

Are driver's values and self-image factors for traffic safety?

Authors Sirpa Rajalin, Leena Pöysti, Martti Puohiniemi	Type of publication research report
Name of publication Are driver's values and self-perception safety factors?	
Publication parts	
Abstract	
<p>In this study, the connection of drivers' values and self-perception to self-reported traffic violations, accidents and traffic behaviour was looked into.</p> <p>The research material consisted of a questionnaire poll which was based on a nationally representative population sample. There were 1,293 people who answered the poll and the return per cent was 62. The form featured the following meters: value questionnaire, self-assessed driving ability; i.e. a questionnaire measuring the self-perception of the driver and driving behaviour questionnaire that measured violations and errors. The value questionnaire deployed Schwartz's (1992) value conflict typology which was based on value theory and value questionnaire. Those people who emphasised community-oriented goals were classified as collectivists and those who emphasised individual goals were classified as individualists.</p> <p>The study found a link between values and self-perception and risk-taking in traffic. Those with collectivist values assess themselves to have more safety skills than those who have individualist values. Those drivers classified as individualists take more risks in traffic than collectivists.</p> <p>The safety skills related to self-perception are connected to risk-taking in traffic. Safety skills which have been self-assessed to be minor manifest as ample risk-taking. In a similar way also age, gender and driving task are connected to risk-taking. Furthermore, also the vehicle handling skills related to self-perception are connected to risk-taking. It appears that the better the vehicle handling skills were estimated to be, the more risks were taken, regardless of the gender of the driver.</p> <p>The study provided new information about the connection of values to guiding the actions of the driver. At the same time, it shed some light into the differences of traffic behaviour and risks with regards to men and women. In addition, the study reinforced knowledge about the connection between driver's self-perception and traffic behaviour.</p> <p>At the end of this paper, the possibilities to utilise the research findings in traffic safety work are assessed.</p>	
Key words (topical) values, self-perception, risk-taking, collectivists, individualists, safety skills, handling skills	
Other information	
Distributor Liikenneturva	Publisher Liikenneturva

Introduction

The notion that a person drives like he/she lives (Tillman & Hobbs 1949) has made researchers look for reasons for traffic accidents from permanent characteristics which affect the driver's actions (Häkkinen 1979, Summala 1985). Näätänen and Summala published in 1976 their theory regarding the way driver's personality and motives shape the utilisation of one's skills in traffic (see also Näätänen 1972). The driver himself/herself chooses the difficulty level of the driving task. While studying the process of learning to drive, Stradling & Parker (1979) observed that quite soon after the vehicle is mastered technically, driving starts to reflect the permanent personality traits of the driver, i.e. his/her attitude towards other road-users.

Values have been defined as principles which guide choices; something that people cling to when faced with a difficult situation which requires them to choose. Values also communicate - to ourselves as well as others - what type of a person we want to be and what kind of groups we want to belong or identify with (e.g. Rokeach 1973). Since values are learned during a long period of time in one's lifetime, they become quite permanent once they are properly formed (see Puohiniemi 2006). Like motives, values help to moderate behaviour, also in driving context (Lajunen & Summala, 2004).

Values are a part of a wider self-image. This self-image is the person's conception of who he/she is, what are his/her strengths, what he/she can do, appreciates and aims for in life (see Keltikangas 2000, Mead 1962, Deaux & al. 1993). Recently it has been demonstrated that a driver, whose self-image emphasises the view of oneself as a skilful handler of the vehicle, takes more risks in traffic and is more likely to be involved in an accident. The self-image has been measured using driver's evaluations regarding his/her own driving (Lajunen & Summala 1995, Koivisto & Mikkonen 1997, Lajunen & al. 1998, Sümer & al. 2006).

Schulze (1990) and Berg (1994) discovered a connection between the lifestyle of the young drivers and traffic behaviour. Young people who are interested in cars and various activities surrounding cars show an increased risk for accident. Lifestyle involves the social operative environment of the individual, i.e. growing environment, family, immediate community etc. which serve to instil values into the youth.

