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Personality, risky driving and accident involvement among Norwegian drivers

Hilde Iversen*, Torbjörn Rundmo

Department of Psychology, Norwegian University of Science and Technology, 7491 Trondheim, Norway

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Abstract

Despite the large body of studies, the role of personality in risk research still remains debatable and unclear. The objective of this study was to identify determinants of road user behaviour and accident involvement with the aim of developing effective accident countermeasures. Examining relationships between personality, risky driving and involvement in accidents can open up the possibility of early identification of those more likely to be involved in accidents. The aim is not to influence personality as such, but to develop measures constructed for specific groups. The results are based on a self-completion questionnaire survey carried out among a sample of Norwegian drivers in year 2000 and 2001 ($n = 2605$). The Norwegian Directorate of Public Roads financed the study. The questionnaire included measures of risky driving, accident involvement, normlessness, sensation-seeking, locus of control and driver anger. Results showed that those who scored high on sensation seeking, normlessness and driver anger reported more frequent risky driving compared to those who scored low on these variables. They were more often involved in both speeding and ignorance of traffic rules. Respondents involved in risk taking-behaviour experienced near-accidents and crashes leading to both injuries and material damage more often than other drivers. © 2002 Published by Elsevier Science Ltd.

Keywords: Sensation-seeking; Locus of control; Driver anger; Normlessness; Risky driving; Accident involvement

1. Introduction

Traditional considerations of traffic safety focus on the physical environment, the vehicle and the road user. Improvements in road environment and vehicles have achieved major safety gains. However, less progress has been made in understanding the behaviour of the road user (Rothengatter, 1997). In recent years psychology has become more involved in the study of risk behaviour and traffic safety, focusing on how emotional and personality factors influence driving behaviour and accident involvement. At present there is a renewed interest in analysing the role

* Corresponding author. Tel.: +47-7355-1362; fax: +47-7359-1920.
E-mail address: hilde.iversen@svt.ntnu.no (H. Iversen).

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of personality in accident causation research. Elements of personality can not only compel individuals to commit particular acts but can also mediate effects of social influences designed to constrain these behaviours (Burgess, 2000). A major challenge is to find measures that influence groups of high-risk recipients more efficiently. Amongst the personality factors which have been found to be significantly associated with risky driving are locus of control, driver anger, sensation seeking and normlessness (Burns & Wilde, 1995; Deffenbacher, Oetting, & Lynch, 1994; Montag & Comrey, 1987).

The first aim of the present paper is to examine the relationship between locus of control, driver anger, sensation seeking, and normlessness on the one hand and risky driving on the other. The second aim will be to analyse the relationship between these four factors, risky driving and accident involvement. Due to the fact that driver anger may be an important predictor of risky driving it is also of interest to consider determinants of driver anger. Therefore, the study aims to investigate the relationship between locus of control and driver anger.

1.1. Risk behaviour and traffic accidents

The importance of behaviour in the prevention of vehicular accidents has been documented extensively (e.g. Elander, West, & French, 1993; Parker, Manstead, & Stradling, 1995) and has led to many attempts to encourage a variety of safe driving behaviours (e.g. Juhnke, Sullivan, & Harman, 1995; Martinez, Levine, Martin, & Altman, 1996). The emphasis has shifted from performance-related capabilities to willingness to take risk.

Evidence indicates risk-taking as a major factor underlying high collision risk (Jonah, 1986). Several self-report measures of driver behaviour have been developed. One of the most prominent is the Driver Behaviour Questionnaire (Parker, Reason, Manstead, & Stradling, 1995; Reason, Manstead, Stradling, Baxter, & Campbell, 1990) which is concerned with assessing the relative frequencies with which drivers engage in different types of aberrant driving behaviour. Self-reported violations, defined as the deliberate infringement of some regulated or socially accepted code of behaviour, have been shown to predict accident rates (Parker, Reason et al., 1995; West, French, Kemp, & Elander, 1993). Manstead, Parker, Stradling, Reason, & Baxter (1992) found that speeding was perceived as the most prevalent of eight driving violations. Research reports associations between major deviations (both slower and faster) from the average traffic speed and an increase in crash risk (Parker, Manstead, Stradling, Reason, & Baxter, 1992). Speeding is not only a common violation; it is also regarded with a degree of tolerance by many. It is the propensity to violate (deliberate infringements), rather than the tendency to make errors of intention or action while driving, which is associated with involvement (Parker, Reason et al., 1995; Parker, Stradling, & Manstead, 1996). However, high scores on the error and lapse factor were found to be predictive of involvement in active accidents among elderly people, while passive accidents was associated with high scores on the lapse factor (Parker, McDonald, Rabbitt, & Sutcliffe, 2000). Considering these results, it is expected that drivers who have a high score on self-reported risky driving will be more frequently involved in traffic accidents than other respondents.

