Long Time Effects of a Lowered Blood Alcohol Limit in Sweden

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ABSTRACT

The first of July 1990 the legal BAC limit in Sweden was lowered from .05% to .02%. In the present paper results from a cross sectional study where effects of the change of law on drivers decision making, attitudes and self reported behaviour have been investigated in three questionnaire studies in 1987, 1991 and in 1994. The questionnaire was partly developed according to the theory of reasoned action presented by Ajzen and Fishbein.

In 1987, three years before the change of the BAC limit, a questionnaire was sent to 4000 drivers who were asked about different aspects of drunken driving. About one year after the change of the law, in 1991, the questionnaire study was repeated on a new sample of 2000 drivers. After the change almost all drivers knew about the new limit and were in favour of the change. However, nothing in the answers indicated a change of driver behaviour and the attitudes after the change had become more permissive towards driving with a BAC over the limit. In the present study (involving 2000 drivers) the problem is to investigate if the immediate effects of 1991 remain the same after another three years or if the attitudes have changed back again and if fewer drivers report drunken driving over the .02% BAC limit than before. The response rate in all three studies was between 65 and 70%.

INTRODUCTION

To drink alcohol and to drive a car are both behaviours that are familiar and more or less accepted behaviours to citizens in countries all over the world. However, a combination of the two activities is not accepted; one reason is the highly increased risk of accidents. In Sweden, drunken driving is considered a serious crime and most drivers are very negative against such behaviour (Åberg, 1993a). The number of drunk drivers in traffic in Sweden is low compared to other countries. It has been estimated that one or two drivers out of one thousand are drunk in general traffic (Swedish Road Administration, 1994).

In 1990 the BAC limit was lowered from .05% to .02% in order to further prevent drunken driving, and today Sweden has one of the lowest limits in the Western world. In addition to the new BAC limit the punishments for drunken driving became more severe in 1994 and drunken drivers with a BAC over .1% now run a risk of imprisonment. The police enforcement with routine breath testing has increased considerably since 1990. Another factor that is likely to decrease drunken driving is that young drivers, aged 24 years or younger, have decreased their mileage with about 25% between 1989 and 1993 (Swedish National Road Administration, 1994). Thus, today there are several different factors that all work against drunken driving in Sweden.
In 1987 a questionnaire study was carried out in Denmark, Norway and Sweden with the purpose to investigate drivers’ opinions about drunken driving in the Nordic countries (Åberg et al, 1990). The questionnaire was developed partly according to the Theory of Reasoned Action presented by Ajzen and Fishbein (1980). A path analysis was performed on the Swedish sample (N=2491) which suggested a causal structure, involving 6 variables (Åberg, 1993a). In the causal structure, intentions to drive intoxicated and self-reported behaviour were related to attitudes, evaluation of punishment, subjective norm, and frequency of intoxication. The same structural model could be used to explain variance in self-reported behaviour and intentions of drivers in each of the three countries in spite of great national differences in level of model variables (Åberg et al, 1990).

A new questionnaire study (N=1262) was performed in 1991 to evaluate the effects of the new Swedish law of 1990 on drivers’ decision making, intentions, attitudes, and self-reported behaviour (Åberg, 1993b). The comparison between data from 1987 and 1991, as regards the causal model, indicated no change in drunken driving behaviour after the lowered BAC limit. However, the attitudes against drunken driving over the limit had become less negative than before and drivers with previous experience of drunken driving changed their attitudes more than other drivers. There was an increased frequency of law violations after the law change and the drivers themselves expected that they might continue to violate the law in the future. The self reported drinking habits had not changed during the four years between the investigations.

**Figure 1**
A causal structure of variables explaining drunken driving. The relationships denoted by arrows indicate significant contributions from one variable to another (see Åberg, 1993a). Dashed lines denote hypothetical relations to external variables.
In the present paper levels of self-reported drunken driving and other variables of the causal model are investigated (see Figure 1). The results from the 1991 study concerned immediate effects of the law change but it might take longer than one year for a driver to adjust his or her behaviour to a new situation. The problem of the present study is to investigate if the changes observed in 1991 should be seen as effects of a process leading to an increase in drunken driving and further changes of drivers' opinions or if they simply were quickly disappearing effects of the new law. As there are other factors than the BAC limit that might be of importance for drunken driving, changes in variables affected by measures like increased enforcement with routine breath testing and more severe sanctions will also be discussed.