Lajunen and Summala (2004) studied the connection of values - which conform to Schwarz's value theory (Schwarz & Bilsky 1987) - to the traffic safety attitudes of young Finnish drivers and self-reported driving behaviour. For young women, the value type traditionalism-universalism linked with aggressive violations and rule violations. With regards to both violation types, traditionalism-universalism reduced the likelihood of risk behaviour. In the study, the return per cent for young men was very low, less than thirty, so it was difficult to make any meaningful conclusion on young male drivers.

On the basis of previous research, it is justified to make the assumption that life values are visible in the guidance of driver's actions. The aim of this study is to explore - in accordance with Schwartz's value theory - how values are connected to driving behaviour, risk-taking and driving safety with regards to the entire age range of the drivers. In addition, we take a look at the connection between the driver's self-image and these same factors.

Research material and methods

The research material has been compiled in connection to 'Values, attitudes and zeitgeist' study (Puohiniemi 2005). The material consists of survey studies which are based on nationally representative population samples. The participants of the survey were recruited over the phone and a questionnaire was mailed to those who promised to partake in the survey. The questionnaire was filled out by a total of 1,293 drivers. The return per cent was 62. The study material has been further balanced in accordance to age and gender to better match the population structure of the research year. Due to this procedure, no deviation in the sample formation or the final sample could affect the findings. The research material was analysed and statistical significance was assessed via - for the most part - a variant analysis (GLM). The material is, by nature, cross-sectional which makes it more difficult to form causal conclusions.

Measuring values

At the moment the most functional value theory - with the best empirical support - is Shalom Schwartz's theory which is based on ten value categories and two basic dimensions (Schwartz 1992). The value theory is used as the framework for this study. The central idea of this theory is that values which guide people's choices are connected to each other and they form either complementing or opposing relationships. Due to this, values can be portrayed in a form of a circle. On the horizontal axis of the circle, there is openness to change vs. conservation; on the vertical axis, there is emphasis on self-enhancement vs. self-transcendence. Values that are located on these two dimensions are: self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence and universalism. The segments of Schwartz's Value Survey (SVS) - developed on the basis of the value theory - have proven to be so solid in their designations that scales derived from them can be utilised in the study of the relationship between values and wide-ranging phenomena, as well as in determining how common certain values are in the population (for more on research regarding other value dimensions, see Rescher 1969). Since the theory has demonstrated how values link to each other, it has made it possible to formulate a values-based typology. In the applied research, especially meters, which determine the frequency of values, have been found to be useful. Such studies include List of Values (LOV) typology (Kahle 1983), Values, Attitudes and Life-Styles (VALS) typology (Mitchell 1984) and value conflict typology (Puohiniemi 1995).

Several versions - for multiple purposes - have been developed from value conflict typology (Puohiniemi 1995, 2002, 2005, 2006). The basic idea behind all of them is the same, however. People are divided into exclusive groups based on the values which dominate their value profile. The starting point for calculations is always the entire value profile of the survey participant. Using a factor solution, also Lajunen and Summala (2004) discovered three value scales (traditionalism-universalism, individualism-hedonism and power and success) which are not in conflict with Schwartz's original classification and Puohiniemi's typologies.

Grade scale

In this study, the participant forms an opinion about the questions of the value meter which is based (Puohiniemi 1995) on Schwartz's theory. The participant ranks the importance of 57 values which measure the value areas depicted in the Table 1. On the questionnaire form, the values are presented as two lists. The participant is first asked to read the Value List 1 and to choose, at first, the values which are the most important. After this, the participant is asked to pick the values he/she opposes; and subsequently, the least important values. For these values, the participant is asked to assign them grades on the scale of -1...7. At the same time, the participant anchors the grade scale in his/her mind. After this, the participant is asked to give a numerical value to all values on Value List 1. The procedure is the same with regards to Value List 2. In addition to this, the form asks questions

about the participant's own attributes and current phenomena. Value measurement technique and value segments have been described in detail in the work by Puohiniemi (1995, 2002 and 2006).

Classification of material into value classes

The value profiles of each class are presented in Table 1 while being balanced out with the population medians. The calculation algorithm classifies the values of each participant into three main categories: (a) values that are emphasised more than is the population median, (b) values that are emphasised less than is the population median and (c) values that are emphasised less than the dominating value area. As a result of these definitions, nine mutually exclusive participant categories are created as those participants with contradictory values are placed in the class of opportunists (situation-guided). The calculation method eliminates certain answering tendencies since placement into classes is always conducted on the basis of the participant's value profile which has been balanced out against the total average.