1.2. Personality variables, risky driving and accident involvement

Research has emphasised personality factors as contributors to risky driving and accident causation. Despite the large body of studies, findings have been either conflicting or of little importance

(Ranney, 1994). However, this does not imply a lack of capabilities of these measures to predict accidents. Conflicting results can arise from theoretical or methodological shortcomings (Lajunen & Summala, 1997). Mechanisms behind different types of accidents can differ, and these should be treated separately in analysis (Summala, 1996). Personality characteristics are often measured with general inventories, which do not include measures related to the specific targeted behaviour. Attempts to relate general constructs of personality to outside criteria have been more successful when the measures of these constructs were tailored more specifically to the targeted behaviour (Montag & Comrey, 1987). However, it is important to have in mind the definition of personality as a general, broad set of behaviours.

Many studies relate personality factors to the number of accidents. Accidents are rare events, and it is difficult to obtain valid information about occurrence and preceding behaviour. The shortcomings of accident data are well known, and an alternative criterion measure could be to include the behavioural level, not only outcomes. The next section investigates personality characteristics specially targeted to risky behaviours and accident involvement.

Rotter's (1966) Internality–Externality scale (I–E) has been related to risky driving. This scale measures the degree an individual feels in control of behavioural outcomes. The rationale for the relationship between locus of control and safe driving is based on the reasoning that externality is related to lack of caution and a failure to take precautionary steps to avoid the occurrence of unfavourable outcomes (Hoyt, 1973; Phares, 1978; Williams, 1972). Internals attribute more responsibility for road accidents to internal, controllable causes, and report less anxiety while travelling via automobile. They report wearing seat-belts more often (Hoyt, 1973; MacDonald, 1970), and experience car travel as more interesting and involving (Hoyt, 1973). Empirical findings have been mixed (Arthur & Doverspike, 1992; Knapper & Cropley, 1981). Guastello and Guastello (1986) found no direct relation between the Rotter (1966) locus of control scale and accidents. However, this lack of relation appeared to be rooted in the transformation of the Rotter concept into specific beliefs about accidents and driving behaviours. Montag Driving Internality and Driving Externality (MDIE) scales are an attempt to relate internality and externality to locus of control measures specifically tailored to the target behaviour of driving (Montag & Comrey, 1987), rather than using the more general I–E scale itself. Results of their study showed Driving Internality (DI) to be negatively related and Driving Externality (DE) to be positively related to involvement in fatal accidents (Montag & Comrey, 1987). Results indicate that high DE respondents not only tend to believe in external causation, but also exhibit low conformity, low emotional stability, lower energy level, lack of compulsion, and egocentrism (Montag, 1992). Respondents scoring high on DI tend to be emotionally stable, conforming, compulsive, active, and empathic. This indicates that generalised internality rather than externality is related to cautious behaviour. However, half of the sample in the study of Montag and Comrey (1987) was drivers who had been involved in a fatal road accident as a driver. It can be argued that these respondents would alter responses on the DI and DE scales to make themselves appear less responsible for the accident. Arthur and Doverspike (1992) concluded that MDIE was generally not associated with driving accident involvement in both a predictive and postdictive design.

