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# An investigation of driver attitudes and behaviour in rural and urban areas in Norway

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ABSTRACT

This study aimed to investigate differences in self-reported driver attitudes and behaviour in rural, peri-urban and urban areas in Norway. Age, gender and education were controlled for. An additional aim was to investigate the relations between demographics, personality variables, driver attitudes and behaviour in the complete sample and across the different geographical areas. To obtain these aims, a questionnaire was distributed by mail to a randomly selected sample from the Norwegian population registry ($N = 6203$). Of the distributed questionnaires the response rate was 30%. Differences in attitudes and self-reported behaviour were significant due to type of geographical area. However, the results showed that gender, age and education caused stronger differences than type of geographical area in attitudes to driving and driver behaviour. SEM-analysis failed to reject the notion that the strength of the structural relations was similar in the geographical areas. This could imply that demographic characteristics, and their compositions in rural, peri-urban and urban areas, are more important for differences in driver behaviour and attitudes than characteristics of the traffic environment.



## 1. Introduction

### 1.1. Background

Accidents in traffic are one of the most frequent causes of death among Norwegians aged 15–24 years (Statistics Norway, 2008a). A world report published by The World Health Organization (Peden et al., 2004), illustrated that 1.2 million people were deceased in traffic each year. The global costs of these injuries have been estimated to about $520 billion (see also Ward, 2007). Thus, traffic accidents have important implications regarding public health and costs posed upon the society.

The risk of fatal traffic accidents varies between rural and urban areas (Jones et al., 2007). There are generally fewer fatal accidents in urbanised compared to rural areas. On the other hand, urban areas have a higher frequency of smaller accidents resulting in vehicle damages and less severe person injuries (Eiksund, 2009). These differences may be attributed to differences in the physical traffic environment across rural and urban areas, such as the road network and number of vehicles. Alternatively, it is possible that other variables, such as differences in the composition of demographic characteristics by these geographical areas, cause differences in the frequency and severity of consequences regarding traffic accidents. A possible explanation for differences in accident severities across rural and urban areas could be that the relatively low density of vehicles in rural areas facilitates more speeding among drivers. It is also likely that lower levels of motorised activity in rural areas could reduce the probabilities of seat-belt use among drivers (Borgialli et al., 2000).

In addition to these factors, studies indicate that variables such as demographic characteristics, personality variables and driver attitudes may influence behaviour in traffic (Iversen and Rundmo, 2002; Ulleberg, 2002; Oltedal and Rundmo, 2006). Such human factors have also been investigated and compared in relation to traffic safety across different countries (Nordfjærn and Rundmo, 2009; Lund and Rundmo, 2009; Sivak et al., 1989). However, few studies have taken these variables into account when examining traffic risk in rural and urban areas within specific countries.

Traffic safety campaigns in Norway have tended to focus upon the entire population, and these campaigns have only been moderately effective (Rundmo and Ulleberg, 2000). Traffic safety campaigns are probably more likely to succeed when they are entailed to local communities. Identification of differences in attitudes and driver behaviour in rural and urban areas may ultimately provide information which could result in more context-specific

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countermeasures entailed to specific target groups. The objective of the present study was therefore to investigate differences in driver attitudes and behaviour across rural, peri-urban and urban areas in Norway.

### 1.2. Differences in attitudes to driving and behaviour in rural and urban areas

A common definition of attitudes is favourable or unfavourable affective, cognitive or behavioural responses related to objects (Eagly and Chaiken, 1993). Two of the more dominant theories concerning the relation between attitudes and behaviour are the theory of reasoned action (Ajzen and Fishbein, 1980) and the theory of planned behaviour (Ajzen, 1985). The theory of reasoned action asserted that the likelihood to engage in specific behaviours is predicted by personal attitudes and norms regarding such behaviour. The theory of planned behaviour extended this perspective, and included perceptions of control as a predictor of behavioural action. Thus, higher levels of favourable attitudes, norms and perceived control regarding a behavioural activity increase the likelihood that the individual will initiate this behaviour. Both theories have been extensively tested in relation to traffic safety (Parker et al., 1992; Åberg, 1993; Iversen, 2004b; Iversen and Rundmo, 2004; Eiksund, 2009). These studies have mainly supported the idea that attitudes to driving are significant predictors of driver behaviour.

In a longitudinal study, Iversen (2004a) found that self-reported driver attitudes and behaviour were significant predictors of accident rates among drivers a year after the initial data collection. Parker et al. (1995) based their results on the driver behaviour questionnaire (DBQ), and found that self-reported driving violations predicted accident involvement. Hence, it is possible that differences in self-reported driver attitudes and driver behaviour are important for traffic accident risks in rural and urban areas. Studies have found significant differences in fatal traffic accidents between rural and urban areas. Jones et al. (2007) found that urban areas with higher lengths of roads and traffic volume had higher causality rates. Further, the strongest predictors of fatality rates were the age structure and number of residents in the geographical areas.