In the three-class version of the value conflict typology, those participants whose value profile is dominated by values which promote individualistic purposes were classified as individualists (22%). Those participants whose value profile is dominated by values which promote communal purposes were, in turn, classified as collectivists (63%). The rest of the participants were placed in the opportunists' class (15%). Opportunists are people who rarely voice their opinion or their value profile shows values that contradict each other. Typically, these people modify their actions based on the given situation.

Table (1) demonstrates how the ten values defined by Schwartz relate to the three-class classification. With regards to collectivists, the following traits are emphasised more than is the case with individualists:

- universalism (understanding, appreciation, tolerance and protection for the welfare of all people and for nature)
- security (safety, harmony, and stability of society, of relationships) and
- tradition (respect, commitment, and acceptance of the customs and ideas that one's culture or religion impose on the individual)

Individualists receive a higher-than-usual average in e.g.:

- power (social esteem and status, controlling people and resources)
- achievement (personal success and demonstrating competence) and
- hedonism (gratification and pleasure) variables.

Table 1 Key figures between 3-class and 10-class value classifications

Value conflict typology		power	achievement	hedonism	stimulation	self-direction	universalism	benevolence	traditions	conformity	security
Collectivists	Average	1.7804	3.2024	3.7127	2.6577	3.7691	4.4668	5.0886	2.7872	4.4074	4.4793
	N	815	815	815	815	815	815	815	815	815	815
Individualists	Strd. Deviation	1.30141	1.21953	1.29817	1.34497	1.06073	1.03911	.91129	1.23059	1.05204	1.02507
	Average	2.5893	4.0174	4.4844	3.7648	3.9691	3.7910	4.5099	1.9216	3.8670	4.1740
Opportunists	N	291	291	291	291	291	291	291	291	291	291
	Strd. Deviation	1.50450	1.19199	1.18630	1.26336	1.01897	1.05120	.94998	1.19552	1.14320	1.00946
All	Average	2.1513	3.4037	3.9429	2.8865	4.1287	4.4685	5.0451	2.8432	4.6204	4.9134
	N	188	188	188	188	188	188	188	188	188	188
	Strd. Deviation	1.43689	1.33525	1.40877	1.41716	1.04249	1.04325	.99531	1.21081	1.02201	.88596
	Average	2.0162	3.4150	3.9197	2.9399	3.8663	4.3151	4.9521	2.6006	4.3167	4.4736
	N	1293	1293	1293	1293	1293	1293	1293	1293	1293	1293
	Strd. Deviation	1.40858	1.27395	1.32756	1.41103	1.05675	1.07924	.96202	1.27289	1.09776	1.02563

In this study, the class of opportunists was left outside the analysis due to the reasons explained in the previous text. From here on, this study assesses only those drivers who were classified as either collectivists or individualists by their values.

Of the women participants, approximately every fifth (22%) was classified as individualists by their values, while almost every third (30%) of the men received this classification. For both men and women, the age group which featured the largest number of individualists was the youth (age 18-24). On the basis of the variables' averages, the average age for those participants with an individualistic value profile was 37 years; 46 years was the average age for collectivists.

The driver's self-image

The driver's self-image was measured with the Driver Skill Index meter by Lajunen and Summala (1995). The version (Lamble & al. 2000, Pöysti & al. 2004) which was utilised featured 10 questions which ask the participants to evaluate the strong and weak sides of their own driving. The meter includes vehicle "handling skills" and "safety skills" scales. The drivers are asked, for example, whether controlling traffic situations is a weak side or a strong side for them while driving (on a scale of 'clearly weak side' - 'weak side' - 'in between' - 'strong side' - 'clearly strong side').

These evaluations form - in accordance to the theory formulated by Näätänen and Summala - two factors (Summala & Hyven 1990, Lajunen & Summala 1995, 1997, Lajunen & al. 1998, Pöysti et al. 2005, Sümer et al. 2006).

