Reima Lehtimäki

The Conceptions of Traffic Safety among Young Male Drivers

Autor Oy
Helsinki
Finland
To Aune and Aulis who supported me throughout.

Humpty Dumpty

Humpty Dumpty sat on the wall,
Humpty Dumpty had a great fall.
All the king’s horses
and all the king’s men
couldn’t put Humpty Dumpty together again.

English nursery rhyme
Abstract

A Finnish adult usually has two options in getting driver training for a driving licence. These are through driving schools or driver training by an individual permit. Since a family member is the trainer in the latter, its influence on traffic safety has been questioned. Previous research has provided no methodologically sound means of assessing this question.

Traffic safety in the literature is normally seen as the lack of accidents. This notion provided the idea of exploring the characteristics of traffic safety positively rather than stressing the lack of accidents as a criterion. This is also relevant to driver training, which is based on existing teaching methods and aids. A concept of unexplained and unpredictable factors in traffic performance called chance also emerged both in the literature and in the preliminary work for this study.

The notions of safety and chance were conducive to a hermeneutic approach which relies on the ability of the drivers to account of their conceptions. The research resembled an expedition, the purpose of which was to keep a weather eye on everything which might be important.

Since the researcher did not have fixed ideas, which would impair his ability to explore traffic safety or driver training matters, four broad research tasks, not strict hypotheses, were designed. The tasks were:

1. Questioning the accident criterion for driver training, and determining a new positive criterion.
2. Comparing driving school and permission driver training by this positive criterion.
3. Comparing the safety thinking of young male drivers, young female drivers, and master drivers.
4. Elaborating the notion of chance incorporated into traffic safety conceptions.

The research applied systematic analysis, including phenomenographic interviews and phenomenographic analysis. Newly licensed young males provided the main data, while newly licensed young females and master drivers served as the comparison. All interesting findings and even useful clues are reported for the reader’s consideration.

This approach, deviating from the usual hypothetically deductive one, produced a new view of traffic safety. The interviewees’ understanding of safety was in line with socialisation according to the categories of description identified from the conceptions. They conceived no absolute or perpetual state of safety. The young male permission interviewees focused on driving and taking precautions. The young male school interviewees utilised concepts in analysing problems but could not resolve them.

Chance conceptions represented a personal lack of resources in driving, which were characteristic of the permission interviewees, the school interviewees conceived unpredictable incidents where there was a lack of resources in particular events, such as an elk on the road. The interviewees managed critical incidents by common sense but this concept was also used when they excused their mistakes.

The interviewees constructed a thinking process called maxims in this study. These were rules of thumb justifying pieces of driving or directing performance. The maxims, approximating to internal representations, were few. While none of the road rules provide a maxim, the interviewees fundamentally agreed with the legislator that traffic is always dangerous.

The young males thought of chance divergently, i.e. they deliberated on aspects of driving, which enabled experimentation. The young females and the master drivers thought convergently, i.e. they began with appropriate maxims, ensuring that their behaviour was as safe as possible.

Key words traffic safety, driving school, permission driver training, young driver, legislation, hermeneutics, phenomenography, interview, expedition, socialisation, safety thinking, conception, chance, maxims, common sense
Acknowledgements

The Ministry of Transport and Communication commissioned Autor Oy to undertake this research project. Mr. Pekka Tiainen was the contact person.

Profs. Seppo Kontiainen and Kari E. Nurmi supervised my post-graduate adult education studies at the Department of Education at the University of Helsinki. They helped me to adopt the approach of understanding human beings in their complex reality and identifying their potential to attain objectives such as ensuring traffic safety. My supervisors also supported most of my personal learning goals.

I also served as an assistant for half a year at the department. Dr. Sirkka Ahonen discussed phenomenography with me. The university gave me a scholarship to assist with finishing my thesis. Prof. Lars Åberg invited me to his traffic psychological seminar at the University of Uppsala to discuss my research plans.

Dr. Roderick McConchie patiently advised me on scholarly British English and checked the language of this report.

Ms. Outi Hietalahti and her colleague Mirkku Koskinen at the library of the Central Organization for Traffic Safety in Finland provided me with most of the reports I needed. The officials of the organisation assisted me with computer programming difficulties. The organisation also undertook to print and deliver my thesis. Mr. Veijo Tuononen, then the chief of the Driving Examination Office of Helsinki, and his colleagues provided me with most of the interviewees. Ms. Helena Koljonen accurately transcribed the interviews from tape recordings. Ms. Aune Kämäräinen, an artist, designed the plaster casts and the measure used in the interview situations.

Prof. Matti Syvänen at the University of Tampere, as one of my pre-examiners, explicitly analysed the progress and characteristics of my study, giving me valuable advice. Dr. John Hobrough at the University of Surrey, the other pre-examiner, assisted me to prepare a publication appropriate for international readers.

I cordially thank them all, as well as my fellow students, the interviewees, and all who assisted in creating this report.

Reima Lehtimäki
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Chapter 1. Introduction

What kind of driver must we account for in training people for a driving licence? What is the influence of driving school on drivers as against permission (private) training? Can parenting training affect the trainee’s values and attitudes?

A Finnish citizen usually has two options in getting driver training for a car driving licence. The most usual option is a driving school. A licensed citizen with a certain kind of experience can also obtain permission to train his or her family member. These two options, enacted in the Road Traffic Act, 66§ and 68§, were the objects of this research. Vocational and military driver education and training is relatively rare. An immigrant can also change his or her driving licence to a Finnish one in certain circumstances.

