 2004; Ulleberg, 2002). Iversen (2004) was able to demonstrate that positive attitudes towards driving violations predicted risky driving behaviour one year later. This was especially true with regard to rule violation and speeding. It could therefore be argued that violation is carried out when it is regarded as “safe” to do so.

However, one other group of drivers has also been identified namely those who consider risk taking as an end in itself. For this group of drivers the motive behind risky driving is the thrill associated with risk taking, something also described as sensation seeking. Zuckerman (1994) defined sensation seeking as follows: “Sensation seeking is a trait defined by the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience.” (p. 27). Four different types of sensation seekers have been identified; thrill seekers, experience seekers, boredom susceptibility and disinhibition (for a review see Zuckerman, 1994). Sensation seeking has also been linked to risky driving and in a review of the literature Jonah (1996) concluded that it explained 10-15% of risky driving. Thrill seekers who seek adventures rated speeding as more exciting than those who scored low on the same scale (Jonah, Thiessen & Au-Yeung, 2001). It is therefore not very surprising that thrill seekers have been linked to risky driving habits (Zuckerman, 1991) and high involvement in road crashes (Farley, 1991; Singh, 1992; Thorson & Powell, 1987). However, not only thrill seekers but also disinhibition has been linked to driving violations and accidents (Rimmö & Åberg, 1999). In fact in the study by Rimmö and Åberg disinhibition was a better predictor of a driving violations and accidents than thrill seeking which might suggest that the relationship is rather complex.

Farley (1991) showed that adolescents described as thrill seekers had a strong need for independence and valued uncertainty, high risks and variety higher than others. If thrill seekers express a more deep seated need then it is not surprising to find that unsafe driving is only one form of expression and therefore related to other problems.

Indeed, a high involvement in risky driving has been related to lower values on academic achievement, higher value on independence (males only), low intolerance to deviants, low religiosity (females only) and being more influenced by friends than parents (Jessor, 1987). In a study by Singh (1992), 72% of the drivers who answered ‘yes’ to the question if they had taken risks because it made driving more fun in the last six months, had used illegal drugs several times. This group was more likely to drive after using drugs, or to drink and drive. They were also more likely to smoke and be a passenger with a drunk driver than the “never” group. Drivers in the “yes” group felt less confident about their own abilities, expressed less satisfaction with themselves and put greater value on independence than the “never” group. There was also more disagreement between parents and peers in the “yes” group and as Jessor (1987) also found more influenced by peers than parents.

It could therefore be stated that in some cases risky driving is carried out for the sake of it and that this behaviour is linked to a more deep seated need to experience intense sensations. Furthermore,
Jessor (1987) argued that problem behaviours amongst young people reflect a rejection of conventional norms or independence from parental control. A person who feels alienated from society has less to lose by rejecting their norms than somebody who feels highly regarded by society. In contrast, high support and control from parents mitigates against problem behaviour (Jessor, 1987).

Demographic variables

Studies comparing young and old drivers have found that younger drivers were more likely to underestimate risks (Deery, 1999; Parker et al., 1992b), overestimate their own driving skills (Engström, Gregersen, Hermetkoski, Keskinen & Nyberg, 2003; Matthews & Moran, 1986), be more likely to disobey traffic laws (Yagil, 1998) and believed that violations were socially accepted (Parker et al., 1992b). Attitudes towards violations were also more positive with studies demonstrating that young drivers believed to a greater extent than the older ones that violations would result in positive consequences (Moore & Gullone, 1996; Parker et al., 1992b; Parsons, Siegel & Cousins, 1997).

When discussing young drivers it is necessary to point out that the above usually refers to young men rather than young women. Young men have been found to be more optimistic than young females (DeJoy, 1992; McKenna, Stanier & Lewis, 1991) and they also believed themselves to be more invulnerable than female drivers (Harré, Field & Kirkwood, 1996). Positive attitudes towards violations have also been linked to road crashes with young men being three times (per million populations) more likely to be involved in a fatal crash than young women (OECD, 2006).

In a study by McDonald, Ingham, Hall and Rolls (1991) excessive optimism was especially noted amongst a group of young men which in turn was related to riskier driving. A group of drivers had to perform three different tasks: drive on a selected route; complete a diary; and answer questions from an attitude scale. It was found that speeding was the most reported act committed in 90% of the cases, young males more than young females. The youngest group was three to five times more likely to be involved in “own fault” road crash than the oldest age group. Overall the perception of their own driving skills was greater than the observers but this difference was even greater among males aged 17-20 years old. The drivers were assessed according to if they were “good” or “bad” at safety and 34% of the 17-20 years old were rated “bad” and 7% were rated “good” as compared to 11% “bad” and 29% “good” among the older group. A difference between self-rated driving skills and observed driving ability was also noted in the study by Matthews and Moran (1986), young males rating themselves higher than observers.

DeJoy (1992) argued that if young males were more optimistic than young females then it would be expected that the first group would rate risky driving as less serious. The result from a study including 136 college students (68 male and 68 females) found that 77% of the male drivers considered themselves safer than the average motorist. For females this figure was 54%. Young men, as compared to young women, overrated their own driving skills and their perceived risk was lower. However, they did not differ in their overall perception of the driving situation, what they did differ in was the perception of seriousness and the degree of risk. Tränkle, Gelau and Metker (1990), too, have demonstrated greater risk tolerance among young males. For the young females their risk ratings were similar to female drivers in other age groups and higher than males of similar age.

One way to explain the difference between male and female drivers is the link between driving a car and masculinity. Farrow and Brissing, (1990) pointed out that many men regard the car as a mean of expressing their own masculinity and one aspect which defined masculinity was being fearless. Barjonet (1987) also pointed out that masculinity was related to risk-taking. This was also substantiated by Rothe (1987) who found that for men a “good driver” was somebody who can take great risks without feeling anxious (cited in Hanns, 1992). In the same study some men believed themselves to have an inbuilt ability to drive and therefore perceived training unnecessary. However, this seems to apply more to young men than old and middle aged men. When young men were compared with older men then the difference was almost the same as that between young men and women. Finn and Bragg (1986) found that young male drivers perceived less risk than older drivers. Furthermore, Matthews and Moran (1986) demonstrated that young male drivers gave lower ratings to
specific driving situations than did older drivers. Their own estimated risk of an accident was similar to the older group but at the same time they perceived themselves immune to real danger.

However, it would be wrong to treat young male drivers as a homogeneous group. In a study by Schlag, Ellinghaus and Steinbrecher (1986) 43% of the young men were described as high risk drivers (cited in Hanns, 1992). In another study by McDonald et al. (1991) 2/3 of the whole sample was described as safe and 1/3 as unsafe. The two groups did not differ in age, social class, driving experience, miles driven per year, educational level, type of car driven or number of tests taken before getting the licence.

If young men tend to be treated as a homogenous group then this also applies to female drivers but in this case all women, regardless of age, tend to be treated as one group. Very few studies have explored women drivers for its own sake; usually they are compared and contrasted with male drivers. One of the few exceptions was a study by Dobson, Brown, Ball, Powers and McFadden (1999) who compared driving violations amongst young and middle aged female drivers. They found that young women as opposed to middle aged women were more likely to violate. They also found that risky driving amongst young women was linked to stress and consumption of alcohol. More of the young, rather than the middle aged, revealed that they ignored speed limits late at night and early in the morning. They were also more impatient with drivers who in their mind drove too slowly. Attitudes and behaviour were also related to road crashes and young women were three times as more likely to have been involved in a crash during the last three years. It would therefore be wrong to assume that women drivers are the same across the different ages. Indeed gender identity is a social construction and what is appropriate for a woman today is different from what was correct for a woman a generation ago. One factor, amongst others, which has an effect on this group, is the fact that nowadays more women have access to their own car and therefore have become more experienced. In a study by McKenna et al. (1991) it was assumed that the differences between men and women could be due to driving experience. In their study women who used the car regularly, lacked the kind of poor self-confidence that typically described women with less experience of driving. This in turn encouraged them to take more risks. Indeed it has been found that women’s way of driving has changed and that they now, to a greater extent than before, break rules (Holubowycz, 1989). In a review of the literature, comparing the results from 1970-84 with 1985-1997, it was indicated that the sex differences have decreased and that women’s attitudes and self-reported behaviour had become increasingly more similar to men’s (Forward, Linderholm & Järmark, 1998). This is perhaps not so surprising if we consider the evidence suggesting that the differences between males and females are largely social and cultural rather than biological implying that gender is part of a process which is being constructed (Hare-Mustin & Marecek, 1994). Certainly women with different experience will behave differently, as will women of different ages.

Driving violations

Speeding

To disregard the speed limit is considered to be the most frequently reported violation (Gras, et al., 2004; Stradling, Manstead & Parker, 1992). According to a large-scale survey the percentage of Swedish drivers who in 2005 disobeyed speed limits outside built up areas was around 55% and in urban areas 50% (Ifver, 2007). Similar results were also presented by Nilsson (1999) who found that 50-55% of drivers deviate from 70 and 90 km/h speed regulation.

In general, speeding is not perceived to be a serious offence (Åberg, Engdahl & Nilsson, 1989; Corbett, 1991; Hills, Carthy, Packham, Rhodes-Defty, Salter & Silcock, 1993). In the study by Hills et al. (1993) the chance of surviving a road crash was greatly overestimated and drivers argued that traffic conditions many times made speeding necessary. Stradling et al. (1992) showed that those disregarding the speed limit scored low on regret and were not believed to play a major role in accident causation. It was therefore argued that speeding could be regarded as an illegal act which carried little stigma by the public. This is rather alarming considering that speed not only reduces the
time available to avoid a collision it also makes the impact more severe. The likelihood of death is about 20 times greater if the speed is 80 km/h as compared to 30 km/h (RTÉ, 2008).

Drivers might be aware of the link between speeding and crash risk but do not believe that they themselves are at risk. For instance, Brown and Cotton (2003) found that drivers who speeded believed that they could do so but still drive safely. There is also evidence to suggest that speeding is related to beliefs which minimize the perception of risk (Brown & Cotton. 2003; Christensen, Moran & Wiebe, 1999). McKenna (2005) showed that speeders derived more pleasure from driving and used the vehicle as an outlet for their emotions as compared to drivers who would not speed. It could therefore be argued that speeding is closely related to psychological factors.

One mean to reduce speeding is various forms of sanctions, although it would appear that with regard to high offenders this has not always had the desired effect. For instance, Corbett (1991) found that the fear of being stopped by the police for speeding was lower amongst a group of high offenders as compared to low offender. On the other hand, social pressure has been found to influence the intention to speed. Older males, in a study by McDonald et al. (1991), drove slower and more carefully with passengers. Younger males drove in a careful manner with parents but were riskier when with friends.