- vehicle handling skills: controlling traffic situations, fluent changing of the lanes in rush hour traffic, handling of the vehicle, passing, fast reactions (alpha = ,812)
- safety skills: maintaining composure even in annoying situations, tolerating other drivers' mistakes without losing composure, driving behind a slower car without getting frustrated, abiding by the speed limits, avoiding unnecessary risks (alpha = ,734).

The result analysis uses four-step classifications which are formed based on these sum variables. Driver receiving the grade 1 is placed in the participant quarter which received the lowest total points from the sum variable, meaning that the driver estimates his/her vehicle handling skills or safety skills to be weaker than approximately three-fourths of the drivers. Driver receiving the grade 4, on the other hand, belongs in the participant group whose total grade (derived from sum variable) is higher than average, i.e. the driver estimates his/her vehicle handling skills or safety skills to be better than three-fourths of the drivers. One should note that the variables depict self-image as reported by the driver himself/herself regarding one's own driving skill and style.

Risk-taking

Risk-taking was evaluated by asking if the driver had "driven a car after having consumed two bottles of beer, exceeded the speeding limit in urban area, passed a slower vehicle from the wrong side, driven through traffic lights after the light had changed to red, fallen asleep at the wheel, driven while fatigued, driven into a curve with excessive speed, exceeded the speed limit by at least 30 km/h on a highway or driven in urban area without

fastening a seatbelt". The drivers answered the question on the scale of 'never' - 'very rarely' - 'sometimes' - 'somewhat often' - 'often' - 'very often' (compare with Driver Behaviour Questionnaire: Parker & al. 1995).

Because many of the mentioned acts are rare, the study used a classification where those drivers who reported that they had never been guilty of the respective act formed one answer class and those who had at least sometimes (= very rarely or more often) been guilty of the act formed another class.

Findings

Factors which explain risk-taking

According to previous research, the driver's self-image has been discovered to have a connection to his/her risk-taking in traffic. Since life values are addressed as a part of a more comprehensive self-image, it is not without grounds to make the assumption that also values link with safety as driver's self-image does.

An individual's life values are visible in the evaluation he/she gives about his/herself ($p \leq 0,05$). Collectivists' self-evaluations emphasise safety skills (maintaining composure, tolerating other drivers' mistakes without losing composure, driving behind a slower car without getting frustrated, abiding by the speed limits, avoiding unnecessary risks) in the self-image more than individualists. Individualists, on the other hand, perceive their vehicle handling skills (fluent changing of the lanes, handling of the vehicle, fast reactions, passing, controlling traffic situations) to be better than that of collectivists.

Life values explain risk-taking, i.e. has the driver - according to his/her own admission - driven a car after drinking beer, passed a slower vehicle from the wrong side, ran a red light or broken the speed limit on a highway. Individualists report having committed these acts in traffic more often than collectivists.

In addition to values, the age and gender of the participant had an affect in various kinds of risk-taking in traffic. Men and young people reported that they had more violations than others. More often than women, men had driven after drinking beer, passed from the wrong side, ran a red light, fallen asleep at the wheel, exceeded the speed limit by at least 30 km/h on a highway and driven without a seatbelt. Age was linked in a statistically significant way with the frequency of breaking speed limits in urban areas, passing from the wrong side, running a red light, exceeding the speed limit by at least 30 km/h and driving while fatigued. The two youngest age groups had the most of these violations, the oldest age group had the least.

The joint effect of values and participant's age was visible in driving after consuming two beers. Young individualists report having driven a car after drinking beer at least sometimes. In addition to risk-taking, the driving task was linked with getting caught on a traffic violation and being involved in a traffic accident. The volume of risk-taking cases, violations and accidents was bigger with those who drive a lot.

According to this study, the risk factors are located on the value map somewhere between stimulation and achievement, on the other hand, and tradition and power, on the other. Distinct disregarding attitudes are highlighted in the individualistic area, while the risk factors which are positioned in the direction of tradition are, by nature, mostly surprises caused situational factors or one's own physical condition.

Self-image and risk-taking

It has been demonstrated previously in this paper, that values are connected to driver's self-image and risk-taking in traffic. It was stated in the introduction of this paper that values constitute a part of self-image. This means that also the self-image should link with the driver's risk-taking in traffic.