The Finnish car driver training reform of 1990 divided training into three phases as shown in table 1:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Instruction</th>
<th>Comment</th>
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<tr>
<td></td>
<td>Minimum</td>
<td></td>
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<tr>
<td></td>
<td>(Car)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Theory</td>
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<tr>
<td></td>
<td>lessons</td>
<td></td>
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<td></td>
<td>45 min.</td>
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<tr>
<td></td>
<td>Driving</td>
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<tr>
<td></td>
<td>lessons</td>
<td></td>
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<tr>
<td></td>
<td>25 min.</td>
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<tr>
<td>First phase</td>
<td>20</td>
<td>Normally includes night driving demonstrations.</td>
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<tr>
<td></td>
<td>32</td>
<td>Provides a provisional driving licence to get driving experience in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>real traffic.</td>
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<tr>
<td></td>
<td></td>
<td>Minimum total 27½ h.</td>
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<tr>
<td>Intermediate (actually the</td>
<td>Experience</td>
<td>Provisional driving licence is only valid for 2 years.</td>
</tr>
<tr>
<td>second) phase</td>
<td>6 months – 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>years</td>
<td></td>
</tr>
<tr>
<td>Second phase (third phase)</td>
<td>4</td>
<td>Results in final driving licence valid to the age of 70 years.</td>
</tr>
<tr>
<td>Continued instruction</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Minimum overall hours (with</td>
<td>24</td>
<td>34 h. 40 min.</td>
</tr>
<tr>
<td>the instructor)</td>
<td>40</td>
<td>(=24 *45 min. + 40 * 25 min.)</td>
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Table 1. The time needed in the theory and driving lessons at various phases of the Finnish car driving instruction.

The driver training phases are conceived from the viewpoint of the driving schools. In the first phase trainees receive most of their training to enable them to drive autonomously, and they obtain a provisional licence. In the second phase the trainees normally receive some continued instruction from
the driving schools instructors, e.g. driving on a slippery surface, and the
instructors also rate the trainees’ driving skills. An individual applicant with
approved competence can also be accepted as an instructor in individual
cases, which is permission training. In the intermediate phase the new drivers
should practice driving on their own and assimilate the concepts taught. Since
the driving schools have nothing to do with the provisional driver’s day to day
driving it was called intermediate. Only the phases taught by the driving
schools were numbered.

The driver training and licensing legislation is generally piecemeal. The main
statutes are the Road Traffic Act, the Driving Licence Decree, and the
Decision of the Ministry of Transport and Communication (then
liikenneministeriö now liikenne- ja viestintäministeriö in Finnish) on the
Application of the Driving Licence Decree. A curriculum supplied by the then
Vehicle Registration Centre (Autorekisterikeskus 1989, now Vehicle
Administration Centre) must be observed in driver training. The legal norms of
Finnish driver training are generally adapted to driving school training. These
norms are valid for permission training to the appropriate extent (Driving
Licence Decree 21§). In Helsinki, a capital with busy traffic, the driving school
trainees normally get 2 – 3 extra driving lessons. The permission trainees
obviously drive much more than the minimum. The curriculum of the driving
schools was updated in 1998 (Ajohallintokeskus, Vehicle Administration
Centre). Since the sample of this research ended in 1997, the update had no
empirical influence on it.

The long-term effects of the reform were assessed by Katila et al. (1999).
They found a decrease in accidents of 25% among the 18-20 year old males,
50% among the older males, and 16% among the 18-20 year old females,
while among the older females there was no decrease. The authors stressed
confidence as a possibly unsafe factor. They reported that an explanation of
the difference between the male and female trends was the latter’s “increase
in confidence in their driving skills in slippery road conditions". They also
found that the post-reform male drivers were not as confident about their
vehicle handling skills and their ability to operate in dangerous situations as
the pre-reform drivers were.

People regard driving a car as a civil right. The argument seems to be that the
Finnish Constitution (7§) guarantees that a citizen “has the freedom to move
around the country and to choose his or her place of residence.” Historically,
this provision was enacted to prohibit serfdom, the opportunity for physical
movement being secondary. The manner of movement, e.g. driving a car, is
unimportant. Another argument seems to be the necessity of a car in modern
society. People insist on the right to drive, influencing the legislation and the
administration. For instance, training to drive a car in public traffic takes only
about 35 hours. However, a private pilot’s licence takes 165 hours.

Since the methodology of driver training research is difficult, as shown later,
comprehensive preliminary work was carried out. This work, based on
available data, was designed to facilitate understanding of the problem and
previous contributions. Understanding of traffic safety and the findings of previous driver training research particularly were checked.
The design of this project and its previous publications were as follows:

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<tr>
<td>Previous contribution</td>
<td>See the literature surveys.</td>
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<td>Traffic safety and legislation</td>
<td>(a) Lehtimäki, R. 1995 a. Traffic safety</td>
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<td></td>
<td>education in the light of law.</td>
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<td></td>
<td>(b) Lehtimäki, R. 1996. Legal considerations</td>
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<td>in driver education.</td>
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Main study
1994 – 2000

Traffic safety conceptions among young male drivers

The present report

1.1. Traffic safety in the literature

Appendix 1 reviews some essential reports written since World War II. If traffic safety was defined as the lack of damage, accidents, etc or the lack of their likelihood, the definition was called here the negative definition. Once the definition is based on existing entities, it becomes the positive definition. The appendix also shows the page numbers of the quotations.

(a) The negative understanding of traffic safety

The selection of the safety-related reports in appendix 1 showed that negative understanding of traffic safety has been almost universal. The negative safety definition was implied for example in Björkman, Englund and Johansson (1967), Baker, R. (1971), Mikkonen and Keskinen (1980), Trinca, Johnston et al. (1988), Brown et al. (1987), Brown (1991), the Directorate General for Transport of the European Commission (1995), and Lehtimäki (1995). These not very explicit definitions focused either on a negative state as in Björkman et al. (1967): “Traffic safety is, of course, the same as ‘a small number of accidents’ or preferably ‘no accidents at all’”, or on the aims of protection as in the Directorate General for Transport of the European Commission (1995): “The learner driver must among other things be aware of his responsibility towards life, health, the environment, and property.” The rationale for the graduated licensing system for young learner drivers was that their crash risk was particularly high. This modern system exists in New Zealand, Australia, and in North America (Insurance Institute for Highway Safety & Highway Loss Data Institute 1999). The new report on driver training and licensing prepared for the EU also started with public health and traffic accidents (Siegrist (ed.) 1999).
(b) The accident