Studies have showed that the motive behind speeding depends on its context (Quimby, 1998; Ralston, Job & Hatfield, 2007; Stratling & Parker, 1997; Wallén Warner & Åberg, 2008). Wallén Warner and Åberg (2008) showed that speeding was perceived as more fun in a rural area than in an urban area as indicated by the mean values although the correlation with intention was fairly similar (urban area \( r = .28 \); rural area \( r = .31 \)). In an unpublished study by Åberg (Personal communication, March 23rd, 2007) attitudes towards speeding on a road with a 90 km/h speed limit and a 50 km/h speed limit were compared. The results presented a significant difference (\( p < .001 \)) with the first being regarded as more positive than the latter. Drivers believed that speeding on a 90 km/h road was better adjusted to the speed of other drivers, allowing them to get to the destination quicker whereas the risk of being involved in an accident and getting fined was less likely as compared to driving on a road with a speed limit of 50 km/h. These results would then highlight the need to be more specific when examining speeding, something which is in accordance with the specifications outlined by the TPB.

Three studies using the TPB to predict the intention to speed in a built up area demonstrated some interesting results (Elliot et al., 2003; Parker et al., 1992a; Wallén Warner & Åberg, 2008). In the study by Elliot et al. (2003) the model explained 48% of the variance. Perceived behavioural control was the most important factor followed by subjective norm and attitude. This was also very similar to the results presented by Parker et al. (1992a) in which 47% of variance was explained by perceived behavioural control, subjective norm and attitude. In contrast the study by Wallén Warner and Åberg (2008) explained slightly less (31%) and subjective norm rather than perceived behavioural control was the most important variable. One possible explanation could be that in the study by Wallén Warner and Åberg (2008) control beliefs were measured with 9 questions dealing primarily with external factors and using a combination of frequency and easy/difficult. Parker et al. (1992a) only used one question about how easy it would be to avoid committing the violation and in the study by Elliot et al. (2003) five questions measuring ability and confidence were used.

In the study by Elliot et al. (2003) drivers who intended to speed believed themselves to be less able to keep within the speed limits and therefore also less confident about the same. In the study by Parker et al. (1992a) intenders believed, to a lesser degree than non-intenders, that it was more difficult to avoid committing the violation. In both studies older drivers and female drivers perceived more control over the situation than younger drivers and male drivers (Elliot et al., 2003; Parker et al., 1992b).

The importance of subjective norms indicates that violators expected that others would accept their behaviour. Further, females perceived less pressure from same-sex friends to speed than males (Parker et al., 1992b). With regard to attitudes, violators believed to a greater extent that speeding in an urban area would take them to the destination quicker (Parker et al., 1992b; Wallén Warner & Åberg, 2008), be more comfortable, more in tune with the surrounding traffic (Parker et al., 1992b) and more fun (Wallén Warner & Åberg, 2008). Elliot et al. (2003), who only used a direct measure of attitude,
demonstrated that intenders believed that it would be more beneficial, pleasant and positive to speed as compared with non-intenders. In a later study by Elliot et al. (2005) specific beliefs underpinning speeding in a built-up area (20 mph, 30 mph and 40 mph) were assessed. The results showed that complying with the speed limit in a built-up area would make it more difficult to keep up with the traffic but on the other hand it would make them more relaxed and it would be easier to detect hazards. To comply with the rule also became more problematic if other motorists exceeded the speed limit, if they were driving on a long straight road and if they were in a rush.

Newnam, Watson and Murray (2004) used an extended version of the TPB to predict the intention to speed in an urban area using either a vehicle for work purposes or a private vehicle. In addition to the variables within the model they also included anticipated regret. In contrast to previous studies (Stradling, 2000) their results showed that drivers were less likely to speed in their work vehicle as opposed to their private car. The model including direct measures explained 10% of the intention to speed whilst using a vehicle for work and 16% of the variance using their own personal vehicle. The inclusion of anticipated regret and age increased the variance to 27% for personal vehicles and with regard to work vehicle 16%. Compared with other studies this was rather low and one possible explanation offered by the authors was that the study had not been preceded by proper piloting establishing the target groups beliefs.

Speeding in a rural area has also been assessed using the TRA or the TPB. In the study by Wallén Warner and Åberg (2008) indirect measures of the TPB predicted 41% of the variance and the most important factor was control beliefs followed by normative beliefs and behavioural beliefs. To speed in a rural area was believed to make it easier for them to overtake other vehicles, arrive to the destination quicker and be more fun. Negative aspects included that it contributed to a stressful traffic environment and that the risk of a road crash increased. The assessment of control beliefs indicated that being in a hurry would make it easier to speed but also the road layout, such as straight and wide roads and roads having a central median barrier.

In a study by Vogel and Rothengatter (1984), using the TRA, the intention to speed on a highway was examined (cited in Rothengatter, 1988). The model was able to differentiate between fast and slow drivers. Fast drivers believed that driving at high speed was enjoyable and less tiresome whereas slow drivers believed that it would have dangerous consequences. A factor analysis was also carried out on the beliefs underlying this intention and the results revealed four factors: pleasure in driving, traffic risks, travel time and cost with the first being the most important one. This would then highlight the importance of positive aspects of risky driving.

Seat belt usage
In general the use of seat belts in Sweden is rather high and has been so for a fairly long time. In 1983 the percentages of drivers using the belt was on average 85% and in 2006 it had increased to 93% (Cedersund, 2007). Studies have found that seat belt usage is related to legislation and enforcement (Steptoe, Wardle, Fuller, Davidsdottir, Davou & Justo, 2002; Åberg, 1998). Countries which have made seat belt use mandatory show a large increase in its use. However, studies have also found that the seat belt usage is not always consistent and that it is related to trip purpose, driving situations and road conditions.

For instance, Stasson & Fishbein (1990) found that actual seat belt usage varied across different driving situations. Seat belt usage was most likely on long trips, on a highway, under wet conditions and during the night. This is also consistent with other findings which also found that it was most common on long trips (Budd et al., 1984a; Fockler & Cooper, 1988; Svensson et al., 1985) and on highways (Forward, Kós-Dienes, & Obrenovic, 2000; Knapper, Cropley & Moor, 1976). Furthermore Fockler and Cooper (1988) also found that it was most common when driving at higher speeds. The importance of context would then suggest that the same driver can be a user in one context but a nonuser in another.

Results have also showed that the attitudes to seat belts are strongly related to actual usage (Ashton & Warr, 1976; Bener & Jadaan, 1990; Fockler & Cooper, 1988; Jonah & Dawson, 1982; Knapper et
al., 1976; Steptoe et al., 2002) and the intention to use the same (Budd et al., 1984a; Forward et al., 2000; Stasson & Fishbein, 1990).

People usually know that seat belts are effective but the reason for not using them is that they cannot be bothered (Knapper et al., 1976), too lazy to wear it (Budd et al., 1984a) and that it is inconvenient and/or uncomfortable (Ashton & Warr, 1976; Bener & Jadaan, 1990; Fhanér & Hane, 1974; Fockler & Cooper, 1988; Forward et al., 2000). The importance of attitudes was also confirmed by Wittenbraker, Gibbs and Kahle (1983) who used the TRA to predict seat belt usage. The results showed that attitude and subjective norm explained 24% of the variance in intention. The beta weight of attitude was slightly larger than subjective norm (.33 versus .28) which would indicate that attitude was more important.

Studies have also shown that seat belt usage is linked to other forms of violations, such as drunk driving and speeding (Koushki, Ali och Al-Saleh, 1998; Steptoe et al., 2002). In the study by Koushki et al. (1998) drivers who did not use seat belts committed twice as many violations as those who did controlling for exposure.

Drink driving

It has been estimated that 0.2% of Swedish drivers drive with an illegal limit of blood alcohol (BAC limits > 0.2 g/l). In a country like Sweden, where 2.6 billion journeys by car are made each year, it would then mean that approximately 5.26 million journeys are carried out by drivers who are impaired by alcohol (Swedish Road Administration, 2006). Studies have also found that around 8% of all drivers would at one time or another drunk and drive (cited in Ifver, 2007). Drinking and driving is generally considered as serious and in a study by Williams (2003) other drivers tended to perceive drunk drivers as a major threat to themselves. This might explain why drivers who commit the offence justify it in order to prevent feelings of guilt (Hills et al., 1993).

Studies have found that subjective norm is an important factor explaining drink driving. For instance, Åberg (1993) found that subjective norms had a higher predictive value of drink driving than both attitudes and evaluations of sanctions. This would then indicate that drivers who drink and drive believe that significant others would accept the behaviour. The effect of others was also demonstrated by Lange, Johnson and Reed (2006) who assessed drivers in two settings. The first setting included a group of people who would drink heavily and the other those who would drink less. The results showed that drivers were not affected by others drinking, instead drivers in both groups drove back with the same BAC limit. It was therefore concluded that in this instance drivers were more influenced by injunctive norm (subjective norm) than descriptive norm (perceived behaviour of others).

Parker et al. (1992a) used the TPB to predict the intention to drink and drive. The results showed that the model predicted 42% of the variance. Perceived behavioural control was the most important single factor in the prediction followed by subjective norm and attitude. This would then mean that drivers who intended to drink and drive perceived less control over the behaviour, believed that others would accept their behaviour and held less negative attitudes towards the offence. The scores of men and women were also compared and it was concluded that men, in general, expressed less control with regard to drink driving than women. Women also held more negative beliefs with regard to the outcome of the offence. Younger drivers reported more social pressure from partners to drink and drive as compared to older drivers (Parker et al., 1992b).

Other studies have also found that in general male drivers drink and drive more than female drivers. However, studies show that this pattern is gradually changing and that an increasing number of women now drink and drive (Beirness, 1989; Jones, Holmgren & Andersson, 1989; Pikkarainen & Penttilä, 1989; Popkin, Rudisill, Waller & Geissinger, 1988; Weseman, 1989). In the study by Pikkarainen and Penttilä the rate of female drunken drivers over a 20 year period was found to increase six times. There are several reasons to this phenomenon. The most common explanations are the changes in women’s lifestyles and that women’s’ drinking habits have changed (Popkin et al., 1988), nowadays being more similar to those of men (Beirness, 1989; Bungey & Winter, 1986; Holubowycz, 1989). This was also substantiated by Peek, Farnworth, Hollinger and Ingram (1987) who found that women who drink and drive are more similar to men who drink and drive than women who abstain from drinking.
Over recent years the connection between alcoholism and driving while intoxicated has also been actualised with several results showing that alcoholism is a frequent reason for both men and women drinking and driving (Freeman, Liossis, Schonfeld, Sheehan, Siskind, & Watson, 2006; Kelly, Darke & Ross, 2004). It has also been argued that drivers who frequently drink and drive ignore the negative effects of driving whilst being intoxicated in the same way as they deny that they have problems with alcohol (Schell, Chan & Morral, 2006). This was also substantiated by an in-depth study interviewing a group of drivers charged with a BAC over 1.0 g/l. Most of them did not feel that they had been noticeably drunk and in general, the risk of being involved in a car accident was felt to be very small. The majority did not consider that alcohol made them a poorer driver (Forward, Linderholm & Forsberg, 2007).