**METHOD AND ANALYSIS**

The results presented in this paper are based on questionnaire data from 1987 and 1991 and on data from a new questionnaire study performed in 1994. Questionnaires, including the same questions as in the previous studies, were distributed to a sample of Swedish drivers and responses were obtained from 1461 car owners (response rate 69%). The sample was stratified with respect to age. As in previous studies drivers were divided into three subsamples based on self reports: those with no drunken driving, drivers who have driven with a BAC under limit (or after one glass of wine) and drivers with a BAC over limit (or after three glasses of wine or more). The three groups were shown to differ considerably with respect to mean level in the variables of the causal model (Åberg, 1993a,b). Only non-teetotal drivers are included in the analyses.

Initially, frequencies of drivers' responses on questions concerning the six variables included in the causal model explaining drunken driving behaviour are analysed and compared with data from the 1991 sample. In addition to the analyses of the model variables, comparisons with earlier results will be made concerning age, experiences of breath tests, and drivers' knowledge about the new law. The statistical tests used in the analyses are chi-square tests if nothing else is stated.

**RESULTS**

The three subsamples of 1994 did not deviate significantly from the corresponding subsamples of 1987 and 1991 with respect to drivers' sex, age or mileage.

**Self reported drunken driving.** In 1987, in response to a question about the past three years, 69.5% of the drivers reported that they had not been drinking and driving; 7.8% had been driving with a BAC over limit. In 1991, one year after the new law, 65.1% had not been drinking and driving and 7.5% had been driving with a BAC over limit, that is after having drunken alcohol corresponding to three glasses of wine or more. In 1994, 66.8% had not been drinking and driving the last three years while 6.9% had been driving after three glasses of wine. The differences between the different studies are not significant. The mean number of incidents with drunken driving, over the limit or after three glasses of wine, during the past three years, was .22 per driver in 1987 and .30 in 1991. In 1994 the figure obtained was .40 incidents per driver after consumption of three glasses of wine. The increase in number of incidents is not statistically significant.
**Intentions to drunken and drive.** The results from 1991 showed that more drivers (11.8%) expected themselves to violate the new BAC limit, compared to the number of drivers with expected violations in 1987 (7.8%). In 1994, 10.0% of the drivers expected themselves to violate the law in the future. The difference between 1991 and 1994 is not significant. Among the drivers who reported that they had been driving after three glasses of wine, 44.9% expected future violations. In 1991 the figure was 42.9% for this category of drivers (non-significant difference).

**Attitudes against drunken driving.** Although almost all of the drivers (99%), in all three investigations, expressed more or less negative attitudes against violations of the BAC limit the attitudes had become significantly less negative after the change of the law, e.g. between the years 1987 and 1991. In 1994 the attitudes against drunken driving remained at the same level as in 1991 with no significant differences among any of the groups. There was a small but insignificant tendency towards more lenient attitudes among drivers who reported drunken driving in previous years.

**Subjective norms against drunken driving.** Between 1987 and 1991 the drivers’ subjective norms (how important others view the respondent’s driving with a BAC over limit) did not change. Also in 1994 the subjective norms remained at the same level for two of the subsamples. Drivers that had been driving after three glasses of wine, however, reported to a lesser extent (p<.05) than in 1991, that important others did not want them to drive after drinking. The willingness to comply with others’ opinions did not differ between 1994 and 1991 for any of the groups.

**Evaluation of drunken driving sanctions.** Evaluations of different sanctions were measured on 5-point scales ranging from “not important” to “extremely negative”. The only significant difference between 1991 and 1994 concerned evaluation of fines; 63.7% rated fines to be extremely negative in 1994 compared to 59.0% in 1991 (p<.05). There were no differences between subsamples. In 1987 the questions of sanctions were phrased in a different way and therefore a comparison was not possible to make.

**Drinking habits.** In 1987 it was found that the number of times in a year a person gets drunk were relevant in the explanation of drunken driving. No differences in drinking habits were obtained between the samples from 1987 and 1991. However, from 1991 to 1994 there was a significant increase, for the total sample, in number of times when the respondents had been drunk (p<.01; Kolmogorov-Smirnov test). The increase concerned all subsamples, although the difference for drivers with earlier experience of drunken driving was only marginally significant (p<.10).