Eiksund (2009) investigated differences in attitudes to traffic safety and driver behaviour in urban and rural areas in Norway. In accordance with previous findings (e.g. Iversen and Rundmo, 2004) the results indicated that attitudes to driving explained a significant amount of variance in driver behaviour. Furthermore, the results showed that differences in driver behaviour were not entirely explained by attitudes or the composition of demographic characteristics in rural and urban areas. Eiksund (2009) concluded that local differences in safety culture in rural and urban areas contributed to differences in driver behaviour. When controlling for demographic variables and driver attitudes, however, type of geographical area explained only 2% of the variance in driver behaviour. The major limitation of this study was the sample which consisted of c Norwegian adolescents stratified from different locations, and that the study did not include a representative sample of the Norwegian public.

Rakauskas et al. (2007) examined attitudes to driving and driver behaviour by applying two different methodological approaches. The results from the first study were based on a survey of traffic safety attitudes and behaviour. In addition, a second study was carried out with a driving simulator trial where respondents were confronted with common high risk situations in urban and rural traffic environments. Survey results showed that drivers in rural areas were significantly less likely than urban counterparts to use seatbelts and were more willing to drive while under the influence of alcohol. The simulator trial indicated that certain physical characteristics in rural traffic environments facilitated more risky driver behaviour. For example, respondents tended to drive more recklessly in the absence of crossroads, pedestrians and sidewalks. This was especially common among younger drivers. This could indicate that certain land use and topographic characteristics in rural areas may facilitate more risk taking in traffic. These environments usually have higher speed limits and less traffic regulations regarding for instance traffic lights and crosswalks compared to urban areas. Related to these findings, Diener and Richardson (2007) found that pickup drivers in urban areas in the United States were significantly more likely to use seatbelts than drivers in rural areas when gender was accounted for. Borgialli et al. (2000) and Clark (2003) came to a similar conclusion.

Traffic risk may include two important components; system risk and risk culture. System risk consists of objective factors which are independent of the drivers, such as vehicles, driving conditions and differences in road structure. Risk culture includes human factors, such as norms, values, attitudes, and perceptions of risk. Such factors are likely to vary among the public and may interact with the system risk (Eiksund, 2009). This implies that driver behaviour could be directly influenced by engineered countermeasures, such as for instance development of physical barriers and road improvements. Furthermore, driver behaviour may also be altered more indirectly by influencing attitudes and norms among the public. It is therefore likely that systematic differences in the physical characteristics of the traffic environment as well as human factors in rural and urban areas could influence behaviour in traffic.

Summarizing, the cited studies point to differences in driver attitudes and behaviour in rural and urban areas when demographic characteristics are taken into account. This could indicate that these differences are influenced by other factors than the composition of demographic characteristics in rural and urban areas. It is possible that topographic differences in the traffic environments or differences in the local risk cultures in rural and urban areas are related to differences in driver behaviour.

### 1.3. Variability in traffic attitudes and behaviour related to demographic characteristics and personality variables

In addition to variation due to geographical areas, a growing number of studies have demonstrated that demographic characteristics could have important relations to driver attitudes and behaviour. Gender has been a consistent predictor of differences in these entities in a number of studies (e.g. Sivak et al., 1989; Dejoy, 1992; Yagil, 1998; Iversen and Rundmo, 2004). These studies have found that males in general, and younger males in particular, have less favourable attitudes to driving and higher behavioural tendencies to take risks in traffic than females. These findings are reflected in accident statistics, which show that younger male causalities are overrepresented in traffic accidents (Statistics Norway, 2008a,b). Several studies have found that attitudes to driving and driver behaviour are more ideal among older individuals compared to younger individuals (Yagil, 1998; Iversen and Rundmo, 2004). On the contrary, Eiksund (2009) found that older adolescents reported more risk taking behaviour than younger adolescents. As suggested by the author, it is possible that driver experience may moderate the relation between age and reduced risk behaviour.

Education could also be an important variable for driver attitudes and behaviour. Eiksund (2009) found that seat-belt use differed systematically among younger drivers with different levels of educational achievement. Hoseth and Rundmo (2005) demonstrated that individuals with higher levels of educational achievement demanded less transport risk mitigation from authorities than people with lower levels of education. This could reflect that individuals with higher education are more liable to take risks. An alternative explanation suggested by Nordfjærn and Rundmo (2009) is that individuals with higher education tend to live and