There were not very many attempts to formulate the negative traffic safety definition explicitly. Its core element, the accident, was defined by many, including Baker and Ross (1960), Blumenthal (1968), Shaoul (1975, 1976), Häkkinen, S. (1979), Wolfe (1982), Anteroinen et al. (1991) and Rothe (1991), who all included an unexpected element in the definition. Häkkinen, S. (1979) based his definition on a systematic study of various accident theories. Most writers regarded an accident as a process, but Shaoul (1975, 1976), supported by Shinar (1978), regarded a collision as the process and accident as its outcome. Shaoul's notion of an accident seems to serve as the subsequent identification of a collision. Risk (1973) and Shaoul (1975, 1976) explicitly stated that safety was indicated or measured by the results of absence of accidents. Brown et al. (1987) also regarded an accident as a consequence. The terms were considered not only by Baker and Ross (1960) but also by Langley (1988) who found inconsistencies in the terms “accident” and “injury”. There is also confusion between the terms “accident”, “crash”, and “collision” (Shinar 1978).

(c) The positive traffic safety definition

The positive traffic safety definition has been used but there has been no attempt at precise formulation. Baker and Ross (1960) wrote about “the successful trip”. Brown et al. (1987) mentioned that “safe driving does not simply mean accident-free driving. Behaviour which could potentially cause accidents must also be considered”. Häkkinen, Lehtimäki, and Saharinen (1986) also reasoned that the safety of traffic cannot be measured simply by accidents. If nobody moves, no accidents happen. Hatakka (1998b) also detached himself from the negative traffic safety definition “It is important to know about drivers’ cognitions regardless of their relations with accidents, which means a careful analysis of the variation in drivers’ conceptions.” Since Vaaranen (1998) researched various characteristics related to young drivers’ speeding behaviour, she actually applied positive safety thinking.

(d) Argument about safety

While the authors of the EU report on driver training and licensing edited by Siegrist (1999) used both the negative safety definition and the appropriate grid based on driver behaviour, essential curriculum functions and other resources, they argued only as experts, not by complete logical deduction. Since they also replaced objective criterion validity by ‘consequential’ validity aiming at improved training and practice, not the separation of competent drivers from incompetent, the analysis of the EU report clarified the difficulty-to-apply negative criterion to safety measures.

The evidence from Environmental Education also proved to be a more appropriate effort to define traffic safety than road traffic researchers acquiring a positive view of safety matters. The book edited by Kajanto (1992) reported the progress towards sustainable development and harmony between people and nature. The Directorate General for Transport of the European
Commission (1995) also mentioned the traffic environment as one of the objectives of protection.

The Road Safety Research Unit at the University of Salford contributed not only to the definition of an accident but also to the evaluative criteria in driver education. Papers by its members dealt with three levels of criteria applied to data. Raymond, Jolly and Risk (1973) reported the long-, intermediate-, and short-term criteria, while Shaoul (1975) mentioned the ultimate, intermediate, and “practical” criteria. The various criteria also compensated for the lack of an accident criterion, e.g. its absence from driver training. Brown et al. (1987) accepted reduction of accidents as the ultimate goal of training but also established contributory factors in accidents as well as surrogate behavioural measures for accidents. Mikkonen & Keskinen (1980) almost omitted the concepts of risk and accident in developing their theory about human potential, i.e. the internal representations directing traffic behaviour. Keskinen (1998) also accepted criteria other than the negative ones in observing the training process.

Since the team of the Ministry of Transport and Communications in Finland (Liikenneministeriö 1995) simply substituted preservation of professional driver training for traffic safety, it raised the legal question of whether individual autonomy can be violated in this way.

(e) Traffic safety in Finnish road traffic legislation

Finnish road traffic legislation is based on the general obligations of a road user (the Road Traffic Act 267/81, 3§):

A road user shall obey the traffic regulations and otherwise exercise whatever care the circumstances require in order to avoid danger and damage.

A road user may not obstruct or impede traffic unnecessarily.

The basic requirement suggests the negative characteristics of safety, i.e. danger and damage. The legislator recognises individual autonomy, indicating only what a road user is not allowed to do. Within these limits, the road user is free to act. To teach safety means to evoke it by teaching its absence, as in situations of danger and risk. Finnish road traffic legislation is also based on the idea of traffic safety objectives, which means safety as the abstract concept of protecting others' lives, health and property from damage and danger. In fact, “traffic safety” is an auxiliary concept for “life”, “health”, and “property” (Tolvanen 1999). Environmental values are also becoming an objective of protection in traffic. Since traffic safety is not a real entity per se, it must be realised through the actual entities of life, health, property, and environment. Although there is understanding of the objectives of traffic safety, the legislation does not convey the characteristics of the essentials of safety. The terms “non-injuriousness” or “non-damageness” would be more explicit than “safety” because they refer more precisely to the aim. (Lehtimäki 1995, 1996.)
Lehtimäki (1995) suggested an a priori definition of traffic safety which was independent of the damage and other consequences and which was based on some relevant entities and relations. Such a definition would be positive because it would indicate what safety is. It is not clear that such a definition exists. If it does exist it depends on the ethos of people or philosophy and is a convention. Scholarly research can help to explicate it.

Lehtimäki (1996) also remarked that traffic accidents only occur within a traffic system. Traffic safety work includes plenty of cases where an entity is introduced into a traffic system. For instance, a new idea is applied to a vehicle, a road is built across a field or a citizen is trained to drive. Studies often rely on “before and after” thinking, which means that accident statistics would be compiled before and after intervention such as driver training. It would be easy to assess intervention by comparing the statistics with each other and with possible control statistics. This is simply impossible because there are no fully comparable driver accident statistics before licensing. Trying to imagine statistics here leads rather to science fiction than science. Of course, it is possible to assume the negative safety of an entity before introduction, e.g. risk thinking. The assumptions seem to include bias and uncertainty.