**Variables of the causal structure.** The results presented above did not indicate any change in drunken driving behaviour following the new law. On the other hand, intoxication had become more frequent among all drivers and subjective norms were somewhat more permissive among drivers with previous experience of drunken driving. Therefore, using the causal model one would predict an increase in the number of drunken drivers. However, the factors external to the model might have influenced the behaviour in the opposite direction. Therefore, results concerning drivers’ experience of enforcement (breath tests) and drivers’ knowledge about the law will be presented.

**Experience of breath tests.** The drivers reported an increased experience of breath tests since 1991 (p<.001). The percentage of drivers who had been stopped and breath tested during the past three years increased from 26.2% in 1991 to 40.0% in 1994. There was also
an significant increase in the drivers perceived probability of being tested in the future (p<.001, Kolmogorov-Smirnov). Thus, there was a clear indication that the drivers had noticed the increase of enforcement.

Drivers’ knowledge about the law. Asked about the BAC limit in 1994, only 24.8% gave a correct answer and 48.2% overestimated the limit. In 1991, 69.0% gave a correct answer. More important than knowledge about the limit is the drivers’ belief about the quantity of alcohol that can be consumed without exceeding the limit. The estimated number of beers a man of 70 kg can drink before driving increased significantly from 1.7 in 1991 to 2.0 in 1994 (p<.001). In 1987, with a .05% BAC limit, it was believed that it was possible to drink 2.2 beers before driving. There was no increase in the amount of alcohol the drivers allowed themselves to drink before driving. The majority of the drivers (91.1% in 1994) allowed themselves to drink one bottle of beer, or one glass of wine, or less before driving. This figure has remained about the same in all three studies.

DISCUSSION

The present results do not reveal any change in drivers’ self reported drunken driving four years after the new law. Both in 1991 and 1994 the drivers’ expect themselves to commit more violations. The most likely explanation for the drivers’ expected increase in number of violations is that it is an effect of the new law; if drivers do not plan to alter their behaviour they will commit more violations.

Even if there has been no change in behaviour, drivers’ attitudes against drunken driving have become more permissive after the law change in 1991, and they remain at the previous level in 1994. Also evaluations of sanctions remain unchanged, except for a small change in the evaluation of fines. The subjective norm did not change for drivers in general, but there was a change for those that reported drunken driving during the past three years. This small group of drivers perceived less social pressure against drunken driving. Also, in 1994 the drivers reported that they had been drunk more often than in earlier studies. In the causal model from 1987 drinking habits were highly correlated with drunken driving. Therefore, from changes observed among the model variables an increase in the number of drivers reporting drunken driving might have been expected.

The fact that surprisingly few drivers knew the level of the new BAC-limit might indicate that the limit per se is not important for a driver who for some reason have to decide whether to drive or not. What a driver in such a situation needs is information, a “rule of thumb”, about the amount of alcohol that it is possible to drink without exceeding the limit. The amount estimated in 1994 (2 bottles of beer) is almost back to the “rule of thumb” of 1987 (2.2 bottles), when the BAC-limit was .05%, and definitely more than in 1991. Although most drivers claim that they do not allow themselves to drink more than a light beer before driving, some of them might need this “rule of thumb” in situations when they need to decide about driving after alcohol consumption.

Thus, there are some results presented that point towards more drunken driving which, however, was not observed to be the case. Possible explanations might be that the variables, not included in the 1987 model, have had an effect on behaviour. The increased number of routine breath tests since 1990 is such a factor and the number of drivers with experience of breath tests have also increased significantly. Such experience is known to have effect on
behaviour (Åberg, Engdahl and Nilsson, 1986). Another factor also likely to have improved the drunken driving situation in Sweden is the decrease in young drivers’ mileage.

As the results of the present study do not indicate more negative opinions against drunken driving after the new law there is probably a need for sustained enforcement against drunken driving especially if the young should increases their mileage in the future.

The present results are confined to level differences in variables that earlier have been found to be related to drunken driving; structural changes in the causal model have not been investigated. Cross-sectional analyses and comparisons of structural relationships will therefore be made in the future.

REFERENCES