Driver's assessments about himself/herself as a safe driver were connected to risk-taking in traffic. The higher the driver's safety skills (by his/her own evaluation), the less he/she reported having driven after consuming beer, passing from the wrong side, exceeding speed limit by at least 30 km/h, and driving without seatbelt. Also it was less likely that the driver reported having been caught in the act. In addition, the connection to being involved in a traffic accident was almost significant (.052). Assessment about oneself being a skilful driver linked only with exceeding speed limit in urban area. The better the assessment of vehicle handling skills, the higher the chance that the driver had exceeded the speed limit in urban area.

Table 2 Connection between background variables and risk-taking: values

			values	age	gender	driving km / year*	values x age	values x gender	gender x age	gender x values
How frequently have you...		%								
- Driven a car even after having consumed two bottles of beer	never	70.7								
	at least sometimes	29.3	0.001	0.052	0.000	0.015	0.029	0.224	0.103	0.288
- Exceeded speed limit in urban area	never	6.1								
	at least sometimes	93.9	0.951	0.028	0.570	0.001	0.901	0.939	0.284	0.396
- Passed a slower vehicle from the wrong side side	never	76.2								
	at least sometimes	23.8	0.031	0.000	0.000	0.867	0.157	0.033	0.882	0.637
- Driven through traffic lights even though light had already turned to red	never	36.2								
	at least sometimes	63.8	0.014	0.000	0.002	0.043	0.899	0.117	0.541	0.262
- Fallen asleep at the wheel	never	82.9								
	at least sometimes	17.1	0.438	0.109	0.000	0.159	0.436	0.635	0.687	0.663
- Exceeded speed limit on highway by at least 30km/h	never	31.3								
	at least sometimes	68.7	0.002	0.007	0.000	0.002	0.350	0.088	0.790	0.619
- Driven while fatigued	never	7.8								
	at least sometimes	92.2	0.761	0.018	0.308	0.027	0.663	0.966	0.129	0.460
- Driven into a curve with excessive speed	never	15.4								
	at least sometimes	84.6	0.072	0.757	0.540	0.029	0.341	0.566	0.106	0.399
- Driven in urban area without fastening seatbelt	never	51.7								
	at least sometimes	48.3	0.090	0.296	0.000	0.048	0.153	0.177	0.116	0.246
- Have you been involved in an traffic accident	yes	91.1								
	no	8.9	0.485	0.082	0.882	0.038	0.202	0.562	0.316	0.056
- Have you been caught on a traffic violation	yes	12.4								
	no	87.6	0.101	0.354	0.015	0.000	0.747	0.251	0.965	0.528

Vehicle handling skills and gender had a statistically significant joint effect on exceeding speed limit in urban area, driving to a curve with excessive speed and getting caught on a traffic violation. For men, the frequency of exceeding speed limit and being caught increased (while driving into a curve with excessive speed decreased) as the self-assessed handling skills improved. For women, all three variables showed a growing trend spurred by improving handling skills.

Table 3 Connection between background variables and risk-taking, violations and accidents: self-image

How frequently have you...			%	safety skills	handling skills	age	gender	driving km / year*	safety skills *handling skills	safety skills* age	safety skills* gender	handling skills* age	handling skills* gender
- Driven a car even after having consumed two bottles of beer	never		70.66										
	at least sometimes		29.34	0.049	0.451	0.208	0.000	0.142	0.723	0.489	0.785	0.691	0.447
- Exceeded speed limit in urban area	never		6.14										
	at least sometimes		93.86	0.078	0.036	0.000	0.683	0.005	0.001	0.203	0.062	0.114	0.014
- Passed a slower vehicle from the wrong side	never		76.19										
	at least sometimes		23.81	0.007	0.185	0.003	0.000	0.528	0.694	0.753	0.100	0.531	0.172
- Driven through traffic lights even though light had already turned to red	never		36.19										
	at least sometimes		63.81	0.382	0.125	0.000	0.000	0.022	0.318	0.347	0.149	0.123	0.620
- Fallen asleep at the wheel	never		82.86										
	at least sometimes		17.14	0.589	0.442	0.603	0.000	0.062	0.796	0.709	0.428	0.928	0.695
- Exceeded speed limit on highway by at least 30km/h	never		31.27										
	at least sometimes		68.73	0.015	0.150	0.001	0.000	0.238	0.888	0.256	0.540	0.877	0.396
- Driven while fatigued	never		7.84										
	at least sometimes		92.16	0.809	0.146	0.001	0.080	0.120	0.200	0.972	0.159	0.267	0.220
- Driven into a curve with excessive speed	never		15.36										
	at least sometimes		84.64	0.501	0.101	0.718	0.514	0.026	0.899	0.897	0.498	0.644	0.045
- Driven in urban area without fastening seatbelt	never		51.68										
	at least sometimes		48.32	0.004	0.150	0.254	0.005	0.411	0.139	0.903	0.744	0.303	0.785
- Have you been involved in an traffic accident	yes		91.10										
	no		8.90	0.361	0.825	0.009	0.815	0.066	0.926	0.356	0.224	0.462	0.558
- Have you been caught on a traffic violation	yes		12.40										
	no		87.60	0.000	<u>0.052</u>	0.356	0.034	0.003	0.260	0.769	0.069	0.155	0.014

