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Psychological factors in young drivers' traffic accidents

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The frequency of traffic accidents and offences is highest among young drivers in the age range 17 - 23 years, and higher for men than women (figure 1). Apart from age and sex, some other, important factors related to accident rates are education, socio-economic status, the traffic environment, and various psychological factors such as personality traits and attitudes. However, none of the effects of these factors are sufficiently explained as yet.

In the first phase of the present project, we administered a questionnaire to 101 drivers (Briem, Ragnarsson, & Thordarson, 2000). The results indicated a significant effect of age and sex on the frequency of both accidents and offences, which were also related to driving experience and exposure. Fourteen psychological traits were shown to be associated with involvement in accidents and offences. These findings provided a basis for constructing a second version of the questionnaire containing 94 questions, both of a general nature and pertaining to traits and attitudes.

The aim of the second phase, reported here, in which the new version of the questionnaire was used, was to further explore the association of previously isolated traits to accident proneness, as well as to construct a final version of the test for use in predicting the incidence and types of drivers' accidents and offences. The project is being carried out in Iceland and Sweden, and Figure 1 shows the relationship between drivers' age, sex, and serious traffic accidents in these two Nordic countries. The observable trends are identical to all intents and purposes. Extending the comparison to include relative traffic exposure, 65% and 35%, respectively, for male and female drivers in Iceland in 1997 (Thordarson & Briem, 1998), these proportions closely match the accident frequencies for male and female drivers (cf. Figure 1).

Method

322 young drivers (17-28 years) completed the revised test. The sample was then reduced to 257 drivers, 142 women and 114 men, 17 - 23 years old, by excluding (i) those who had driving experience of 6 months or less, (ii) several people who were over 23 years old, and (iii) a few who had misunderstood some central questions. The data were then subjected to a series of statistical analyses ($\alpha = .05$).

In D. de Waard, K.A. Brookhuis, C.M Weikert, and A. Toffetti (2002), *Human Factors in Transportation, Communication, Health, and the Workplace* (pp. 249-254). Maastricht, the Netherlands: Shaker Publishing.

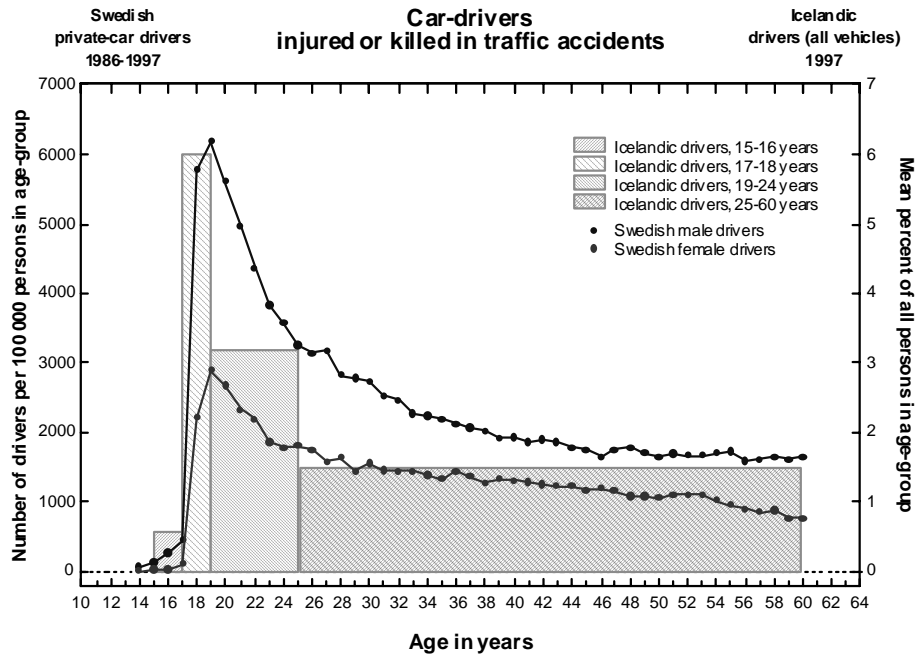


Figure 1. Number of drivers in traffic accidents in Iceland (1997) and Sweden (1986-1997: Proportion: Men = 64%, Women = 36%)

Table 1 Number of men and women who reported having been involved in one or more traffic accidents

Major accidents				Minor accidents			
	Yes	No	Total		Yes	No	Total
Men	27	87	114	Men	75	39	114
Women	21	121	142	Women	78	64	142
Total	48	208	256	Total	153	103	256

Fisher's Exact P-Value = .0955

Fisher's Exact P-Value = .0778

Results

The results largely confirm our previous results. They also allow us to determine with greater accuracy the psychological factors related to major and minor accidents in this age group. Below, all reported accidents requiring medical care or financial compensation in excess of € 500 are referred to as “major”, and all less severe accidents as “minor”. A MANOVA for both major and minor accidents showed a significant, overall difference in accident *frequency* between men and women (Wilk's lambda = .965, $p = .012$) (Figure 2), but the difference in the *number* of men and women involved in accidents was not statistically significant (Table 1). Although there was no overall difference between the three age groups, a Fisher's PLSD test

indicated a slight increase in major accidents between ages 17-18 and 20+ ($p = .040$). It was suggested above that driving frequency and traffic exposure might influence the number of accidents that a person is involved in. Sure enough, the difference between the sexes, apparent earlier in the MANOVA was no longer significant when *km driven per year* was included as a covariate.