Dangerous overtaking

It is estimated that in 2006 dangerous overtaking accounted for 41% of all drivers who died in traffic (Ifver, 2007). Factors determining dangerous overtaking has also been studied but to a much lesser degree. Parker et al. (1992a), who used the TPB, was able to predict 32% of the intention to overtake in a dangerous situation. The most important factor was subjective norm followed by perceived behavioural control and attitude. In general drivers believed that it could cause an accident and put lives in danger. Their results also showed that the attitudes towards dangerous overtaking were more positive amongst the younger drivers who believed that it would take them to the destination more quickly. Younger drivers also reported a greater pressure from others to commit this violation (Parker et al. 1992b). Overtaking on the inside was explored by Parker et al. (1995a) and in this instance 34% of the variance was explained by the model. In agreement with their assessment of dangerous overtaking, subjective norm was the most important factor. In this study an extended version of the TPB was used by including moral norm and anticipated regret. When these constructs were entered at a separate step the explained variance increased by 15% over and above the variables within the TPB. This would then indicate that intenders did not to the same degree as the others feel that it was wrong to behave like this and they were not as remorseful.

Conclusion

Over the years the number of studies assessing the link between psychosocial factors and driving violations have grown and it is therefore possible to present a general picture of drivers who violate. Perceived risk is one factor which appears to be important. Studies have found that drivers who violate usually are aware of risks but do not believe that it will affect them. The reason for this optimism appears to lie in their beliefs and that they regard themselves to be better than other drivers in handling the car. Their own risk taking is considered to result in positive consequences and in this instance it would therefore be wrong to talk about risk taking. They violate the rules of traffic when they consider it is safe to do so. However, one group of drivers, albeit rather small, is different since they take risks for the sake of it. This has also been described as sensation seeking and the group most likely to violate are those who are considered to be thrill seekers, that is, they seek adventures and enjoy the rush of adrenalin which usually follows this kind of experience. Demographic variables have also been examined and those most likely to violate are young drivers. They are more optimistic than the older ones and regard their driving skills as superior. However, research has also found that it is a relatively large difference between young men and women and that it is the men who are more at risk. Nevertheless, it would be wrong to treat young men and women as a homogenous group since differences within the groups have also been demonstrated.

The motive behind committing specific driving violations has also been studied. There is evidence to suggest that speeding is often regarded as less risky than drinking and driving and that seat belts are more likely to be used on a long trips and when driving at greater speeds. Drivers’ who speed regard this as more positive and that it would take them to the destination quicker, be more comfortable, more in tune with the surrounding traffic and more enjoyable. Studies using the TPB or the TRA have also
found that perceived behavioural control and subjective norm are important factors. This would then imply that drivers who speed regard this as easy and more difficult to control, and they also perceive a greater support from other people. Nevertheless, the results from various studies also suggest that the perception of speeding depends on its context. Speeding in an urban area is usually regarded as more serious than in a rural area. Although the factors explaining the behaviour are fairly similar, i.e. quick, comfortable et al., the degree differs. Speeding in a rural area is considered to be more positive than speeding in an urban area. The use of seat belts also varies according to its context and there is evidence to suggest that non usage is more common outside built up areas. Drivers’ are aware of that seat belts are effective but despite this some of them still fail to use them. The answer to this lies in their attitudes and perceived behavioural control. Non users regard seat belts as inconvenient and uncomfortable and they would be less likely to use it if they feel lazy. As previously mentioned drinking and driving is considered to be rather serious and both subjective norm and perceived behavioural control appear to be important factors, explaining why some drivers still do it. Drivers who drink and drive hold less negative attitudes towards the behaviour and believe that significant others would accept it. This would seem to be regardless if the driver is a man or a woman. Although women are less likely to drink and drive the factors determining their intentions are very similar. Drinking and driving appears to be a multi-dimensional problem since many drunk drivers also have problems with alcohol, something they tend to deny. It could therefore be argued that this group of drivers needs some form of rehabilitation in addition to being taken off the road. Dangerous overtaking was the last kind of violation discussed in this chapter and this behaviour has been less well researched than the others. In accordance with the other behaviours it is motivated by a belief in positive outcomes, less group pressure and less control. Dangerous overtaking has also been linked to moral norms and anticipated regrets. Drivers who carry out this behaviour would not regard it as being wrong and would not feel any regrets about it.

It could therefore be concluded that the factors within the TPB have been found to be important when trying to understand driving violations. However, only a handful has used the model itself with most studies looking at the different constructs in isolation without any attempt to predict intentions or indeed behaviour. Furthermore, those studies using the TPB cannot always be compared since the methodology used is not always the same. It is therefore some time before multi-act criteria through the use of aggregation can be generated which in turn could provide information about more general traits. In order to do so it is necessary to carry out repeated observations using the same framework and across different behaviours. It could therefore be argued that this field of research would benefit greatly from more research which not only assess the different constructs but also predict intentions and behaviour. However, before this is possible more research is needed.
Implication for intervention

The intervention can be targeted on an individual or societal level. Programmes targeted on the individual level could be in the form of education, rehabilitation and/or punishment. It may be used to increase the driver’s understanding of risk and includes both short and long term programmes. Intervention on a societal level use different forms of mass media campaigns and is targeted to a wider audience. It may be used to increase the public knowledge of the problem, change social attitudes and reduce the number of violations committed.

Campaigns aimed at various traffic-safety-related behaviours have been evaluated through the use of a meta-analysis (Delhomme et al., 1999; Vaa, Assum, Ulleberg, & Veisten, 2004). In both studies the reduction of accidents during the campaign was very similar (8.9% and 8.5%, respectively) and after the campaign it was 14.8%. Furthermore, it was shown that campaigns have a higher chance of success if they address only one theme and select a specific target audience.

The problem with many campaigns is that they tend to be poorly designed and not based on a theoretical foundation (e.g., Foon, 1988; Delhomme et al., 1999). For instance, campaigns aimed at changing attitudes about crash risks and traffic safety may have little or no success, because most drivers believe that road crashes happen to others and that they are both safe and skilful. A message will then be interpreted in such a way that it confirms already held beliefs.

Another problem when trying to change maladaptive behaviour, which is not widely recognized by programme developers, is that the same behaviour might have been carried out over a length of time without encountering any negative consequences. As a result different coping responses such a belief in their own invulnerability could develop. Hence, Tanner, Hunt and Eppeight (1991) argued that maladaptive coping responses need to be established beforehand and then challenged.

A campaign might fail because it tries to appeal to reason rather than to emotions. With regard to seat belt usage it has been found that most drivers know that seat belts protect the person but this kind of information would not appear to change behaviour by itself (Spolander, 1983b). Indeed, a number of North American seat-belt campaigns failed because their information was aimed at a rational level with sentences like; "Seat belts reduce the risk of injury”. What determined behaviour was by more “irrational” arguments like; "Seat-belts make me to feel locked in”, “It is difficult to put on” etc. How a message is evaluated depends, at least in part, on the receivers own underlying beliefs. A message which runs counter to an individual’s own beliefs may be re-interpreted to become more consistent, partly ignored, repressed or compartmentalized. To be effective it is necessary to involve both the intellect and the emotions and it is these beliefs which need to be challenged. DeBono (1987) found that a message was persuasive if it was functionally relevant. In DeBono’s study subjects were more likely to change their behaviour if they believed that their old attitudes failed to serve their function and that different attitudes would be more useful.

Few attempts have been made to use the TPB when trying to change behaviour but there are some evidence which suggests that TPB-based interventions can be successful (e.g. Armitage & Conner, 2002; Gratton, Povey & Clark-Carter, 2007; Middlestadt, et al., 1995). According to the theory a person’s behaviour is based on his/her intention which in turn is determined by attitude, subjective norm and perceived behavioural control. However, in order to change a behaviour it is those beliefs described as ‘salient beliefs’ underlying the more global ones which need to be targeted (Fishbein & Ajzen, 1975). Salient beliefs can be changed by one of the following: 1) challenge that an object possesses certain attributes 2) change the evaluation of a belief from positive to negative or vice versa; 3) introducing new beliefs and evaluations. Before a new behaviour will be exhibited it would be necessary to convince the person that it will result in a valued outcome, that significant others agree with the performance of the act and that the behaviour is under their own volitional control.
Depending on the person and/or the behaviour, the message could deal with attitudes, norms or issues related to control. If few attempts have been made using the TPB-based intervention in general then this apply even more to driver behaviour although there are some evidence which suggest that the manipulation of some or all of its constructs can achieve positive effects.

Bliersbach and Dellen (1980) for instance, emphasized the need to understand the target group and their underlying beliefs. They suggested that a road safety campaign would only be successful if it uses a language which addresses the psycho-social processes of driving. A long-term effect can only be attained if the drivers’ attitudes towards the offence change. In order to achieve the aforementioned, the characteristics of the offender need to be considered.

Research into how social influences can be instrumental in changing driver behaviour is rather recent but the evidence so far implies that it is important. For instance, Baron and Misovich (1993) argued that group support especially among young people, is an important factor in maintaining and changing attitudes. Indeed, attitude change “becomes real when it is socially constituted in regard to being embedded in new pattern of associations, relationships and group memberships./..” (p. 65). An old behaviour which is rejected by in-group members is easier to resist than if it is accepted.

The social aspects of driving were also included in a driving whilst intoxicated (DWI) program for driving schools. The results indicated that participation in this program led to improved knowledge about DWI. In general the already positive attitude remained and people in the experimental condition planned to drink less alcohol as compared to the control group. However, the actual DWI behaviour was more difficult to change, although in a follow-up fewer people in the experimental group would drive after drinking if other people were telling them not to drink (Kaysen, Schippers & van der Staak, 1993).

In order to increase the effect of an educational program the National Campaign Against Drug Abuse, Australia, used the framework presented by the TPB (Queensland Drunk Driving Project, 1990). In this study the constructs within the model helped to promote discussion.

The following emphasis was placed on attitudinal and behavioural objectives and included ways to develop attitudes, beliefs and social skills which would reduce undesirable behaviours:

**Beliefs**
- increase the perception of negative outcomes from "undesirable" behaviour and positive outcomes from "desirable" behaviour;
- raise negative evaluation of outcomes of undesirable behaviour;
- raise positive evaluation of consequences of counter behaviour.

**Subjective norm**
- raise perception that significant others disapprove of undesirable behaviours;
- raise perception that significant others approve of counter behaviour;
- refute myths and false beliefs;
- remove perceptions about significant others that are:
  - conducive to undesirable behaviour;
  - hindering counter-behaviour.

**Perceived behavioural control**
- discuss the options available and how to implement them.

The immediate impact of the program was assessed one month after implementation and the trend was in the intended direction. In a follow up three years later the same positive effect remained although their own program also coincided with a national drunk driving prevention initiative which could have affected the results of the study (Sheehan, Ballard, Schonfeld, Schofield, Najman & Siskind, 1996).
Combination of education and enforcement

Studies have found that a combination of education and enforcement increase the success of a campaigns. The result from a meta-analysis was able to demonstrate that 8.5% of crashes could be reduced if traffic safety campaigns were combined with traffic enforcements. If this was followed by yet another campaign then this figure increased to 15% (Delhomme et al., 1999). This would then be in agreement with the deterrence theory which states that persons will avoid an illegal act if they believe that it will result in sanctions (see Freeman et al., 2006).