(f) Criticism of the negative criterion

A deficiency in the accident-based definition is that an accident cannot normally be utilised in driving as a real-time perception. For instance, a driving trainer has to stress existing entities, i.e. pedestrians, road signs, and brakes. Since accidents are not normal during driving practice they are not useful teaching aids. There have been scholarly attempts to eliminate this deficiency. The various criteria, contributory factors in accidents, and surrogate measures were intended to indicate the potential for damage. Moreover, the application of the risk concept also intermediates between the available data and the absent accident data. The trainer informs the trainee about the risk, describing its real characteristics in traffic. There is an urge to link the accident concept with data to demonstrate the validity of measures.

Although a negative definition of safety is possible and useful it is not sufficient in all situations. Developing a positive definition of traffic safety is of great importance to traffic safety work. The positive definition would be formed

• by means of real entities that are not open to speculation either,
• in advance and independent of the phenomenon to be avoided, i.e. the concepts of damage,
• by means of a variable covering the whole range of safety- and danger-performance and
• extension beyond traffic systems.

Lehtimäki (1996) also pointed out that the laws only affect action. Thinking is free. For instance, a researcher is allowed to criticise the legal system and to consider other possibilities than are permitted in law. In practice, many legal principles affect thinking, hindering criticism and new solutions.
In brief, the negative definition of safety and the definition of an accident have bound the thinking of traffic researchers and professionals, as individual autonomy and legal praxis suggest. However, some ideas about the positive aspect also emerge. Evidently, traffic safety has two criteria. One is based on the lack of accidents and the other on some actual harmonious circumstances not explicated up to now. This way of thinking is supported by the progress in Environmental Education. The question remains of what kind of safety an ordinary driver thinks about, while performing in traffic, if any. Following negative definition he or she must fit driving with thinking about possible harmful results. Following the positive thinking he or she perceives and performs in the actual situation. The latter way seems simpler.

1.2. Driver training and related topics in the literature

In 1907, when there were not much more than a hundred automobiles in Finland and only a few in Helsinki, driving an automobile was subjected to licensing in Helsinki. A licensee had to be at least 18, sober, normal, and confident, and he or she had to be fully acquainted with the structure, servicing, and steering of an automobile. The number of automobiles increased and the supervision of traffic developed. In 1915, mandatory driver training was introduced in Helsinki, including a medical check. However, the first national decree in 1922 required no mandatory driver training, which was introduced in 1926. It could be either professional training or training by someone provisionally permitted to do so. (Sornikivi & Höök 1997, 2–7). Driving school training was then legalised, even though it was subjected to certification. “Training of trainees on the public roads was no longer ‘illegal’ (Melin 1988)”. The core of supervising driver training is the control of practice on the public roads. Driver training can be seen as a response to the legal and administrative demands of society.

Automobile sellers and motor mechanics often trained their customers, as well as members of family and friends training each other before the compulsory driver training.

The two driver training types, i.e. driving school and permission training, now dominate in Finland. While driving school training is supported by government and is firmly supervised, permission training is a spontaneous activity of families, lacking social resources and development. The effect of permission training on safety is often questioned.

These two driver-training types function in many countries. Of course, there are cultural and legal differences. Driving school training is also called professional training and permission training is often called non-professional, lay instruction or private training, even in Finland where driving schools are private enterprises.
Reports on the influence of the driver training types and relevant literature surveys are summarised in appendix 2, which also shows the page numbers of the quotations. Some tendencies were noticed in these studies:

(a) Criterion

In the driver training studies the negative criterion prevailed. Various methods of associating the criterion with relevant phenomena were reported. (See Traffic safety in the literature, p. 4.) While Vaaranen’s (1998) positive safety thinking contributed to driver training, she did not definitively research it. One of the most recent reports by J. A. Groeger and S. J. Brady (1999) used the driving exam as the ultimate criterion, avoiding consideration of the negative criterion. While the authors of the EU report edited by Siegrist (1999) adopted the negative safety definition and the appropriate grid based on driver behaviour and essential curriculum functions, they argued only by appeal to received expert opinion. They replaced the missing definition of safe driving with appropriate functions in driver training. In addition, while the graduated licensing system of New Zealand, Australia and North America strictly started from the high crash rates of young people, it supports their maturation educationally and controls their inexperience administratively (Insurance Institute for Highway Safety & Highway Loss Data Institute 1999).

(b) Accidents, violation, and risk-taking

Lauer (1960) suggested that driver training “helps one to stay out of accidents” in his work related to the psychology of driving and accident proneness. However, it has been subsequently established that there are very few studies which convincingly demonstrate any causal relationship between the reduction in accidents and a training form (The OECD 1990). Hatakka et al. (1996), for instance, found no difference in the number of accidents between drivers from driving schools and private training. Indeed Hatakka et al. (1998a) suggest that good general education might actually help to reduce traffic violation and risk-taking. Positive accident trends seem to follow reforms in the driving training system post 1990 in any case (Keskinen et al. 1999). Generally, Evans (1991) reasoned that so much of the aim of organised training is learned by trial and error and by experience that marked changes in training and education could not have been established.

(c) Skill and risk

The OECD (1990) report distinguishes between driving skill and the way the skill is applied. Skill is like a method of taking precautions. A high level of driving skill is associated with high accident risk. There must be values, motives, and other human factors characterising the application of the method. Indeed, Wilde (1994) suggests that better driving skill is not associated with greater safety. Häkkinen (1958) previously stated that driving instruction provided too early in real traffic, without any quiet practice on an isolated area, caused harmful sudden inactivity, speed, and tension. The pupil then simply hopes that he or she will manage to drive somehow.
Several reports noted various administrative viewpoints. Some reported the inherent relation between applied human research and administration. Some simply took an ethical or common-sense viewpoint, leaving an incongruity in the argument.

Observation of administrative action. Since traffic research is part of applied human research, it often focuses on administrative implementation such as Sweden’s lowered age for driver training (Gregersen 1997). Once the state had permitted this, many more parents utilised it in family education, training their dependent children. Once the children become adults, it is no longer so easy to train them. While Gregersen et al. (2000) clarified the influence of the Swedish reform of lowering the age limit from 17½ to 16 years for car-driving practice, they produced a good example of research which supports the actions of road administration.