Zuckerman's (1979) Sensation Seeking Scale (SSS) is a personality trait of thrill seeking behaviour. It reflects a need for varied, complex and novel sensations and experiences and a willingness to take risks for these sensations and arousal. Gender differences have been found in the

trait; males recording higher scores than females (Zuckerman, 1984). Drunk driving behaviour among adolescents has been related to sensation seeking as well as egocentrism (Arnett, 1989). This measure has been found to correlate with many types of risk taking behaviour, like driving speed and self-reported traffic violations (Jonah & Clement, 1984). Burns and Wilde (1995) suggest that sensation seeking personality can be used to predict an individual's tendency to be a repeat offender, because of the association with observed fast and careless driving and convictions for both speeding and traffic violations. However, none of these studies found a positive correlation between sensation seeking and records of previous collision involvement. This implies that sensation seekers may drive fast but they do it safely (Burns & Wilde, 1995). Arnett (1994) claims that certain limitations of concept and form are associated with the use of SSS. He states that the "forced choice" format may be perplexing and frustrating, some activities are age-related, items reflect the 1960s and 1970s period, and finally, the items are often precisely the types of behaviour studied. Jonah (1997) reviewed 38 studies, which examined the relationship between sensation seeking and risky driving. Reported correlations ranged from the 0.30 to 0.40 range, and only four studies failed to find a positive relationship. He concluded that it is clear that SS is related to risky driving, but the strength and biological basis of this link require further research (Jonah, 1997).

Another personality variable examined in this study is normlessness. Human behaviour is largely constrained by rules that govern particular situations and social interaction. Constantly we are obliged to behave in certain ways to avoid particular reactions. Some of these rules are laws developed by authorities; others are social, informal rules implicit within the specific situation. However, people don't always adhere to rules, and this reduces safety margins that rules provide and often increases the likelihood of accidents. In psychological research the concept of normlessness is often a measure of subjective variety, i.e. perceived normlessness in an individual-centred viewpoint. The idea is that certain people at certain times may not respect presumed norms, trust others to respect them, perceive consensus with respect to appropriate behaviour or are prepared to act in deviant ways to achieve given goals. Kohn and Schooler (1983) operationalized normlessness on a continuum ranging from the individual's belief that it is "acceptable to do whatever (one) can get away with" to "holding responsible moral standards".

Driver anger has been related to traffic violations and accidents (Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000). Trait anger reflects a broad predisposition to experience anger more frequently and intensely across situations (Spielberger, 1988). Deffenbacher et al. (1994) suggested a general dimension of driving anger as well as anger related to specific driving-related situations. Driver anger was defined as more frequent and intense anger while operating a motor vehicle. Anger while driving may interfere with attention, perception, information processing and motor performance and may increase the likelihood of an accident directly or indirectly through the increased probability of other risk behaviours. Deffenbacher et al. (1994) developed a Driver Anger Scale (DAS), which can help to explore anger as a person-related variable in accidents or driving risks and also assess how anger relates to different driving behaviours. Ellison-Potter, Bell, and Deffenbacher (2001) examined the effects of trait driving anger, aggressive stimuli and anonymity on aggressive driving behaviour. Participants drove more aggressively when they were anonymous and exposed to aggressive stimuli, and males drove more aggressively than females. Results suggested that situational factors affecting other forms of aggression are also important in aggressive driving (Ellison-Potter et al., 2001). It is important to note that this study focuses on driver anger (emotional state), not behaviour.

2. Method

2.1. Sample

The present study was based on a self-completion questionnaire survey carried out in 2000–2001 among a sample of Norwegian drivers randomly selected from the driver's licence register. All the respondents received the questionnaire by mail, and replied anonymously. The response rate was 48%, and the final sample comprised a total of 2605 respondents, 48% men and 52% women. Mean age of the respondents was 45 years (S.D. = 15.67). Forty-four per cent had a college/university education, 47% work related or senior high school and the remaining junior high school. Subjects had held a licence for on average 23 years (S.D. = 14.50). They had experienced on average 1.16 (S.D. = 0.42) crashes leading to injuries as a driver, and 1.15 crashes leading to injuries as a passenger (S.D. = 0.41). Respondents had been involved in an average of 1.96 (S.D. = 0.77) crashes with material damage as a driver, and 1.53 (S.D. = 0.70) crashes with material damage as a passenger. Finally, the sample had on average experienced 2.47 (S.D. = 0.77) near-accidents as a driver, and 2.24 (S.D. = 0.88) near-accidents as a passenger. A control study was conducted to find out if the group of respondents who had replied to the questionnaire differed significantly from those who did not. Fifty subjects were contacted by phone and interviewed using the same questionnaire as in the survey. Results from this study showed that the final sample was representative of the population of Norwegian drivers with regard to age, gender and education.