Conclusion

The results of meta-analysis have shown that campaigns can be successful in reducing the number of accidents. But evidence so far also suggests that the likelihood of success could be enhanced if the methods used are improved. It could therefore be concluded that in order to succeed in persuading the public to adopt safer driving techniques the campaign needs to be based on a sound theoretical basis. This is needed in order to determine what factors predict road user behaviour and decide which elements of the same should be targeted by a traffic safety campaign. Furthermore, the selection of a specific target audience and focusing on only one theme seems to be important. To further increase its effect a combination of education and enforcement would probably be even more successful in strengthening the overall impact of the campaign and supporting a more lasting impact. Changing people’s driver behaviour is a long term process. It is therefore unrealistic to believe that a driver will suddenly change his or her behaviour after being exposed to a campaign, especially if the behaviour has become habitual. Research in other areas of psychology has shown that a change in awareness is a first step towards behavioural change (see Prochaska & DiClemente, 1983). Thus a change in attitudes or normative beliefs should be regarded a sign of success which should be followed up by further attempts.
Aims of the present thesis

When the aim is to take appropriate actions which will reduce the number of road crashes one must first identify the various key elements, and then decide how they can be influenced and changed. In order to achieve this very ambitious goal a holistic approach is needed addressing vehicle, infrastructure and road user behaviour respectively. However, road user behaviour tends to be given less focus although it account for the majority of road crashes. One reason for this is that changing people’s behaviour is regarded as more difficult than changing the road layout or making the vehicle safer. The general aim of this thesis was therefore to predict the intention to commit driving violations and suggest how the behaviour can be changed by exploring antecedents of behaviour.

One important step in the advancement of traffic psychology is to compare and contrast road user behaviours across different environmental contexts and cultures using a theoretical model which is clearly defined and which has been empirically tested. Indeed, research into driving violations has become more structured and systematic and a growing number are using the TRA or the TPB. However, to date it is still difficult to draw any firm conclusions from these studies. Some of them use direct measures others indirect ones something which Wallén Warner and Åberg (2008) pointed out can present very different results. Furthermore, only a handful analyzes the data as suggested by Ajzen (1991). Thus the first aim of the thesis was to predict the intention to commit three different driving violations through the use of the TPB.

Although the results from studies using the TPB within mainstream psychology have been very impressive it still leaves us with roughly 50% of the behaviour unexplained. The second aim of this thesis was to explore the possibility of including descriptive norms and past behaviour as further constructs. The TPB does not only try to predict behaviour it also tries to provide a deeper understanding of the same, which in turn can help in formulating more effective measures aimed at changing driver behaviour. The third aim of this thesis was therefore to explore what particular beliefs are responsible for the behaviour and differentiate between intenders and non-intenders.

In Study I, one of the aims was to explore drivers’ attitudes and behaviour in some depth including the interviewee’s contradictions and difficulties. The methodology chosen was semi-structured interviews which allows the interviewer to tailor his/her questions to the person interviewed rather than following a strict code of practice. The second aim was to investigate the responses to an extended version of the TPB. Hence - and in addition to the variables within the model - habits, driving skills, driving experience, if their mood affected their driving, their definitions of a “safe driver”, accident involvement and/or other offences was discussed.

In Study II the first objective was to predict the intention to violate in two different contexts using the TPB, namely speeding in a built-up area and dangerous overtaking. The second assessed the contribution of descriptive norm and past behaviour after controlling for the variables already included in the TPB. The third determined the possible relationship between risk and descriptive norm and the fourth assessed the effect of demographic variables and annual mileage.

In Study III the objective was to explore the motive behind the actions by comparing and contrasting drivers’ salient beliefs. A further objective was to explore drivers’ expressed lack of control and its possible relationship with intention, behavioural beliefs and perception of risk.

In Study IV the focus was on speeding in a rural area, a behaviour described as ‘less risky’. The first objective was to determine the effect of TPB and descriptive norms in the prediction of intention. The second was to examine attitudes towards the behaviour in more detail, including the possibility of distinguishing two different groups; low and high ambivalence. The third was to compare and contrast male and female drivers.
Empirical studies

Study I: The intention to commit driving violations – a qualitative study

The aim of this study was to explore the beliefs included in the TPB through the use of semi-structured interviews. In addition further variables were assessed, attempting to determine if they could contribute to our understanding of driver behaviour.

Method

Fifty licensed drivers of both sexes, 20 males and 30 females, took part in this study. The participants were recruited from an adult education centre in Uppsala, Sweden. The average age was 36 years, with an age range of 25 to 70 years. The aim of this study was, through the use of an extended version of the TPB, explore drivers’ attitudes and behaviour in some depth including the interviewee’s contradictions and difficulties. The methodology chosen was therefore semi-structured interviews which allow the interviewer to tailor his/her questions to the person interviewed rather than following a strict code of practice. Each participant was given three different scenarios which included a short description and a line drawing. The descriptions of these scenarios were as follows:

1. *Speeding in an urban area:* You are driving through an urban area. The time is 11.30 on a fine and dry day. The road has a 50 km/h speed limit but you are driving at 65 km/h.

2. *Dangerous overtaking:* You are driving on a rural road where the speed limit is 90 km/h. The time is 11.30 on a fine and dry day. On this section of the road there are a series of bends and the visibility is poor. In front of you is a lorry, which is being driven at 65 km/h. You have now been stuck behind this lorry for about 2 km and you have not met anybody in the last 5 minutes. You are beginning to be short of time and even if the view is still restricted, you pull out and start to overtake.

3. *Speeding on a major road:* You are driving on a major road where the speed limit is 90 km/h. The time is 11.30 and on a fine and dry day. After a while a car drives up behind you and stays about 2 m behind, the driver appears to be irritable. You increase your speed to 100 km/h in order to widen the gap.

Participants were instructed to imagine themselves in the depicted set of circumstances. The respondents' salient beliefs were obtained by asking “what would the consequences be if you commit this offence”, “can you think about any reason why you might be driving in the way indicated”, “can you think about why you would refrain from it”, “do you believe that people important to you would approve or disapprove of this kind of driving?””, “how easy is it to avoid carrying out this behaviour” and “is there anything, or anybody, which could make you to lose control over the situation”. The intention measure contained various questions trying to determine if they themselves would commit this offence or not. Habit was measured using two questions: “have you ever been in a similar situation before” and if that was the case “how often”. At the end of the interview additional questions were asked about their age, driving skills, driving experience, if their mood affected their driving, their definitions of a "safe driver", accident involvement and/or other offences.

Fifty percent of the participants were given scenarios which took place during the day and 50% during the evening. In all other respects the two conditions were identical. All the interviews were tape-recorded and each interview took approximately 40 minutes.
Results

Each interview was transcribed and in order to distinguish different groups from each other some of the answers were coded according to different themes. With regard to intention the participants were coded as intenders or non-intenders. Intenders answered that they would commit the offence and non-intenders that they would abstain. Driving skills were coded as: better than others, same and worse.

In this study half of the participants were given scenarios which took place during the day and the remainder during the evening. However, this would not appear to have any significant effect on their responses. In only one instance was this a crucial factor where it became part of the argument in favour of a dangerous overtaking. For this person it was regarded as safe to overtake because the light from an oncoming car could be seen at a greater distance, giving him enough time to take the necessary avoiding action.

The results showed that regardless of the scenario, people who intended to violate held more positive attitudes towards the act and believed that others would accept it. With regard to perceived behavioural control, intenders expressed less control over the situation than non-intenders. Since the study used a qualitative method it was also able to elaborate on the questions asked. It was then discovered that an expression of lack of control many times was related to a perception that the behaviour was not so dangerous. It was therefore interpreted as a form of excuse to carry out an act they knew was illegal. The three scenarios presented different degrees of risk; speeding on a major road as least risky and dangerous overtaking as most risky. The results showed that the response to the latter was more immediate whereas in the two other cases it was more deliberate, carefully considering the pros and the cons. This would then suggest that the first is more ruled by affect than the other which is more ruled by cognition. Furthermore, the reaction to the question about subjective norm was also unexpected. For some, the question was difficult to interpret and that the answer depended on how they perceived themselves and others. The study was therefore able to distinguish three different groups; the first one based their answer on their own behaviour as a form of ‘false consensus’. The second also based it on their own behaviour but saw themselves as different, that is, a ‘false uniqueness effect’. In the third group the answer depended on who they identified with. The final group became adamant and did not want to answer since it became a question of credibility. To criticise their driving style was seen as a personal attack. The results could also have some practical implications. To highlight that others do not think and act as they do, might only further reinforce their behaviour if the effect is “false uniqueness”.

The interview also showed that drivers were influenced by other drivers and that it was important to adjust their driving accordingly. This was then interpreted as a further indication of the need for introducing another variable dealing with the perception of others and its effect on behaviour. To identify the type of norm influencing behaviour is also crucial when designing a programme for change. For instance, a message highlighting that a certain offence is very common and therefore in need of heavier sanctions could be counterproductive if the norm is descriptive rather than as measured by the TPB subjective.

In this study the participants’ perception of their own driving skills and its relationship with perceived control was discussed. In general, participants who perceived themselves as superior to others also expressed high degrees of control. In contrast to other studies (e.g., Parkers, Reason, Manstead & Stradling 1995c) it was those who did not intend to speed in an urban area, rather than intenders, who perceived themselves as better than others. The intenders tended to perceive themselves as equal. Usual comments as to why they perceived themselves as superior included: driving experience, no previous road crashes and being alert. The main reason presented as to why some of them felt inferior was lack of experience. This is consistent with earlier studies who found that driving skills were linked to experience (Fuller, 1984; Spolander, 1983a).

It was also discovered that the perception of driving skills was relatively unaffected by road crashes or fines. It would appear that their self-image had not been affected by their experiences, the event had been unexpected, outside their own control and therefore they could not be held responsible. This could be explained by something called the self-serving attributional bias where people attribute failure to external factors rather than to internal ones, leaving the self-image intact (Bradley, 1978). However, in order to drive a car feelings of control and a positive image of themselves as drivers is
needed, at least to some degree. After a traumatic experience perceived control over the situation also reduces anxiety (Fiske & Taylor, 1991). Thus to deny responsibility for the event serves important functions, something which needs to be considered before a behaviour could be changed.

Finally, past behaviour was examined in some detail. It was shown that very few of the participants had formed a habit. Even if the behaviour had been carried out in the past it was not often enough and had not become semi-automatic, a term used to describe a habit. It was therefore suggested that past behaviour was a better expression than habit. The results showed that past behaviour was closely linked to future intentions but only under some conditions. If the experience had been unpleasant then it was less likely to happen again. Examples of negative experiences could be a police control or being involved in an accident and/or more personal ones like feelings of regrets and the sudden realization that the behaviour could result in negative consequences.

Study II: The theory of planned behaviour: The role of descriptive norms and past behaviour in the prediction of drivers’ intention to violate

The first aim of this study was to examine road user behaviour in two different contexts using the TPB, namely speeding in a built-up area and dangerous overtaking. The second aim was to assess the unique effect of descriptive norm and determine its possible relationship with risk. The third was to assess the unique effect of past behaviour after controlling for the variables already included in the TPB. The fourth aim was to assess the effect of age, sex and annual mileage.