An administrative measure can also be an inherent component of driver training. For example, the graduated licensing system controls dangerous aspects of maturation, such as the inexperience of young people (Insurance Institute for Highway Safety & Highway Loss Data Institute 1999).

Hatakka (1998a) concluded among other things that social equality justifies the permission training system, providing explicit arguments for this. The notion of social equality should favour licensing of poor people and those living in remote areas.

Implicit common sense or ethical arguments. Various authors suggested common sense or ethical measures without an explicit argument or appropriate administrative-legal considerations. Some administrative reports simply preferred professional training to lay instruction (Spolander et al. 1984, Directorate General for Transport of the European Commission (1995), and Liikenneministeriö (1995)). While Gregersen (1991) preferred the liberty to choose individual freedom and the training form, he did not explain his choice. While Hatakka et al. (1996) mentioned that the role of professional training is also to maintain the general level and to take care of the most problematic candidates, they did not clarify their position. Hatakka (1998a) and Keskinen (1998) feared the growth of permission training because of difficulties in supervision, but they did not show that it involved demonstrable difficulties. Although Siegrist (ed.) (1999) saw the selection of better educated parents to train their children as a social equality problem, they did not report any violation of civil rights or any reason to restrict the parents’ rights. Brown et al. (1987), having stated that “the contribution of current driver training methods to road accident reduction is largely unknown”, continued without argument: “but [is] almost certainly less than it could be”.

Inconsistency. While Spolander et al. (1984) did not consider it practical to raise the level of the drivers’ exam, they inconsistently suggested the incorporation of private training into driving school training in Sweden. If the drivers’ exam fails to identify competent drivers, how do we know that the
arrangement of driver training is appropriate? The team of the Ministry of Transport and Communications in Finland (Liikenneministeriö 1995) favoured professional driver training at the expense of the traffic safety criterion. The team did not stress the individual autonomy and rights in road safety, e.g. life, health, and property, as against the right to conduct professional driving schools.

(e) Choice and general education

Some authors noted that the trainees chose one of the two training forms, resulting in differing trainee populations in the professional driving school and private training. Spolander et al. (1984) considered this, relating it to the age and gender differences between private and school trainees. Wilde (1994) reasoned that the choice was made on the basis of personal characteristics associated with accident involvement. Hatakka et al. (1996) and Hatakka (1998a) also noted that the trainees chose between the driver training forms, relating their choice to the general education, like Siegrist (ed.) (1999). Gregersen et al. (2000) also found that the families of the interesting 16-year-old group had the highest education.

Groeger and Brady (1999) reported that, while the vast majority of driving test candidates take some professional driver training (97%) in the UK, most also drive with friends or relatives in the course of learning to drive.

(f) Methodological difficulties

Since previous authors reported essential methodological difficulties in driver training studies, comprehensive preliminary work was conducted to overcome these.

Shaoul (1976) reported the methodological problems and difficulties in researching driver training and retraining, as did Lund and Williams (1985), as well as some authors on the basis on the latter’s work. Spolander et al. (1984) mention the difficulty of improving the driving exam and compared private and school-trained drivers. Since the families of their interesting 16-year-old group had the highest education, Gregersen et al. (2000) had to overcome a methodological difficulty in the comparison between the different groups. Since Siegrist (ed.) (1999) replaced the objective criterion validity by ‘consequential’ validity involving improvement of training and practice and did not separate competent drivers from incompetent, the analysis of the EU report showed a methodological difficulty in respect to validity.

(g) Behavioural changes

Behavioural changes among driver trainees did not always produce effects on accidents (OECD 1990).
(h) The family context of driver training

Training in the family context amasses experience for the trainees and stabilises their visual routines. Families actually match driving schools. The private trainer also learns, raising thus the level of the road user population.

Spolander et al. (1984) characterised private training as follows: it is cheap and relaxing, thus having educational value; it is permitted, but to be systematically incorporated into school training, it has no curriculum, is an obstacle to developing driver instruction, and is a deviation in Swedish educational context. The Directorate General for Transport of the European Commission (1995) also reported that lay instructors train their trainees less expensively, giving greater mileage and amassing more experience than professional training. Since private training also produces driving practice more cheaply, it is more relaxing than school training, and stabilises the visual routines of trainees, Spolander et al. (1984) consider that it has educational value. A "large pool of knowledge" was also attributed to training in the family context (Evans 1991). Hatakka (1998a) reported the possible influence of private training on the trainer.

Groeger and Brady (1999) found that practice with non-professional instructors was a more important determinant of successful acquisition of driving skills than professional training. The resources on parents are essentially involved in the graduated licensing system (Insurance Institute for Highway Safety & Highway Loss Data Institute 1999). Gregersen et al. (2000) state that prolonged practice by the learner driver, normally with a family member, produced reduced accident involvement.

(i) Omission of private training in reports

Various authors researched professional training, ignoring private training. Some even use the terms “training” and “education” in the sense of professional activity only. If observed at all, the potential of families for driver training was considered as against professional training but not for its own characteristics, abilities, or functions. For instance, since parents know their child from birth, they do not need quick diagnostic competence like traffic instructors. While professional instructors have to give their instruction effectively in a short time, the lay instructors have time enough to train their child.

Parenting training was not always considered when dealing with driver training, implying a focus on professional or “organised” activity (Häkkinen 1958, Brown et al. 1987, Keskinen 1998, Evans 1991, Directorate General for Transport of the European Commission 1995, and Siegrist (ed.) 1999). While Keskinen et al. (1999) reported on their sophisticated two-phase professional driver education system and its positive accident trend, they did not compare it with the parenting training system. They even omitted the legal option of other Finnish citizens than the qualified traffic instructors to train a driver at the second phase (as did Siegrist (ed.) (1999), p. 62). Professional driver training was favoured without sufficient empirical evidence on
permission driver training and parenting (Liikenneministeriö 1995). Although Gregersen et al. (2000) calculated that “accident involvement was approximately 35 times higher during the first 2 years after licensing than during the 2 years of practising”, they did not consider the influence of the private supervisor and the interaction between him and the learner driver.