2.2. Measures

Risk behaviour comprised five items related to breaking the speed limit on particular roads, risky overtaking and ignorance of traffic rules (see Table 1). An alternative would have been to use the whole DBQ, which have turned out to be a reliable and relatively valid instrument for measuring risky driving. However, these five items were selected from a scale validated in a study by Ulleberg and Rundmo (in press). This study showed that the predictive ability of the measure was not reduced when only a certain number of items were selected from the full scale. A five-point evaluation scale was used, ranging from "very often" to "never". Montag DI and DE scales measured locus of control (Montag & Comrey, 1987). The scales included a total of 30 items, which

Table 1
Means and standard deviations for variables measuring risky driving

Variables	Mean	S.D.
1. Break 50 mph speed limits by more than 10 mph	3.78	0.87
2. Break 80–90 mph speed limits by more than 10 mph	2.99	1.02
3. Overtake the car in front even when it keeps appropriate speed	3.83	0.95
4. Ignore traffic rules to proceed faster	3.53	3.41
5. Drive faster to catch up on an appointment	1.03	0.92

Ratings given on a five-point scale from 1, very often to 5, never.

ranged from "fully agree" to "fully disagree". A high score on DI indicates a more internal locus of control; a high score on DE similarly indicates a more external locus of control. Normlessness (i.e. the belief that socially unapproved behaviours are required to achieve certain goals) was operationalized by Kohn and Schooler's (1983) Normlessness scale. The scale included four items. After thorough review of relevant literature new items measuring sensation seeking were developed for this study in particular. These items were selected to avoid the questionnaire becoming too extensive, and were related to e.g. fascination regarding situations with uncertain outcomes, yearning for excitement, enjoying gambling and bets, etc. Five-point Likert scales ranging from "fully agree" to "fully disagree" measured both normlessness and sensation seeking. All items from the 14-item short form of the DAS were used. These items were developed from scores more highly correlated with scores on the long form (Deffenbacher et al., 1994). The five-point evaluation scale applied was in Likert format and ranged from "not at all" to "very much". Traffic accidents were recorded by asking the respondents to report how many life-time traffic accidents they had been involved in as a driver or passenger. Accident involvement referred to both crashes leading to injuries, and crashes with only material damage. The frequency of involvement in near-accidents as a driver and passenger was also included in the measure. The scales ranged from "never" to "many times". Subjects were asked to record their gender, age and years with a full driving licence.

2.3. Statistical analysis

Principal component analysis with iteration and varimax rotation was initially used to analyse the underlying structure of all the measures. Cronbach's alpha coefficient was applied to evaluate the internal consistency of the indices. The Linear Structural Relation (LISREL) analysis program was applied to explore the relationship between locus of control, driver anger, sensation seeking, normlessness, risky driving and involvement in accidents and to test the goodness-of-fit of the models (Jöreskog & Sörbom, 1993). Structural Equation Modelling Made Simple (STREAMS) offers a consistent interface to the LISREL program and was used as a support in this study (Gustafsson & Stahl, 2000).

3. Results

3.1. Dimensions of personality and risky driving

Five principal component analyses using maximum-likelihood method and varimax rotation were applied to determine the dimensions of each of the main elements (locus of control, driver anger, sensation seeking, normlessness and risky driving). The factor analysis of Montag Driving Internality and Driving Externality (MDIE) scales reproduced the same solution as originally (Montag & Comrey, 1987), and the scales were scored and analysed as two separate scales measuring DI (eigenvalue = 3.71) and DE (eigenvalue = 4.64). A one factor solution was selected for sensation seeking (eigenvalue = 3.16), normlessness (eigenvalue = 2.00) and risky driving (eigenvalue = 3.83). The factor analysis of driver anger identified three dimensions named (1) *Discourtesy* (eigenvalue = 2.86), (2)*Police presence and traffic obstructions* (eigenvalue = 2.47) and

(3) *Hostile gestures* (eigenvalue = 1.72). Factor loadings and eigenvalues of the test items comprising each of the five indices are summarised in Table 2. The calculations of sumscores were all based on the factor analysis described in this section.