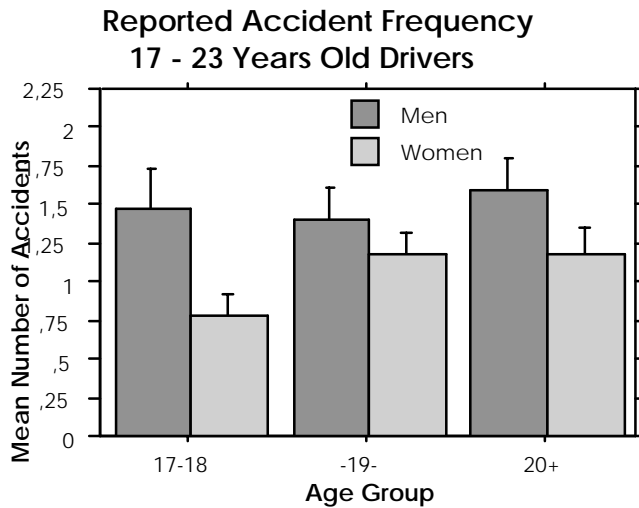


Figure 2 Average number of major and minor accidents reported by male and female drivers in the study.

The predictive power of the psychological traits with respect to men's and women's major and minor accidents was tested in a stepwise multiple regression analysis, which indicated that 5 of the 14 traits were directly predictive of accident involvement (Tables 2 & 3).

Discussion

One way to classify mistakes that may lead to traffic accidents while driving is as *errors*, *lapses*, and *violations* (Reason, Manstead, Stradling, & Baxter, 1990). The question may then be posed: "Which of the young drivers included here are the ones that are especially likely to make these mistakes?" *Errors* occur mainly among those drivers who are not very experienced, who are still learning to control the car, or who forget how to do so effectively on account of not using the car often enough. *Lapses* are primarily associated to drivers who do not attend properly to the task in hand, or those who have some social or medical problems that interfere with their driving. *Violations* are associated to drivers who do not know better, or who do not care about the consequences of their actions, thus making them liable to cause harm to themselves and others by reckless driving.

Table 2. A description of the 5 psychological traits shown in the statistical analyses to predict the frequency of accidents in which the participants reported having been involved as drivers in the previous three years.

Trait	Description
A: Excitement seeking	Thrill through fast driving, showing off one's skills and splendour
D: Novelty seeking	Yearning after new and unexpected experiences, freedom from rules and regulations, but within safe limits
H: Fatigue	Boredom, tiredness, and lack of concentration while driving
J: Safety seeking	Going to great lengths to anticipate and prevent mishaps and adverse consequences
K: Confidence	Self-confidence, energy, gregariousness, openness for new information and experiences

Table 3. Regression analysis showing the relationship of four psychological traits to major accidents reported by the male participants (M), and two psychological traits to minor accidents reported by the female participants (F). Regression coefficients (B) are shown for traits contributing significantly to increases in R^2 (ΔR^2)

Variable	Major accidents (M)				Minor accidents (F)	
	Step 1 B	Step 2 B	Step 3 B	Step 4 B	Step 1 B	Step 2 B
A	.284	.249	.308	.298		
D			-.198	-.206		
H					.264	.239
J		.191	.205	.243		
K				-.185		-.193
<i>F</i> for step	9.82**	7.26**	6.52***	6.14***	10.45**	8.26***
<i>df</i>	1, 112	2, 111	3, 110	4, 109	1, 140	2, 139
ΔR^2	.07	.03	.03	.03	.06	.03
Total R^2	.07	.10	.13	.16	.06	.09

The test instrument that we use here is addressed to all these groups. However, we eliminated a major source of *errors* when excluding the absolute novices from our analyses. By engaging a young and healthy group, we have also eliminated many of the drivers contributing to *lapses*. We have, on the other hand, not excluded the *violators*, or, for that matter, the errors and lapses that occur naturally in a young population of drivers.

What we see here, then, is a difference in accident frequency between men and women. However, both this difference and the small age difference also observed

can largely be accounted for by the driving frequency of the groups involved. We also see that a sizeable part of the remaining differences in accidents, or the absence thereof, may be explained as due to the effect of a number of personality traits. Further, it is clear that we have the capacity to discover these individual differences with the instrument that we are presently working with.

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