(j) Professional training

The characteristics of school training are as follows: it is expensive, causes nervousness, is open to educational development, and essential in the Swedish educational context (Spolander et al. 1984). Professional driving instructors are able to structure their driving lessons systematically, are in a better position to recognise learning progress and identify mistakes and also know how to integrate theoretical and practical instruction (Directorate General for Transport of the European Commission 1995).

No extra benefit from professional training was noticed (Brown et al. 1987, Gregersen 1991, and Hatakka 1998a). Professional instruction did not appear to enhance success in learning, but those who received more professional instruction were likely to learn more slowly (Groeger and Brady 1999).

The schools may also induce people who have no real need for a licence to undertake training (Siegrist (ed.) 1999).

(k) Professional and private training

While Spolander et al. (1984) presumed that school training produced safer drivers than private training, The Directorate General for Transport of the European Commission (1995) recommended compulsory training by professional driving instructors, and Gregersen et al. (2000) favoured the correct training methods of professional instructors as against the uncritical methods of lay supervisors, whose bad habits can be acquired quickly.

Since private driving practice has educational value, it should be systematically incorporated into school training (Spolander et al. 1984).

While Gregersen 1994 found that professional education had no significant effect on private training, the increased experience associated with lay instruction was a factor in improving safety along with formal education (Siegrist (ed.) 1999). A few weeks of professional driver education adds only a modest increment to the large pool of knowledge received in the family automobile environment of motorised countries (Evans 1991).

In brief, professional driver training has been studied almost exclusively to the exclusion of the familial or lay viewpoint. While arguments for and against professional training have been produced, familial training is a blank spot on the map.
Considering traffic safety education in the light of Finnish law, Lehtimäki (1995, 1996) dealt with the principle of individual autonomy, which means that individuals are primarily free but are not allowed to impair each other’s rights. He also discussed the principle that “Traffic is always regarded as dangerous”. Care is demanded of road users (the Road Traffic Act 267/81, 3§, see above). Since drivers of motor vehicles must be trained and licensed, driver training is a response to the legal demand. The core of the legal demand is careful action, i.e. being “as careful and cautious as the circumstances require”. Their abilities, skill, and knowledge of a driver must exceed this demand, when the legislator thinks the driver is competent. Unfortunately, the formal demand is not defined very objectively. The aim of the driving exam is that “the candidate master matters included in driver training and that he or she be able to apply them and to perform safely and fluently in traffic” (Driving Licence Decree 845/1990, 26§). The aim is partially defined by the matters to be evaluated in training. The exam should concentrate on proper performance in traffic but the term “safely” is implicit as in all road traffic legislation. Neither is the aim explicitly deduced from the basic rule (the Road Traffic Act 267/81, 3§) (Cf. also the definition of the criterion for driving testing in Siegrist (ed.) 1999.)

Of course, a driver can perform more carefully than the law demands. It would be wise but is voluntary.

In his statistical study of driver training type and performance in the driving exam, Lehtimäki (1998) found that type made a difference between it and all available independent measures at a very significant level (cf. Hatakka 1998a). These were sex, age, and mother tongue of driver, deviation from the instruction system and the need to wear eyeglasses. Although the independent variables could be seen as surrogate variables of the negative safety definition (Brown et al. (1987), see p. 6), this finding meant a crucial difficulty in comparing statistically between the different training groups, because a good randomised sample could not be drawn from a population. These factors meant that the trainees did not choose their driver training type at random but according to their personal circumstances. This methodological difficulty was increased by the finding that some independent factors conducive to endangerment, such as masculine gender and youth, seemed to be associated with permission training. (Cf. Shaoul 1976, Lund and Williams 1985, and Siegrist (ed.) 1999, also see p. 11.)

Lehtimäki (1998) also found differences between the training form and the dependent variables available, viz. mistakes in theory and road tests and number of attempts before acceptance in theory and road tests. In these tests the school trainees were more successful than the permission trainees, except in the road test. It was worth noting that while the permission trainees were better at the educational road test they were administratively rejected more often in licensing on that basis compared with the school trainees. There was insufficient evidence to explain this finding exhaustively, but it raised the question of whether the authorities lacked knowledge of the context of individual permission cases and whether they were prone to require more
training in the critical cases when they were not convinced about the ability of candidates.

The problem of introducing an element into the traffic system was also discussed (Lehtimäki 1998). While accidents before licensing are rare and, moreover, represent either non-car, illegal driving or incidents of damage caused by a trainee, they do not provide a general evaluation of car driver training with sufficient and unbiased data. In all, this preliminary work suggested research into the school and permission drivers’ personal conceptions of training and safety, relying on their competence to account for them.

In brief, professional training was not shown to result in safer drivers than those trained by laymen, given the negative definition. Possible differences noticed between the training forms and surrogate variables and safety seemed to have resulted from the selection established by some independent factors, such as sex, age and general education. Nevertheless, several authors distrusted permission training.

In fact, a simple comparison between the forms is inappropriate for four reasons. Firstly, it is a question of whether a training form provides drivers capable of driving according to the legal demand; there is no competition between the forms, which would result in the illegalisation of the loser. The comparison between forms simply means a way to evaluate their good and bad aspects so as to develop them. Secondly, may it be that the driving school course can be regarded as a sensible research subject but permission training is an inseparable part of family life, providing no good research subject without any taking a long perspective on family function. Thirdly, the training forms are mutually dependent through the family functions. Even driving school is based on the education given by families. Fourthly, the driving exam is the official method by which the state controls the competence of drivers. Comparing simple statistics on the forms does not resolve questions in particular sub-populations.

Driver training research is also characterised by other methodological difficulties. These are associated with the before-after design. The selection of the training form hinders comparison between the training groups. There are no driver accident statistics before licensing.
1.3. Expert opinions about driving and training in the lifelong context – concluding the preliminary work

The concluding preliminary task was an expert interview. Its purpose was

- To obtain a preliminary contact with expert opinions about driver careers,
- To obtain experience on qualitative methods, particularly ethogeny, which has seemed promising for the main study (Harré 1988, Hakanen 1991),
- To help to outline the research problem and to clarify tasks.