The Cronbach's alpha coefficient was applied to evaluate the internal consistency of the indices (see Table 3). The reliability of the index measuring DI was satisfactory ($\alpha = 0.808$), this was also the case for DE ($\alpha = 0.754$). The loadings were slightly higher than those reported by Montag and Comrey (1987). The third dimension of driver anger ($\alpha = 0.836$) had a higher internal consistency than the other two dimensions ($\alpha = 0.701$; $\alpha = 0.753$). The reliability of sensation seeking ($\alpha = 0.817$) and risky driving ($\alpha = 0.837$) was also satisfactory. The internal consistency for the items measuring normlessness were also high ($\alpha = 0.824$).

Table 2
Dimensions of locus of control, driver anger, sensation-seeking, normlessness and risky driving

Dimensions	Eigenvalue	Factor loading
Locus of control		
1. Driving Internality	3.71	37
2. Driving Externality	4.64	25
Driver anger		
1. Discourtesy	2.86	41
2. Police presence and traffic obstructions	2.47	46
3. Hostile gestures	1.72	85
Sensation-seeking	3.16	66
Normlessness	2.00	50
Risky driving	3.83	58

Table 3
Reliability of the indices

Indices	Cronbach's α	Number of items
Locus of control		
1. Driving Internality	0.808	15
2. Driving Externality	0.754	15
Driver anger		
1. Discourtesy	0.701	7
2. Police presence and traffic obstructions	0.753	5
3. Hostile gestures	0.836	2
Sensation-seeking	0.817	6
Normlessness	0.824	4
Risky driving	0.837	5

3.2. Associations between personality variables, risky driving and accident involvement

Structural equation modelling was applied to explore relationships between locus of control, sensation seeking, normlessness, driver anger, risky driving and accident involvement. This model distinguished between two conceptually distinct parts: a structural part and a measurement part. The structural part of the model specifies the relationship among the latent variables, and the measurement part specifies the relationship of the latent to the observed variables. The exogenous, latent variables in this model were locus of control, sensation seeking and normlessness. Endogenous, latent variables were driver anger, risky driving and accident involvement. Accident involvement comprised three observed variables: (1) crashes leading to injuries as a driver or passenger, (2) crashes with only material damage as a driver or passenger, (3) and involvement in near-accidents as a driver or passenger. Before being entered into the model all variables were transformed to *z*-scores. Each latent variable was made up from two to six manifest or direct measured variables (see Fig. 1). Covariance between all the variables measuring personality were taken into account. Table 4 shows correlations and descriptive statistics of the personality variables.

The predictors explained 39% of the total variance in risky driving and 20% of the variance in accident involvement (see Fig. 1). Sensation seeking was the strongest predictor for risky driving ($\beta_{32} = 0.31$). However, normlessness ($\beta_{22} = 0.26$) and driver anger ($\beta_{12} = 0.25$) were also associated with risky driving.