Summary and evaluation of the findings

The aim of this study was to discover what the connection between people's life values and traffic behaviour is. The task was made more difficult by the inaccuracy of the used meters, value meter classifications and drivers' self-evaluations. For instance, the utilised driving skill meter measures the driver's perception of his/her strong and weak sides; not the absolute driving ability as such. The connection between life values and traffic behaviour did not show as forcefully as was the preconception, but the study did manage to make it visible.

The study utilised a meter which depicts the frequency of values, based on Schwartz's value theory and questionnaire. The meter is known as value conflict typology (Puohiniemi 1995). Those survey participants who emphasise communal goals in their life were classified as collectivists and those who emphasise individual goals were classified as individualists. 63% of the drivers were collectivists. They appreciate e.g. other people and environment and are understanding and tolerant. They perceive the safety of society and their own inner circle to be important, and hold in high regard also stability and continuity of their own lives. In addition, they respect and observe traditions provided by culture and religion.

Individualists, who account for 22% of the drivers, emphasise e.g. power, achievement and hedonism, translating into social appreciation and status, personal success and pursuit of gratification and pleasure.

The study posed the question whether the driver's life values had a guiding effect on his/her actions (and therefore also a connection to safety) or not. Based on the findings, that question can be answered affirmatively. Values affect both one's perception of himself/herself as a driver as well as risk-taking in traffic.

In the study, the drivers themselves evaluated their own behaviour in traffic. A sum variable was formed on the basis of self-evaluations which depict safe traffic behaviour. This sum variable was designated as safety skills. The other constructed, self-image measuring sum variable consisted of questions which depict the driver's perception of his/her own vehicle handling skills.

In the collectivists' evaluations about themselves as drivers, one can perceive more traits which are required in safe driving than is the case with individualists' self-evaluations. Collectivists assess that they are able to maintain composure even in annoying circumstances, tolerate other people's mistakes without losing their composure, drive behind a slower vehicle without getting frustrated, abide by the speed limits and avoid risks.

Drivers classified as individualists take more chances in traffic than collectivists, drive after drinking beer, pass a slower vehicle from the wrong side, run a red light or break speed limits on highway.

As demonstrated earlier, also evaluations about oneself as a safe driver - as they relate to self-image - are connected to risk-taking in traffic. Safety skills, which were evaluated to be lacking, manifested themselves as increased risk-taking. Also age, gender and the driving task itself were connected to risk-taking.

The study material strongly suggests that also the self-image component which emphasises handling skills had a connection to risk-taking. The better the handling skills were evaluated to be, the more risks were taken, regardless of the gender.

Previously it has been shown that safe traffic behaviour appears to emerge from people's desire to reach their destination safely, their desire not to break norms and to take other people into consideration (Hatakka & al. 2000, see also Puohiniemi 2007). Lajunen and Summala (2004) stated that value "traditionalism-universalism" decreases the likelihood of risk-behaviour with regards to young women drivers. Their value system is characterised by consideration for other people, abiding by rules and norms and appreciation for safety. The findings of this study strengthened these observations for drivers of all ages.