Seven experts who had opinions about car driving and its prerequisites were invited to the interview. Table 2 describes them.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Point in driver’s life, proficiency</th>
<th>Functional connection with driver’s career</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Traffic instructor</td>
<td>Training</td>
<td>Education, transmission of traffic culture</td>
</tr>
<tr>
<td>(2) Permission trainee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) School trainee</td>
<td>Driving, creating a driving career, managing personal life</td>
<td>Acquiring knowledge and skill, managing traffic</td>
</tr>
<tr>
<td>(4) Permission trainee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Examiner</td>
<td>Driving exam</td>
<td>Accepting traffic knowledge and skill</td>
</tr>
<tr>
<td>(6) Police officer</td>
<td>A driver’s whole career, enforcement</td>
<td>Legal acts directed at driving, monitoring drivers and their activities, transmission of traffic culture</td>
</tr>
<tr>
<td>(7) Insurance lawyer</td>
<td>A driver’s whole career, insurance law</td>
<td>Assessment and compensation for instances of damage caused in traffic</td>
</tr>
</tbody>
</table>

Table 2. Description of the experts interviewed about their opinions on car driving and its prerequisites

The beginning of the interview was an open discussion about a driver’s career, while the rest consisted of a fixed set of four themes. After some small talk the interviewer, i.e. the researcher, asked the interviewee to talk about everything he or she regarded as important in a driving career. All interviewees talked freely. The interviewer asked questions when necessary and kept the discussion on the subject. After the interviewee finished his or her own comments, the interviewee introduced four subjects in turn:

(1) What is danger in traffic?
(2) What is traffic safety?
(3) Is the automobile necessary in the society?
(4) What does the interviewee think of driver training?

An interview taking two hours was summarised individually. Every interviewee checked his or her summary, and two of them emended their texts.
The method of analysis was adapted from Hirsjärvi & Hurme’s model (1993). Firstly, the individual interviews were examined and 26 individual main categories and their characteristics, in addition to the researcher’s four main categories, were formed. This produced the individual summaries.

The overall summary, with two main categories with sub-categories (appendix 3), was compiled from the individual summaries. The main category of a drivers’ chronicle consisted of the opinions of a driver’s career, while the other main category consisted of the opinions without chronological connections.

<table>
<thead>
<tr>
<th>(A) Driver’s career</th>
<th>(B) Driver’s non-chronological values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Experience before official driver training</td>
<td>1. Danger in traffic</td>
</tr>
<tr>
<td>2. Motives for driver training</td>
<td>2. Traffic safety (term, definition)</td>
</tr>
<tr>
<td>3. Driver training manoeuvring</td>
<td>3. The necessity for an automobile</td>
</tr>
<tr>
<td>4. Driving exam and driving licence, perception, manoeuvring, “traffic eye” as a criterion</td>
<td>4. Beliefs, attitudes, opinions, personal interpretations</td>
</tr>
<tr>
<td>5. Intermediate phase and the speed limit for new drivers</td>
<td>5. Culpability and compensation for damage</td>
</tr>
<tr>
<td>6. Second phase</td>
<td>6. Gender and traffic</td>
</tr>
<tr>
<td>7. Initial phase of autonomous driving, young drivers</td>
<td></td>
</tr>
<tr>
<td>8. Being accustomed to driving, the reality of driving, continued training, “traffic eye” as a driving skill, family driving, consequences and sanctions</td>
<td></td>
</tr>
<tr>
<td>9. Diminution of driving ability and performance (excluding danger and safety)</td>
<td></td>
</tr>
<tr>
<td>10. Abandonment of driving</td>
<td></td>
</tr>
</tbody>
</table>

The expert opinions covered an ordinary driver’s career from traffic education in childhood to giving up the car in old age. Their opinions of driver training stressing permission training and parenting were noted (appendix 3).

Family education, either collaborating with school training or including permission training, was important, while both training forms were a part of the education the parents give their children.

A family also forms a natural unit educating and safeguarding its members. A family influences the whole life of an individual. It can give pretraining, training, retraining, and continued training. Apart from a family providing a basis for driver training, and arranging, monitoring and supporting it, it can promote its member’s driving skill after licensing. The two training forms mean freedom to choose a suitable method.

Trained traffic instructors work in a driving school, employing teaching methods and aids. In practice, trainee receives minimal driving practice. A
driving school course is too short to affect a trainee’s values to any significant extent. A driving school is always possible, but it costs.

Permission training is possible for families who are interested in it and willing to apply it. In choosing permission training, the family must accept some prior arrangements. Training is a part of the family functions and education, simultaneously influencing the learner’s values. Driving practice is plentiful. The trainer and the other family members also re-learn driving skills and knowledge.

The findings suggest that permission training can be developed by the trainer’s preparation, models of giving feedback, self-criticisms, family members’ mutual support, and driving school facilities. It is worth noting that among the findings of the driver training literature review there was some neglect of private training, indicating passivity on the part of the authors in developing it (see Omission of private training in reports, p. 12).
The properties of danger and safety were either omitted or existing as described in table 3.