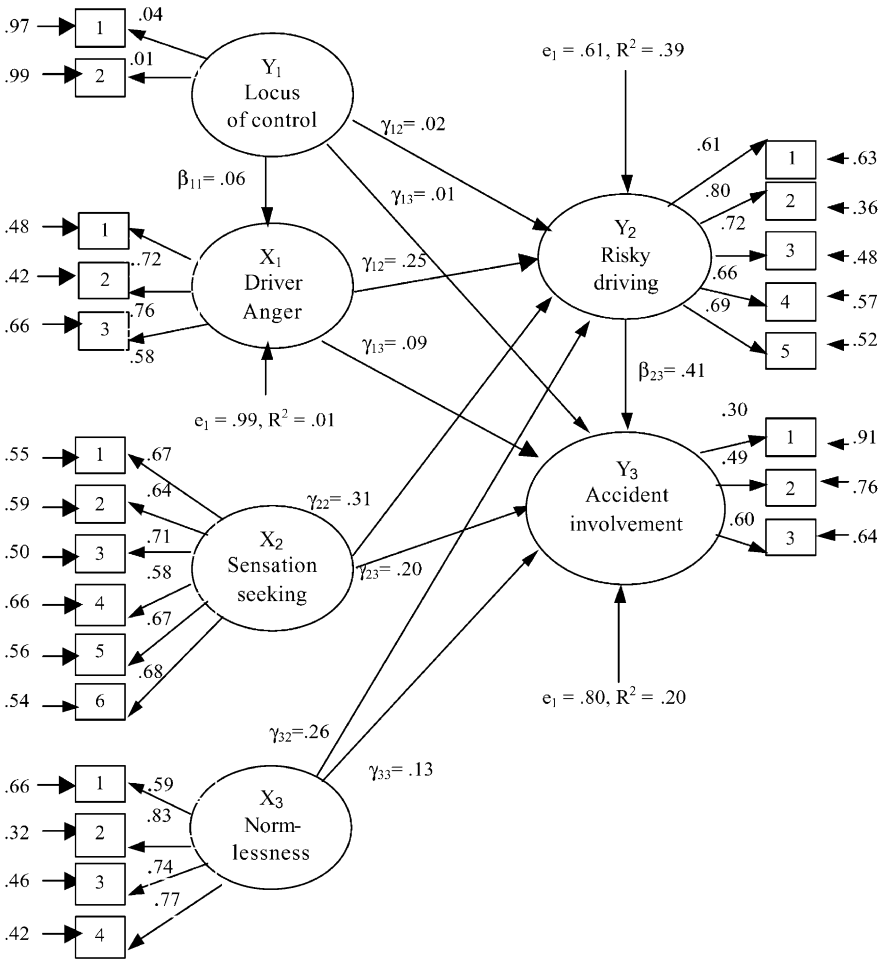
Risky driving exerted a strong and significant direct effect on accident involvement ($\beta_{23} = 0.41$). The personality variable sensation seeking was also associated with accident involvement ($\beta_{23} = 0.20$); this was also the case for normlessness ($\beta_{33} = 0.13$). Driver anger had a moderate influence on accident involvement ($\beta_{13} = 0.09$). Locus of control did not influence either risky driving or involvement in accidents. The effect from locus of control on driver anger was also insignificant. The model fit was satisfactory; RMSEA was 0.050, Goodness of Fit Index (GFI) was 0.95, and Adjusted Goodness of Fit Index (AGFI) was 0.94 ($\chi^2 = 17\,765$; df = 325).

4. Discussion

The results of the present study imply that some of the personality variables could be used to predict an individual's tendency to commit risky driving. The intention is not to suggest interventions aimed at changing personality. However, many interventions have failed to show any

Table 4
Correlations, mean scores and S.D. for the personality measures ($N = 2604$)

	1	2	3	Mean	S.D.
1. Locus of control	–			3.18	0.42
2. Driver anger	0.09			2.60	0.59
3. Sensation seeking	0.14	0.17		3.80	0.49
4. Normlessness	0.12	0.21	0.56	3.91	0.54



χ^2 = 17765, d.f. = 325, Goodness of Fit Index (GFI) = .95, Adjusted GFI = .94, Root Mean Square Residual (RMSEA) = .050

Fig. 1. Associations between Locus of control, Driver anger, Sensation seeking, Normlessness, Risky driving and Accident involvement.

effects. One of the reasons can be that they try to influence too large and too heterogeneous groups of drivers. Identification of the groups representing specific personality traits associated with risky driving and accident involvement more than others can help develop more adjusted traffic safety interventions. The results suggest that different intervention strategies may be needed, adjusted for different subgroups of drivers.

The aim of this study was to examine whether individuals with a high propensity for sensation seeking, externality, driver anger and normlessness take more risks while driving compared to

those who score low on these variables. In addition, associations between personality variables, risky driving and involvement in accidents and near accidents were explored. The results showed that there was a tendency for both sensation seekers and those who score high on normlessness and driver anger to report more speeding and rule violations. According to the analysis carried out in this study, locus of control, as operationalized by the MDIE, was generally not associated with risky driving or involvement in accidents. Externals reported more risk taking, but this tendency was insignificant. The findings showed that sensation seeking, normlessness and driver anger influenced involvement in traffic accidents. However, the most important direct effect on accident involvement was from risky driving.