The weak connection between values and involvement in accidents can be explained by e.g. acknowledging that many random factors come together in accidents. Violations depict better the way of operating as chosen by the driver (see Rajalin 1998). By breaking the rules, the driver seeks to save time and pursues gratification which results from smooth driving. Aggressive violations which are manifestations of anger are often connected to the driver's personality and emotions (see Lajunen & Summala 2004). As an event, being involved in a traffic accident is rather rare which in turn also explains the weak connection.

A person's values change slowly. Getting older increases the appreciation of stability, safety and conservation (see Pohjanheimo 1997, Puohiniemi 2002). Hedonism, i.e. the pursuit of personal gratification, is the most significant difference between the youth and the older driver groups. Youth is summed up by the emphasising of personal gratification.

Also the driver's driving style, which the driver uses to manifest his/her personality and attitudes towards others, changes slowly. Not even a dramatic accident is likely to change the way a person drives; at least the transition does not last long (see Rajalin 1998). As age and life experience accumulate, driving style may change towards a more careful and anticipatory style (see Rajalin 1998, Rajalin & Keskinen 2002). In the light of earlier studies, however, it seems evident that despite the safety-manifesting values the risk of the elderly drivers increases (see e.g. Liikkanen 2007). The benefits related to experience - brought on by age - are offset by the deterioration of health and the slowing down of cognitive functions (Summala & Rämetsä 2004).

Various studies have shown that drivers tend to overestimate both their skill and safety abilities when evaluating their own actions (Walton & Bahurst 1998, see also Sümer & al. 2006). Evaluation of oneself as a driver, as performed by individuals, is something that can be focused and developed via goal-orientation. In fact, it seems justified to try and influence - right from the beginning of a driving career - the driver's consciousness about the fact that technical mastery over the car alone is not sufficient for safe coping in traffic. Driver teaching and education should bring to the forefront safety problems related to driving style more effectively than is the case presently. In addition, social skills such as anticipating, acting in a way that allows also others to predict actions, communicating emotions in an appropriate manner and self-control should be boosted via education. Actions can be influenced by information, rewards and penalties.

Since people's values differ, they respond to different messages. What is appealing to a collectivist, may serve only to amuse an individualist and vice versa. With regards to education, it is not relevant to emphasise the importance of safe driving per se, since a risk-driver believes, according to studies (see Näätänen and Summala 1976, McKenna & al. 1991), that he/she is, in fact, driving safely and is able to handle dangerous situations due to personal skills. For individualists, losing one's own ability to perform is a serious threat in traffic. Dramatising this threat in education, in a manner that is understood by the individualist, is warranted.

The study gave new information about how values are connected to the guidance of the driver's actions. At the same time, the study shed some light into the differences of traffic behaviour of men and women and the risks therein. Of women drivers, every fifth was characterised to be an individualist in traffic (manifested as increased risk-taking) while with men, almost every third driver is an individualist.

In traffic safety research, "gender" has typically been defined to designate biological gender only. Gender roles, e.g. masculinity and femininity, have not been exposed to wider scrutiny. Even though there is only limited research into the significance of gender roles, it appears that they may explain risk behaviour more effectively than biological gender definitions (see Krahe & Fenske 2002, Bem 1981, Lajunen & Summala 2005).

There is reason to actively introduce traffic safety thinking and information into the value-related discussions that are taking place in society, with regards to e.g. disadvantages of alcohol and climate change. Therefore, for instance, health and environmental values can be used to enhance the appreciation for safe traffic behaviour.

Traffic behaviour is also influenced, for its part, by the individual's temperament; by his/her tendency to react in a given situation. However, the more important a certain thing is in a person's value system, the more he/she uses conscious decision-making, thus diminishing the role of temperament (see Keltikangas-Järvinen 2008).

Whether behaviour emerges from genes, values or environment, a human being is responsible for his/her actions and tendencies. It is difficult to adjust values from the outside in such a manner that a favourable impact would be visible in traffic behaviour. Instead, by influencing a driver's driving style, where values connect with traffic behaviour via personality traits, by e.g. legislation, monitoring, developing of vehicles and environment and education which links into these issues, it is possible to influence attitudes and perhaps also to enhance the appreciation for safety.