Method

The participants consisted of 275 people with a current driving licence. The participants were between 20 and 75 years (mean=44 years; standard deviation of age (14.72), 132 (48%) were females and 143 males (52%). Nearly half of the sample (42%) had been involved in at least one accident and 64% would use their car daily, 27% a couple of times a week, 4% a couple of times per month and 5% very rarely. Fifty-one people (18.5%) had previous traffic convictions. A questionnaire was mailed to 500 people drawn from the public driving licence records. Of the 500 questionnaires, 275 usable ones were returned (56% response rate). The questionnaires included two different driving scenarios used in study I, namely speeding and dangerous overtaking. Each outline included a line drawing together with a short description, and participants were then instructed to imagine themselves in the depicted set of circumstances. These different scenarios described various driving violations:

**Speeding in an urban area:** You are driving through an urban area. The time is 11.30 on a fine and dry day. The road has a 50 km/hr speed limit but you are driving at 65 km/hr;

**Dangerous overtaking:** You are driving on a rural road where the speed limit is 90 km/hr. The time is 11.30 on a fine and dry day. On this section of the road there are a series of bends and the visibility is poor. In front of you is a lorry, which is being driven at 65 km/hr. You have now been stuck behind this lorry for about 2 km and you have not met anybody in the last five minutes. You begin to be short of time and even if the view is still restricted, you pull out and start to overtake.

The salient behavioural beliefs for each scenario were generated through pilot interviews with 50 adults, following Ajzen and Fishbein's (1980) recommendations. Thus respondents were asked to list their beliefs about speeding in an urban area and dangerous overtaking separately.

In addition to the questions specified by the theory, descriptive norms, past behaviour and perception of risk were included. Respondents’ age, sex and annual mileage were also collected at the end of the survey.
Results

The results demonstrated that the TPB was able to predict drivers’ intention to commit two different driving violations: speeding in an urban area and dangerous overtaking. Overall, the TPB explained 47% of the variance with regard to speeding and 33% of the variance with regard to dangerous overtaking. This would also be consistent with Parker et al. (1992) who showed that the model explained 47% of the intention to speed and 32% of the intention to overtake despite poor visibility. In the present study attitude made the greatest contribution to the prediction of the intention to speed ($\beta = .33$, $p < .001$), closely followed by subjective norm ($\beta = .30$, $p < .001$) and perceived behavioural control ($\beta = .26$, $p < .001$). With regard to dangerous overtaking perceived behavioural control was the most important factor ($\beta = .32$, $p < .001$) followed by attitude ($\beta = .30$, $p < .001$). In this instance subjective norm became non-significant. According to the theory the variables within the model are different constructs and would therefore correlate more strongly with intention than with each other. This was supported with regard to speeding in an urban area but it was not supported with regard to dangerous overtaking since subjective norm presented a stronger relationship with attitude ($r = .44$) than intention ($r = .33$).

Perceived behavioural control was initially measured by four items but two of them had to be dropped since they suppressed the predictive power of the model. The items retained were measuring how easy it was to speed (perceived ease) and how easy it was to avoid doing the same (perceived control). The two items had a low internal reliability suggesting that they measured two different things. The results from a regression analysis showed that it was only the perception of ease which contributed significantly to the prediction of speeding and dangerous overtaking.

As opposed to the guidelines presented by Ajzen (2006) where both injunctive (subjective norm) and descriptive norms are combined to form a measure of subjective norms, descriptive norm was treated as a distinct construct and added to the equation after the constructs within the TPB. The results showed that descriptive norm made significant effect on the prediction of intentions. It explained 4% of speeding in an urban area and 10% of dangerous overtaking. This would then indicate that descriptive norm should be treated as a separate construct. Furthermore, and in accordance with previous studies, the contribution was greater in the scenario described as very risky (Rivis & Sheeran, 2003b). In fact, in the scenario describing dangerous overtaking, subjective norm was non-significant even before descriptive norms had been entered, supporting studies showing that descriptive norms can be a better predictor of intentions than subjective norms (Rivis et al., 2006). It was therefore concluded that perceived social pressure from salient others was less important than their own behaviour in a risky situation.

In addition to testing the effect of descriptive norm the aim of Study II was to determine the effect of past behaviour. Previous research has found that it has a unique effect over and above the variables within the model – something which was also confirmed by this study. Past behaviour was entered into the equation, after all the other components but despite this it added a further 17% of speeding in an urban area and dangerous overtaking. This study then clearly showed that past behaviour was an important variable and that it was consistent with current intentions. In addition to this, a fairly strong relationship was found between past behaviour and the variables within the TPB. This would then be contrary to that of Ronis et al. (1989) who suggested that habitual behaviour was guided by environmental cues rather than the more cognitively driven components of the model. Although this refers to the relationship between past and future behaviour similar argument has been put forward with regard to intention (see Norman & Conner, 2006). On the other hand it would be consistent with Ajzen (2002) in his discussion of past behaviour and future behaviour. He has stated that not only novel behaviours but also routine behaviours, were guided by variables within the model. Nevertheless, some caution is needed when interpreting the results from the present study since we do not know if the measured behaviour had become a habit or not, the only thing for certain was that it had been executed on a regular basis. This is often a problem when past behaviour is being measured since most studies only use a measure of frequency. A possible way forward could be as Norman and Conner (2006) suggested, offering alternative solutions to capture if the behaviour is automatic or not.
The more traditional variables used to explain driving violations were also assessed (age, sex and annual mileage). The results showed that the contribution of age and mileage were significant with regard to speeding but not with regard to dangerous overtaking. It added a further 3% to the prediction of speeding in an urban area, which indicated that young people were more likely to violate, something which is in agreement with a large number of other studies (e.g., Deery, 1999; Parker et al., 1992a; Yagil, 1998) and that drivers who used the car on a regular basis were more likely to do the same.

The results from this study suggested that the TPB was able to predict drivers’ intention to commit two different driving violations: speeding in an urban area and dangerous overtaking. However, when an extended version of the model was tested the results showed that descriptive norms and past behaviour contributed to the prediction of the same over and above the variables already included in the model. This would then suggest that they should be added to the model as separate constructs. The results also has some implication for intervention stating that a program should focus on the target groups’ beliefs, norms and the perception of how easy or difficult something is. The effect of descriptive norms indicated that behaviours conducive to traffic safety need to be emphasized more often and presented as normal.

Study III: An assessment of what motivates road violations

The TPB does not only predict behaviour – it also tries to explain the same. The aim of this study was to identify the motives behind unsafe driving by examining the unique effect of attitude and subjective norm. The second aim was to assess if the degree of control was related to perception of risk, intentions and attitudes towards behaviour.

Method

The participants consisted of 275 people with a current driving licence. The participants were between 20 and 75 years (mean=44 years; standard deviation of age (14.72), 132 (48%) were females and 143 males (52%). Nearly half of the sample (42%) had been involved in at least one accident and 64% would use their car daily, 27% a couple of times a week, 4% a couple of times per month and 5% very rarely. Fifty-one people (18.5%) had previous traffic convictions.

A questionnaire was mailed to 500 people drawn from the public driving licence records. Of the 500 questionnaires, 275 usable ones were returned (56% response rate). The questionnaires included two different driving scenarios used in study I, namely speeding and dangerous overtaking. Each outline included a line drawing together with a short description, and participants were then instructed to imagine themselves in the depicted set of circumstances.

Results

The first aim of this study was to compare and contrast different forms of driving violations ranging from very serious to not very serious at all. In accordance with Armitage and Conner (2001b) the differentiation between intenders and non-intenders was based on how they scored on the question of intention. The first group had replied in the affirmative (5-7), whereas the second group had given a negative answer (1-3). The intermediate group who replied neither/nor was excluded from this analysis. The use of a perhaps more traditional approach namely the modal split would in this instance compare and contrast two very different groups for different violations. Although all measures were skewed towards not violating the distribution with regard to dangerous overtaking was exceptional with only a handful of drivers indicating that they would violate. Thus, the advantage with the chosen methodology is that intenders and non-intenders alike are always based on the same scores and not determined by the selection of sample or indeed the kind of violations being assessed.

The results demonstrated a significant difference between intenders and non-intenders. The first group believed more in positive outcomes and the latter in negative ones. In addition to this, intenders
perceived the aforementioned behaviour as being emotionally rewarding, and something they also found very important. However, some differences were found between the two different contexts. In their evaluation of dangerous overtaking it was the negative beliefs which to a greater extent differentiated the two groups rather than the positive ones. Intenders were less likely to believe that it would make the driving unpleasant and that they would be involved in an accident with another vehicle. Subsequently this was also confirmed by the use of a factor analysis. For speeding in an urban area two different factors were extracted. The first one included all the positive attitudes and the second all the negative ones except for being fined. These factors were then entered into a regression analysis with intention as the independent variable. The results demonstrated that the two beliefs accounted for 30% (F 55.865, p < .001) of the intention to speed but also that positive beliefs accounted for more of the effect than negative beliefs (β = .41, p < .001; β = -.23, p < .001, respectively). For dangerous overtaking the result presented three different factors; two negative and one positive. Factor 1 included beliefs about accidents and that it would be unpleasant to overtake, factor 2, which was the positive one, included beliefs about excitement and emotional outlets and factor 3, which was the second negative one, included items about being fined, annoying other drivers that it would not make the journey any quicker. The same three factors were then entered into a regression analysis with intention as the independent variable. The results demonstrated that the two of the three factors, one positive and one negative (factor 1) accounted for 19% (F 20.224, p < .001) of the variance but also that negative beliefs accounted for more of the effect than positive beliefs (β = -.30, p < .001; β = .19, p < .001, respectively). It could therefore be argued that the intention to speed is predicted by factors considered as emotionally rewarding whereas dangerous overtaking is more controlled by a denial of negative consequences.

As opposed to most studies within transportation psychology this study not only assessed the effect of significant others in general but was able to state who these significant others are. The results showed that both men and women, regardless of context, believed that men of the same age as themselves were more accepting of the violations. However, their perception of other men was different with the women believing that other men would be more accepting. The results also showed that it was a person of the same age and gender as themselves who had the greatest effect on their own intention. However, the latter would not appear to apply to females who intended to violate since they believed that it was men of the same age as themselves who were most in agreement with their intentions.

The second aim of the study was to explore perceived behavioural control in some depth. Perceived behavioural control was measured by three items, two of which could be described as low control and one as high control. The low control items dealt with the ability to avoid violating and the high control item if it was easy to violate. The three items were then assessed in combination with intention, behavioural beliefs and perceived risk. The results showed that those who expressed that it was hard for them to avoid speeding in an urban area (low control) also were more likely to speed which would be logical but at the same time they also perceived less risk and believed that speeding would result in positive outcomes. The same applied to those who would argue that others might put pressure on them to speed despite their own will. The same paradoxical reasoning also applied to dangerous overtaking with the exception of a non significant relationship between intention and how hard it was to stay behind the lorry. The relationships between high control and the aforementioned variables are logical and consistent with previous research although the one applying to low control might be more difficult to interpret. However, the present study concluded that with regard to driving an expressed low control could be regarded as a form of denial of responsibility or a defence to weaken their feelings of moral obligation. It could therefore be argued that perceived behavioural control, in the context of driving, is different from for example health behaviours like taking prescription or losing weight.