Some findings have shown that individuals with an external locus of control are less attentive and fail to take precautionary steps to avoid the occurrence of unfavourable outcomes (Hoyt, 1973; Montag & Comrey, 1987; Phares, 1978; Williams, 1972). In accordance with other studies (e.g. Arthur & Doverspike, 1992), this study failed to find associations between locus of control and risky driving, and also failed to find a relationship between locus of control and accident involvement. If a relationship exists, it may not be of sufficient magnitude to be of value.

Associations have been found between sensation seeking and fast and careless driving and convictions, but not with records of collision involvement. Studies have suggested that sensation seekers may drive fast but that they do it safely (Burns & Wilde, 1995; Jonah & Clement, 1984). The results of this study showed that sensation seekers were more involved in risky driving. Effects of the trait on accident involvement were also found. This may suggest that sensation seekers do not only drive faster and commit more rule violations; they may also be more involved in traffic accidents than others.

The respondents who scored high on normlessness were involved in more risky driving, accidents and near-accidents. They accepted rule violation and didn't care whether they broke laws as long as it served a certain goal. In addition, they reported more willingness to act in deviant ways to achieve given goals.

Driving anger turned out to be a significant factor for dysfunctional behavioural reactions on the road. Individuals who became angrier than others while driving engaged in more risky behaviour and were more frequently involved in accidents. They might be more at risk of emotional upset and adverse consequences, and they may also put others at risk. Lajunen and Parker (2001) found that the relationship between driver anger and aggression depends in part on the characteristics of the situation. Effects of verbal aggressiveness on self-reported driver aggression were mediated by driver anger whereas physical aggressiveness was directly related to aggressive behaviour. They concluded that aggressive driver behaviour is a complex phenomenon with a range of psychological causes. A study carried out previously showed that trait driving anger can be reduced by cost-effective groups focusing on self-managed relaxation coping skills (RCS) or a combination of cognitive and relaxation skills (Deffenbacher et al., 2000).

Crash data can be obtain by the drivers' own reports or official records kept by the police, employers, licensing authorities, and so forth. Both are subject to systematic and random error. The accidents recorded in this study were life-time accidents based on the drivers' own reports. Studies have shown that 14% of people involved in injury-provoking road accidents did not remember the event a year later (Loftus, 1993), and approximately 30% of accidents are forgotten each year (Maycock, Lester, & Lockwood, 1996). Near accidents are generally forgotten extremely rapidly, and studies show that 80% of incidents are no longer reported after a delay of

up to 2 weeks (Chapman & Underwood, 2000). Therefore, biases in these self-reports have to be considered when evaluating results from this study. However, other studies have concluded that it is possible to predict drivers' violations and accidents in a longitudinal setting with self-report measures (Hatakka, Keskinen, Katila, & Laapotti, 1997). Hatakka et al. (1997) argued that self-evaluations are a valuable tool in traffic psychological research, enabling the scientist to look at several aspects of driving behaviour at the same time. There will be a follow up of this study 1 year after the first was conducted, mailed to the same group of respondents.

There are general problems related to the use of accidents as a basis for evaluating individual drivers. Accident data lacks stability, statistical power due to their infrequency and reliability of state accident records (Ranney, 1994). Since traffic accidents are infrequent events, near-accidents were considered an appropriate additional measure in this study.

A well-known problem related to the distribution of mail questionnaires is low response rates. This study had a total response rate of 48%, which is not unusual for this method of administration. Consequently, individual interviews with a small sub-sample (50 respondents) of those who did not reply by mail were conducted, and the answers were compared to those of the total sample. The results showed that the sub-sample did not differ significantly from the total sample related to background variables or accident involvement.

The study of rule violations and accident involvement should consider the inherent social context in which the actions take place. Societal norms and pressures influence calculations and shape attitudes towards risk-taking and rule-breaking behaviour within any particular society. Norway is widely known for having strict traffic laws and low rates of automobile accidents and fatalities. The country has always had defined speed limits, and introduced restrictions related to drinking and driving at an early stage (Elvik, Mysen, & Vaa, 1997). This context has implications for the findings in this study. Legal and societal conditions must be discussed when associating personality variables to risk behaviour and accident involvement in different countries.

Situational aspects and environmental factors are also of great interest when relating risk-taking behaviour and personality features. These factors are more transient and temporary and can represent the stimuli to trigger reactions that stem from more temperamental or personality factors.

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