Study IV: Intention to speed in a rural area: Reasoned but not reasonable

The motive behind then intention to speed in a rural area was examined in this study. The study had three aims: The first was to determine the effect of TPB and descriptive norm in the prediction of
intention. The second was to examine attitudes towards the behaviour in more detail, including the possibility of distinguishing two different groups; low and high ambivalence. The third was to compare and contrast male and female drivers.

Method
Participants were 1,798 drivers randomly selected and drawn from the public driving licence records, 603 were female (33.5%) and 1195 were male (66.5%). Fourteen percent (n=250) had previous convictions for speeding, 47% would drive in rural areas on a daily basis, 26% several times a week, 16% two times a week, 7% two times per month and 4% very rarely. The annual mileage was on average 2,095 km in the last 12 months (range 1 km – 22,000 km).

A questionnaire was sent out to 3000 drivers in the county of Västra Götaland and completed by 1,798 (response rate = 60%). The questionnaire was based on an extended version for the TPB and included a driving scenario with the view to give the respondent a clear understanding of the situation. The description included a photo of a fairly narrow rural road without a hard shoulder (approx. 9 m wide). The visibility was reduced by a sharp curve. In the photo three cars travelled on the road, two in one lane and one in the other. The text underneath the photo asked the respondents to imagine themselves that they were driving on this road. The speed limit was 90 km/h but they were driving at a speed of 110 km/h. At the end of the survey the respondents’ age, sex and annual mileage were recorded.

Results
The results showed that attitude, subjective norm, perceived behavioural control and control beliefs accounted for 53% of the variance in the prediction of intention to speed. Attitude and subjective norm made the greatest contribution to the prediction of intention. Descriptive norm was entered on step 2 accounting for a meagre 0.3% of the variance in intention. In this study both a direct and an indirect measure of perceived behavioural control was included. The results showed that both had a unique effect. Thus drivers who believed that it was easy to violate were more likely to do the same and it was more common in a situation when the drivers were in a hurry or felt irritated. However, in contradiction to the theory, the relationship between the direct and the specific measures of perceived behavioural control was rather weak (r = .26). This would then support Ajzen (1991) who argued that the effect has only been partly supported. Furthermore, as compared with other studies assessing speeding in an urban area (i.e., Elliott et al., 2003; Parker et al., 1992a), the effect of perceived behavioural control was relatively poor. One possible explanation would be that speeding in a rural area was regarded as easier by both intenders and non-intenders thus failing to separate the two groups.

In order to explore drivers’ behavioural beliefs in more detail a principal component analysis was then applied. The analysis yielded two factors which together explained 60% of the variance. All positive beliefs loaded on factor 1 and all the negative ones on the second factor. A multiple regression analysis was then used demonstrating that the two factors together explained 42% of the intention to speed. The three most important items, explaining 40% of the variance, were: Make the driving more pleasant, adjust my driving to other drivers and the risk of losing control over the car. This then suggested that positive beliefs were more influential than negative ones. Further evidence in favour of this was then provided using a correlation coefficient analysis showing that an index of positive beliefs was more strongly correlated with intention than a negative one (r = .59, p < .001; r = -.44, p < .001, respectively).

This study was relatively large enabling us to make a more thorough examination of male and female drivers. The results showed that females were less likely to speed as compared to men. This could also be confirmed by a number of studies who have found that women are more negative about breaking traffic rules than men (Weseman, 1989, Parker et al., 1992a) and tend to commit fewer violations (Åberg & Rimmö, 1998; Reason et al., 1990). However, very few studies have considered driving experience and age. When both annual mileage and age were controlled for the difference
between men and women became non-significant albeit with one exception. Young men who were driving more than 15,000 km annually were more likely to violate as compared to young women who were using the car to the same extent. It could therefore be argued that when discussing possible differences between men and women the effect of both age and annual mileage are important factors.

A multiple regression analysis was then able to demonstrate that the TPB was able to predict both men’s and women’s intentions to approximately the same degree. The model explained 50% of the variance for women and 53% for men. The variable within the TPB with the largest contribution in both groups was attitude followed by subjective norm. However, the effect of perceived behavioural control and control beliefs were slightly different. Amongst the women perceived behavioural control was a slightly better predictor of intention than control beliefs whereas for men it was the opposite, although the differences were very small.

Additional multiple regression analysis were carried out, entering behavioural beliefs and outcome evaluations separately. The results showed that the belief which made the greatest contribution for both men and women was that speeding made driving more pleasant. This was then followed by a belief that high speed was better adjusted to the speed of other drivers. These two beliefs accounted for a substantial amount of the variance. The results assessing the effect of outcome evaluations also showed that men’s and women’s beliefs were rather similar. Both groups argued that the most important factor was that the journey was fast and the most serious ones were being fined and involved in a road crash.

An increasing number of studies have found that it is quite possible for people to hold both positive and negative attitudes towards an object, something which has been described as ambivalent attitudes. Although this has been established across a range of different behaviours none of them has examined driving violations. Thus a further aim of this study was to distinguish two different groups, low and high ambivalence. Positive and negative beliefs were assessed separately. A person was described as high in ambivalence if the separate measure of positive beliefs and negative beliefs was between 5 and 7 (on a scale from 1-7) indicating that the person agreed with both the positive and negative statements. A person low in ambivalence scored less than or equal to 3.9 on the negative factor and 5 to 7 on the positive factor indicating that the person disagreed with the negative ones but agreed with the positive ones. This method ensured that they were ambivalent and not merely indifferent. The results showed that the first group (low in ambivalence) consisted of 311 people (17% of the total sample) and the second group (high in ambivalence) consisted of 156 people (9% of the total sample). In the first group 93% intended to speed (score > 4) and in the second 71%. The main difference between the two groups as indicated by mean and standard deviation was that those high in ambivalence received less support from people close to themselves, associated themselves with people who would not speed and perceived that the behaviour was more difficult to carry out. Furthermore, this group was also more likely to speed if they felt irritated or if they were in a hurry. It was therefore concluded that amongst the speeders there exists a group that do not fully believe that their behaviour will result in positive outcomes.
General discussion

It should be noted that there are numerous extraneous features that pertain to road crashes, and these could involve: road design, inclement weather, vehicle failures, etc. Whilst the above is clearly of some relevance, it nonetheless should be noted that it is the ‘human factor’ which is behind most fatal and injury crashes. Sabey and Taylor (1980) suggested that 95% are partly due to this factor and 65% wholly. This is interesting but insufficient unless we also try to understand what kinds of factors are responsible. In order to become more specific three different human failures have been defined: violations (e.g., speeding, drinking and driving), errors (e.g., failing to see or misjudgements), and lapses (forgetfulness) (Stradling et al., 1992). Violations describe deliberate actions which also have been found to predict road crashes (Gras et al., 2004; Parker et al., 1995a; Sullman et al., 2002). The crucial issue is therefore to understand what motivates drivers to commit an act, which put both themselves and others at risk. The focus of this thesis was therefore to take a closer look at the motives behind two different violations; speeding and dangerous overtaking. Whilst the method was both qualitative and quantitative the theoretical framework was the same, namely the theory of planned behaviour.

The predictive power of the model

In this thesis the TPB was used to predict three different intentions; driving 65 km/h in an urban area sign posted as 50 km/h, driving 110 km/h on a rural road with a speed limit of 90 km/h and overtaking a lorry on a windy rural road. Overall, the TPB explained 33 to 53% of the variance. The theory explained 47% of the variance to speed in an urban area which is the same as the results presented by Parker et al. (1992a) (47%) but greater than the one presented by Wallén Warner and Åberg (2008) (31%). The intention to speed in a rural area was slightly more successful with 53% being explained. However, the prediction of dangerous overtaking was less successful since only 33% of the variance was explained by the variables within TPB. However, this is fairly similar to the results presented by Parker et al. (1992a) who reported a figure of 32%. One possible explanation why dangerous overtaking would be more difficult to predict by the model might be, as demonstrated by Study I, that it triggered a very emotional response. In this study it was found that the response was immediate whereas the response to the scenario presenting speeding was more deliberate, carefully considering the pros and the cons. Mathews (1998) explained this as a difference between automatic and strategic processes. In a situation of fear and danger the person is best served by a rapid perceptual encoding rather than the more time-consuming controlled elaboration of the problem. It could therefore be argued that although the model includes both affective and instrumental constructs it is still biased towards cognitive processes rather than the more emotional ones. Another explanation is more methodological and refers to the low variability within the sample. As previously mentioned dangerous overtaking was a very unusual behaviour which in turn can reduce the variance and the correlation.

The contribution of the different variables showed that attitude and subjective norm made a significant and large contribution towards speeding, regardless of context. It could therefore be argued that speeding is greatly influenced by normative pressure and an evaluation of its outcome. However, there were also some differences. Perceived behavioural control, as measured by how easy it was to perform the act, contributed more to the prediction of intention to speed in an urban area than speeding in a rural area ($\beta = .26, p < .001; \beta = .17, p < .001$). A possible reason could be that both intenders and non-intenders in a rural area were able to speed thus failing to differentiate between the two groups.
This was also substantiated by Study IV which showed that most of the drivers (both intenders and non-intenders) perceived speeding in a rural area as very easy (M=5.66, SD=1.48) and Study II which found that speeding in an urban area was fairly difficult (M=3.54, SD=1.96). In addition to this speeding in an urban area was not very common, only 18% indicated that they would do the same. This can then be contrasted with speeding in a rural area where 52% answered that they intended to do the same.

Furthermore, this could also be substantiated by examining the results predicting the intention to overtake one other vehicle despite poor visibility. In this case the behaviour was described as very ‘risky’ as indicated by a separate measure and the variable within the model with the greatest contribution was perceived behavioural control (β = .32, p < .001).

Direct and indirect measures of intention

Behavioural beliefs

In Study I it was found that the beliefs about violations were related to its context. To speed in an urban area was perceived as more dangerous than on a major road. To overtake with a restricted view was by most of the participants regarded as something which could result in an accident.

Study III showed that the beliefs achieving the strongest link to the intention to speed in an urban area can be described as positive; it would make the driving more comfortable, better adjusted to the speed of other drivers and take them to the destination quicker. This is very much in agreement with the study by Parker et al. (1992b) and Wallén Warner and Åberg (2008). In the study by Parker et al. (1992b) drivers who speeded in an urban area believed that it would take them to the destination quicker, be more comfortable and more in tune with the surrounding traffic. In the study by Wallén Warner and Åberg (2008) positive beliefs related to intention included getting to the destination quicker and making driving more fun. In order to provide a better understanding of the relationship between behavioural beliefs and intention, further analysis of these beliefs was performed. Based on the results from a factor analysis two different factors emerged. The first one included all the positive attitudes and the second all the negative ones, except for being fined. These factors were then entered into a regression analysis with intention as the independent variable. The results demonstrated that the two beliefs accounted for 30% of the variance but also that positive beliefs accounted for more of the effect than negative beliefs (β = .41, p < .001; β = -.23, p < .001, respectively).

Study IV then followed this up examining speeding in a rural area. Consistent with Study III a factor analysis was able to distinguish two factors, one positive and the other negative. Subsequently the positive factor was shown to make the greatest contribution to intention, 36% (β = .50, p < .001) as opposed to negative beliefs, 4% (β = -.23, p < .001). Furthermore a multiple regression analysis was able to demonstrate that the two most important beliefs predicting intention to speed were “make the driving more pleasant” (32.5%) and “adjust my driving to other drivers” (4.8%). This would then be in agreement with research on speeding pointing out those drivers who speeded believed that they could do so but still drive safely (Brown & Cotton, 2003) and that it is related to beliefs which minimize the perception of risk (Brown & Cotton, 2003; Christensen et al., 1999).

With regard to dangerous overtaking it was very few who would violate and it is possible that this group of intenders might be fairly extreme. However, as opposed to speeding in an urban area, it was the negative beliefs which to a greater extent differentiated the two groups rather than the positive ones. Intenders were less likely to believe that it would make the driving unpleasant and that they would be involved in an accident with another vehicle. Subsequently the effect of negative attitudes was also confirmed using a factor analysis and a multiple regression analysis. The result from the factor analysis presented three different factors, two negative and one positive. Factor 1 included beliefs about accidents and that it would be unpleasant to overtake, factor 2, which was the positive one, included beliefs about excitement and emotional outlets and factor 3, which was the second negative one, included items about being fined, annoying other drivers that it would not make the journey any quicker. The same three factors were then entered into a regression analysis with intention as the independent variable. The results demonstrated that two of the three factors, one positive and
one negative (factor 1) accounted for 19% of the variance also that negative beliefs accounted for more of the effect than positive beliefs ($\beta =-.30, p <.001; \beta =.19, p <.001$, respectively). It could therefore be concluded that speeding in an urban and rural area was motivated by factors considered as emotionally rewarding whereas dangerous overtaking is more controlled by a denial of negative consequences.

Attitudinal ambivalence

In Study IV two groups of intenders were assessed separately, one high in ambivalence and one low. The method used was similar to the one proposed by Kaplan (1972) since positive and negative beliefs were assessed separately. A person high in ambivalence evaluated speeding as both positive and negative whereas a person low in ambivalence evaluated it as positive, disbelieving the negative ones. In the total sample 9% of the participants were defined as high in ambivalence and 17% as low in ambivalence. This would then suggest that attitudes towards speeding are bi-dimensional rather than uni-dimensional, something which has also been demonstrated by a number of studies (Berndsen, & van der Pligt, 2004; Conner, et al., 2003; Costarelli, & Colloca, 2004; Craig et al., 2005; Dahl et al., 2005; Lipkus et al., 2005; Newby-Clark et al., 2002). Ajzen (2002a) recognizes that people hold beliefs and that is also the reason for occasional low internal consistency. Nevertheless, he would not, as opposed to the above authors, advocate a bi-dimensional approach. Study IV was not only able to identify people high and low in ambivalence, it was also able to relate it to their own intentions. Further analysis showed that 71% of the people defined as high in ambivalence intended to speed and amongst the people low in ambivalence this figure was 93%. This would then mean that a group of intenders are not so convinced that the outcome will be of benefit to them. Additional tests were performed revealing that people high in ambivalence were more likely to speed if they were irritated or in a hurry. This group also felt less support from others, believed that a smaller proportion of them would behave in the same manner as themselves and perceived the behaviour to be less easy to perform than drivers low in ambivalence. It was therefore concluded that amongst the speeders exists a group (albeit small) which does not fully believe that the behaviour will result in positive outcomes.

Normative beliefs

Normative beliefs differed according to context. Drivers believed that speeding in a rural area was fairly acceptable, whereas speeding in an urban area was slightly less acceptable and dangerous overtaking quite unacceptable. In Study I the view of significant others’ norms was not always consistent and it would appear that some people had a greater impact than others. It was therefore concluded that the praxis of aggregating normative beliefs into one variable might be a mistake. However, this was not confirmed by Study II since the internal consistency was .85 and .87 indicating that the reliability of these constructs was good. However, that does not rule out that the interpretation of the results would benefit from separate tests. This was then confirmed by the results from Study III were the respondents salient beliefs were examined in some more detail. The results showed that both men and women believed that violations were more accepted by men of the same age as themselves as opposed to other women. This is not so surprising considering that driving violations usually are described as a male behaviour. However, it was interesting to note a significant difference between men and women in their perception of other men. The women in this study believed that men of the same age as themselves would be more accepting of the behaviour. The study also showed that somebody of the same age and gender influenced their intention most followed by same age and opposite gender. However, this did not apply when men and women were assessed separately. Females who intended to violate received greater support from male drivers rather than female drivers.

Perceived behavioural control

Perceived behavioural control can be measured both directly and indirectly although the direct approach is more commonly found (Ajzen, 2002b). In Study IV perceived behavioural control was
measured by three items, one direct and two indirect. The results showed that both the direct measure, dealing with how easy it would be to violate, and the indirect one, dealing with being irritated and in a hurry, equally contributed to the intention to speed in a rural area. It has been argued that the first, also described as self-efficacy, closely resemble attitudes (Leach et al., 2001; Kraft et al., 2005) although this was not confirmed by Study IV. In fact, perceived behavioural control presented a stronger relationship to intention ($r = .44$) and subjective norm ($r = .40$) than attitude ($r = .33$). The theory suggests that the indirect measures should correlate well with the more global one although this could not be confirmed by Study IV. Instead the relationship was rather weak ($r = .26$) which would be in agreement with Ajzen who argued that the assumption has not always been supported (Ajzen, 1991; 2002b).

Perceived behavioural control was added to the theory of planned behaviour model in order to deal with behaviour of low volitional control. It was therefore suggested that in situations with high actual control the variable is expected to be less significant. Driving violations are distinguished from error and lapses in so far that it describes deliberate actions. It would therefore be difficult to explain why perceived behavioural control in some studies explains the same and in some instance is the most important factor (e.g. Elliot et al., 2003; Parker et al., 1992; Wallén Warner & Åberg, 2008). Either it is a mistake to describe certain behaviours as volitional or more likely the interpretation of perceived behavioural control is different when driving is being discussed.

Thus one of the aims of Study I was to explore this variable through the medium of interview(s). During the interview(s) various external and internal, interfering factors were discussed. The results showed that those participants who were aware of the negative consequences of speeding in an urban area would, if irritated or under pressure, reduce their speed. This could then be contrasted with those who expressed that ‘feelings of stress and irritation’ made them to increase their speed. On the surface it would appear that this reduced their level of control but further discussion revealed that they at the same time did not believe that speeding would harm them. It was therefore suggested that a low level of control might, at times, be used as some form of excuse for committing a traffic violation. This assumption was followed up in Study III, which was quantitative and explored if the degree of control was related to perceived risk, intention to violate and attitudes towards the behaviour. Perceived behavioural control was measured by three items: external pressure to violate despite their own will, hard to avoid violating and easy to violate. The three items were then assessed in combination with intention, behavioural beliefs and perceived risk. The results showed that those who expressed that it was hard for them to avoid speeding in an urban area (low control) also were more likely to speed which would be logical but at the same time they also perceived less risk and believed that speeding would result in positive outcomes. The same applied to those who would argue that others might put pressure on them to speed despite their own will. The same paradoxical reasoning also applied to dangerous overtaking with the exception of a non significant relationship between intention and how hard it was to stay behind the lorry.

It could therefore be concluded that the results from study III confirmed the qualitative results presented in Study I. Thus, in the context of driving, an expressed low level of control might be interpreted using the model presented by Schwartz and Howard (1984) as a form of denial: either a denial of responsibility by blaming the situation (others would make them to deviate against their own will) and/or denial of ability (unable to stay behind the lorry or avoiding to speed). It would therefore be different from other forms of behaviour such as giving up smoking or losing weight. One important implication of these results refers to its interpretation. When describing driving violations a low level of perceived control would not necessarily indicate that the control over the behaviour itself is low.

One of the objectives of Study II and IV was to test the effect of additional variables, namely descriptive norms and past behaviour, after controlling for the variables already included in the TPB.
Additional variables

Descriptive norms

Fishbein (1967) argued that both injunctive (subjective) and descriptive norms could be described as normative pressure. In the most recent description of both the TRA and the TPB it is suggested that a direct measure of subjective norm should also include a measure of descriptive norm (Ajzen, 2006; Ajzen & Fishbein, 2005). However, they still suggest that it is part of subjective norm and not distinct, something which has been challenged by a number of studies (e.g. Cialdini et al., 1990; Conner & McMillan, 1999; Deutsch & Gerard, 1955; Grube et al., 1986). The studies described in this thesis therefore decided to treat descriptive norm as a separate construct from subjective norm. The results from Study II and IV supported this demonstrating that descriptive norm made a significant contribution increasing the variance over and above the variables already in the model. In Study II it explained 4% of speeding in an urban area and 10% of dangerous overtaking and in Study IV less than one percent (0.3%). It could therefore be concluded that the effect was greatest with regard to dangerous overtaking and weakest with regard to speeding in a rural area.

One explanation for the poor effect of descriptive norm in Study IV could be that the relationship between descriptive norm and subjective norm was rather high ($r = .70$) which could indicate that subjective norm, which were entered first, also accounted for descriptive norm. Further tests were carried out assessing the possibility that the variables measured the same thing. The results showed that multicollinearity was not a problem. Furthermore it was found that 53% of the sample did not respond in the same way to both questions. This might support the findings from Study I, which showed that participants’ interpretation of the question measuring normative beliefs differed and that in some instances it was about their perception of others. Nevertheless, as Cialdini, et al. (1990) pointed out, what is seen as acceptable is many times also typical but that does not necessarily mean that they are not distinct, something which both Study II and IV were able to demonstrate. In the context of the TPB the results support studies showing that subjective norms are too narrow and that it would benefit from the introduction of descriptive norms as a separate variable.

Another explanation, which could be seen as complementary, is that speeding on a rural road is not regarded as risky, a factor believed to increase the variance of descriptive norms (Rivis and Sheeran, 2003). This was also confirmed by Study II using a separate construct measuring risk. The results demonstrated that its contribution to the prediction of a behaviour regarded as very risky, namely dangerous overtaking, was greater than another perceived as less dangerous (speeding in an urban area).

Past behaviour

According to the TPB past behaviour relates to intentions for future use but the effect is indirect and is mediated by the variables already included. Despite this, a large number of studies have demonstrated that the model would benefit from the introduction of past behaviour (e.g. Bentler & Speckart, 1979; Hom & Hulin 1981; Mullen et al., 1987; Charng et al., 1988; Rutter & Bunce 1989).

In Study II past behaviour was entered into the equation after all the other components. This was done to prevent it from eliminating the effect of the others. Even if this procedure was adopted it still added a significant amount to the prediction. It predicted 17% of speeding in an urban area and dangerous overtaking.

In addition to the above, a fairly strong relationship was found between past behaviour and the variables within the TPB. This would then be contrary to Ronis et al. (1989) who suggested that habitual behaviour was guided by environmental cues rather than the more cognitively driven components of the model. Although this refers to the relationship between past and future behaviour, similar argument has been put forward with regard to intention (see Norman & Conner, 2006). On the other hand it would be consistent with Ajzen (2002c) in his discussion of past behaviour and future behaviour. He stated that not only novel behaviours but also routine behaviours are guided by variables within the model.
If we consider the results from Study II demonstrating the importance of variables within the model, it could be concluded that past behaviour was not in conflict with their current beliefs which would have been the case if the same relationship had not been found. This is perhaps not so surprising and could be explained using the transtheoretical model presented by Prochaska and DiClemente (1983). According to this model a person would go through different stages: pre-contemplation, contemplation, preparation, action, maintenance and termination. People in the first stage have no intention of changing their behaviour and would resist change. They would therefore be fairly comfortable with behaving in a way consistent with their beliefs. However, a person at the second stage would have started to become aware of the problem and would therefore hold beliefs which are in conflict with each other. It could therefore be argued that most of the drivers who intended to commit the violations in Study II held beliefs which were in agreement with their past behaviours and therefore not really aware of the problem as such. So even as Fishbein and Ajzen (1975) pointed out, it is not very illuminating to discover that people repeat their actions it is nevertheless important to know when trying to formulate programmes for change.

Age, sex and annual mileage
The theory recognizes the importance of background factors such as: age and sex. However, they are not included in the model and if they affect behaviour it would be via beliefs. Background factors are therefore seen as a complement in so far as they could deepen our understanding of what determine behaviour, but should not be part of, the reasoned action approach (Ajzen & Fishbein, 2005). This assumption was tested in Study II and IV by including age and sex but also annual mileage. In Study II the results showed that age and annual mileage added a further 3% to the prediction of speeding in an urban area. This would indicate that young people were more likely to violate, something which is in agreement with a large number of other studies (e.g. Deery, 1999; Parker et al., 1992a; Yagil, 1998) and that a higher mileage was related to violations. The latter would confirm the evidence presented by Lawton, Parker, Stradling and Manstead (1997) where violations were related to a higher mileage. In Study IV the contribution of these variables was slightly less (1.5%) which could be related to the fact that the behaviour was fairly common and accepted by the majority of drivers but also as suggested by Ajzen and Fishbein (2005) that they affected intention via their beliefs already.

Although the effect of age and sex were marginal it has some added interest since a large number of studies have found that it is men rather than women who violate and young rather than old. Since Study IV included a large number of people it was able to investigate this effect in some more detail. The results presented a significant difference between men and women, with the first being more likely to violate ($p < .001$). However, if the effect of age and annual mileage were considered the differences became non significant. The only exception was in the youngest age group who were driving more than 15,000 km annually. In this group the men were more likely to speed than the women.

Study IV was also able to demonstrate that when men and women have decided to disobey traffic laws the motive behind their action was very similar. Firstly the model was able to predict both groups intention to violate to more or less the same degree and the largest contribution was subjective norm followed by attitude and perceived behavioural control regardless of gender. Additional multiple regression analyses were carried out entering behavioural beliefs and outcome evaluations separately. The results showed that the belief which made the greatest contribution for both men and women was that speeding made driving more pleasant. This was then followed by a belief that high speed was better adjusted to the speed of other drivers. The results assessing the effect of outcome evaluations also showed that men and women’s evaluations were rather similar. Both men and women argued that the most important factor influencing their intention to speed was that it enabled them to get to their destination quicker and for them neither fines nor the chances of getting involved in a road crash were regarded as very serious.

It could therefore be concluded that driving experience makes men and women more similar in their intentions but that this is also a question of age. Hence, the differences between men and women
presented in some studies might be due to women’s lack of experience but also that they fail to consider the effect of age.

**Implication for intervention**

Before carrying out a detailed design of the means of interventions it is important to gather as much information as possible about the target group’s motive behind the behaviour. In this thesis an extended version of the TPB was used, a theory which not only predicts behaviour but also tries to understand the same. Thus the thesis presents some interesting results which could help to develop more effective strategies aimed at changing driver behaviour.

**Attitudes**

The results demonstrated a strong link between intention and behavioural beliefs, in particular positive ones which would suggest that these beliefs need to be targeted for successful change. In this context we have to remember that attitudes are functional and are held because they meet certain individualistic needs. Thus the message needs to convince the individual that the new behaviour is better than the old one. This can be seen as a great challenge especially if the driver mainly has experienced positive consequences from their chosen behaviour. However, Petty and Cacioppo (1986) stated that changes in attitudes are more likely to occur if the message questions pre-conceived beliefs (cited in Shrigley & Koballa, 1992).

This study was also able to present a target group not generally acknowledged, that is high in attitudinal ambivalence. Broemer (2002) demonstrated that people who held ambivalent feelings towards an object were more persuaded by negatively framed messages. Studies have also found that the group described as ambivalent have a stronger desire to change their behaviour (Lipkus et al., 2005). It could therefore be argued that they would be more open to information which could resolve their feelings of inconsistency. For instance, the results showed that they expressed a greater likelihood of speeding if they felt irritated or in a hurry. For them a message addressing these problems might have some success. Furthermore, it might be worth highlighting that this group exists, not all speeders appear to endorse the behaviour. All of the above could introduce another dimension to the discussion about traffic safety.

**Subjective norm**

The importance of subjective norm emphasizes the need for group support. Group support has been found to be an important factor in maintaining and changing attitudes and can be seen as a tool through which one's own attitudes are realised. An old behaviour which is rejected by in-group members is easier to resist than if it is accepted. Yates and Dowrick (1991), who introduced a preventive program, focused on peers of high-risk teenage drivers and social modelling. The program was evaluated over a three year period and the conclusion was that subjects were less likely to drive while intoxicated and more willing to stop a friend from drinking and driving after the implementation than before. In general the results from Study III indicate that people of the same age and gender as themselves have the greatest effect on their intention. However, the same did not apply to women who intend to violate since they received greater support from other men rather than other women. This would then suggest that in addition to tailor the message to a specific target group the message-giver needs to be carefully considered.

**Descriptive norm**

The contribution of descriptive norms was established which have some important implications for interventions. For instance, a message highlighting that a certain offence is very common and therefore in need of heavier sanctions could be counterproductive if the influence is descriptive.
Perhaps the focus has been too much on negative consequences such as road crashes and violations. This has often been for all the best reasons, that is, highlighting the problem and trying to reduce the number of accidents. The perhaps less obvious effect could be that in people’s minds violations have become more accessible than law-abiding behaviour, resulting in an ‘overestimation’. Indeed, as Manstead et al. (1992) showed, the perception of others is not always accurate and many times violations are indeed overestimated, especially amongst the people who themselves violate. This strategy of making non-violations more normal would be especially important when trying to influence young drivers who in the main are very suggestible. Studies have shown that young people believe that violations impress their friends (Rothe, 1992; cited in Hanns, 1992) and that for young men risky driving has become part of establishing their gender identity. In addition to this, Taubman-Ben-Ari, Florian and Mikulincer (1999) found that young men use the car to increase their self-confidence. Thus violations have become very attractive and sought after. This is a trend which would need to be broken and its symbolic interpretations need to be de-constructed.

Past behaviour
Study II showed that drivers’ past behaviours and beliefs resembled each other. This would then indicate that drivers who violate would regard this as desirable and acceptable. Hence in order to change their beliefs needs to be challenged creating a form of dissonance between their behaviour and beliefs. However, the relationship was not perfect which would imply that for some individuals their behaviour and beliefs were at variance. This group would then be a perfect target for an intervention program making them aware of the dissonance and suggesting ways to re-establish some form of harmony.

Future studies
In Study I, the responses to subjective norm varied a great deal and in Study II it failed to predict the intention to overtake with poor visibility. Thus, in order to understand subjective norm and its effect on intention further research is needed. Initially it would be interesting to elaborate on the different effects, that is, ‘false consensuses’ and ‘false uniqueness’.

In Study II and IV, descriptive norms were only measured by one direct question and it would be useful if future studies differentiated between different groups. It is quite possible that young drivers would be more affected by their perception of peers – something which could not be examined in this thesis.

Conclusion
The aim of the thesis was through the use of a well-established theory, namely the theory of planned behaviour, predict and explain drivers’ intention to commit different driving violations. The studies included in this thesis were through the use of the theory able to successfully predict three different violations: speeding in an urban area, speeding in a rural area and dangerous overtaking. Hence, results presented a significant difference between intenders’ and non-intenders’ beliefs about these behaviours although it would be a mistake to treat driving violations as a single behaviour. For instance, speeding was predicted by factors considered as emotionally rewarding, whereas dangerous overtaking was more controlled by a denial of negative consequences. Furthermore, speeding in an urban area was considered to be less dangerous than speeding in a rural area. The thesis was also able to demonstrate that in some instances drivers’ attitudes can best be described as ambivalent which in turn emphasize the bi-dimensional nature of attitudes. Initial assessment of normative beliefs presented results indicating that a person of the same age and sex as themselves would have the greatest effect on their own intention. However, further assessments controlling for sex presented slightly different results in that women who intend to violate received greatest consensus from men of
the same age as themselves rather than women. This would then suggest that the praxis of aggregating normative beliefs into one variable might be a mistake, at least when the aim is to understand the behaviour and not merely predict it. The most important finding dealing with perceived behavioural control was that an expressed low level of control to disobey rules of traffic should not be interpreted as non-volitional as suggested by the theory itself. Instead it should be interpreted as a form of denial of responsibility and/or ability, which could serve as a form justification of the behaviour rather than actual lack of control over the behaviour.

By extending the theory to also include descriptive norms and past behaviour, the variance when explained could be further increased over and above the variables already in the model. This in turn has both practical and theoretical implications. On a theoretical level it is recommended that descriptive norm is treated as a separate construct and that past behaviour is added to the model. On a practical level it would be important to portray driving violations as less normal.

Based on the results from the aforementioned studies it could be concluded that driving violations should be regarded as a reasoned behaviour even if they might be biased and at times inaccurate.

Finally, future progress of road safety research would benefit greatly from the use of the TPB. It would provide clarity and focus to any research carried out and enable aggregation of data, thus allowing more generalized assumptions to be made. On the more practical level it is recommended that a road safety program is based on a theoretical model and that it clearly presents and targets personal beliefs, norms and perception of control. In conclusion, it is this author’s firm belief that by changing psychosocial constructs it is possible to also change behaviour, or as Kelly (1966) stated;

"/... even the most obvious occurrences in daily life might be utterly transformed if we were inventive enough to construe them differently”
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A doctoral dissertation from the Faculty of Social Sciences, Uppsala University, is usually a summary of a number of papers. A few copies of the complete dissertation are kept at major Swedish research libraries, while the summary alone is distributed internationally through the series Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences. (Prior to January, 2005, the series was published under the title “Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences”.)