<table>
<thead>
<tr>
<th>Type of properties</th>
<th>Danger means:</th>
<th>Safety means:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omission, malfunction</td>
<td>• Absence of perception, vigilance and anticipation</td>
<td>• Lack of danger</td>
</tr>
<tr>
<td>(negative)</td>
<td>• Using senses only (not brains)</td>
<td>• Lack of damage</td>
</tr>
<tr>
<td>Something which is</td>
<td>• Ignorance, absence of understanding</td>
<td>• Fear of danger</td>
</tr>
<tr>
<td>not included or has not</td>
<td>• Rashness, misconceptions, indifference</td>
<td></td>
</tr>
<tr>
<td>been done or which does not</td>
<td>• Absence of control, incompatibility</td>
<td></td>
</tr>
<tr>
<td>function properly</td>
<td>• Absence of concentration, depression, absentmindedness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Absence of tolerance; suddenness, surprise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Undeveloped character, inexperience, weak personality, youth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Criminality (not obeying legal norms)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lack of traction (The wheels don’t grip the ground)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Depressed activity such as drunk driving</td>
<td></td>
</tr>
<tr>
<td>Existence</td>
<td>• Life (simply being there without intention)</td>
<td>• Culture, social milieu, caring (social or ordered life)</td>
</tr>
<tr>
<td>(positive)</td>
<td>• Activity (simply acting without intention)</td>
<td>• Administration (ordered life)</td>
</tr>
<tr>
<td>Something which is</td>
<td>• Elks (a creature whose actions is not understood by a driver)</td>
<td>• Control of and adaptation to driving, following rules,</td>
</tr>
<tr>
<td>there.</td>
<td></td>
<td>maintaining tolerance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Perception, vigilance, anticipation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Knowledge, thinking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strong personality (&quot;ordered&quot; human being)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Being reprimanded (receiving feedback)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Health, ability to act, hobbies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Action, protection (intentional)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Using safety aids</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Intentional withdrawal of driving licence (for loss of driving ability)</td>
</tr>
</tbody>
</table>

Table 3. The properties of danger and safety
It can be seen in the table that there were actual properties of danger and safety in the ontological sense. Danger and safety were regarded as phenomena of activity or lack of activity. Since dynamic rather than static features were essential, the understanding of danger or safety is not anchored to some fixed point.

The expert interviewees’ opinions of danger and safety were dichotomous in that the positive features of safety corresponded inversely to the negative features of danger. The negative type of danger meant lack of function or malfunction, while the positive type of safety meant proper action. Danger seemed to be passivity or inappropriateness. Safety must be worked for. In this sense, danger was an unplanned phenomenon or something chaotic, while safety was intentional or something social or ordered.

The negative features of safety seemed to be double negations because danger and damage are a kind of negation per se. While the negative definition of safety was inherent here as well, that is, safety is the lack of danger and damage, the notion of positive safety was also confirmed by many expert opinions.

It was noteworthy in the positive features of danger that life and activity were considered as dangerous. Life must be safeguarded but activity may be dangerous as well. Life is dangerous and people make mistakes. Elks seemed to have been understood as danger, perhaps a symbol for various mishaps.

The positive features of danger, i.e. life and activity, had analogous features in positive safety. Life corresponded to culture, i.e. organised life, and health, a prerequisite for life. Activity corresponded to defined functions, e.g. administration, perception, thinking, control, and protection. There was a dichotomy consisting of unorganised and organised aspects, so that life seemed to have both an unorganised aspect, i.e. danger, and an organised aspect, i.e. safety.

Generally, the expert interviewees were interested in what danger is not and in what safety is.

Road behaviour is a large and complex sector of social and individual life. Driver training and education extend almost over a person’s whole life. A young child as passenger can efficiently learn traffic signs and perception and also teach an adult driver attitudes. Members of a family or a peer group give mutual feedback. Learning is informal and natural. There are plenty of ways to learn driving in our modern traffic society, the official phase of driver training covered by a curriculum being only a brief but visible part of it.

Families are important social units which educate their members to be mobile, to drive, and to survive. Parenting usually includes official driver training while a young person is becoming an adult. Families have two alternatives: driving school or permission training. Families can choose among their resources and motives. Briefly, school gives good theory teaching but is expensive, while
permission training gives plenty of driving, but needs special arrangements. While both forms of driver training depend on family education this dependence imposes a methodological demand on data collection and analysis. In comparing the forms, their relations with functions of a family have to be controlled. What viewpoints were adopted when choosing a form? How were they related to safety? How did the family support its member before, during, and after the driver-training course?

In the expert opinions, safety and danger were understood as processes, e.g. some kind of doing, neglect, or abstaining from doing. The experts did not explicitly report what danger is and, especially, what safety is. Table 4 summarises the expert opinions:

<table>
<thead>
<tr>
<th>Process</th>
<th>Danger</th>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ways to promote safety.</td>
<td>Deficiency in actions, neglect</td>
<td>Activities</td>
</tr>
<tr>
<td>Ways to cause damage.</td>
<td>Unintentionality</td>
<td>Intentionality</td>
</tr>
<tr>
<td>How can safety be maintained?</td>
<td>Life as such</td>
<td>Lack of unfavourable consequences</td>
</tr>
<tr>
<td></td>
<td>Negation of activities</td>
<td>Negation of negation</td>
</tr>
<tr>
<td></td>
<td>Disorder, lack of control</td>
<td>Order, culture</td>
</tr>
</tbody>
</table>

Table 4. The expert opinions referring to the aspects of the process or essence of danger and safety

Danger meant chaos while safety meant order. Unorganised life was dangerous and organised life was safe. Ordered society supports traffic safety. The experts knew how to create safety or danger but they did not explicitly know what these were. The essentials of safety and danger were not completely understood. This weakens the possibility of anticipating. Contemporary safety education means to train activities which are considered safe and impart knowledge concerning those activities.

The principles of ethogeny could not be matched with the expert interview. While ethogeny is designed to capture knowledge on the perimeter of an interviewee’s consciousness, the experts were very well aware of the topics they were canvassed. Although the researcher could not identify the intrinsicality of safety in their expressions, they themselves did not conceive any unfamiliarity. A surprise was the huge amount of data obtained by open interview, which provided excellent empirical contact.

1.4. Previous contributions: summary and conclusion

1.4.1. Criticism of the accident criterion

Traffic safety was generally understood negatively, i.e. as the lack of traffic accidents. While accidents as such provide statistics suitable for the ratio
scale in quantitative research, they can only describe the elements and phenomena of the traffic system. When an element, such as a driver, is introduced into the system, surrogate measures are needed because accidents alone do not provide sufficient information. The concept of risk as well as various short-term and intermediate criteria relate the accidents to preceding relevant happenings and circumstances. The weak point of this mechanism is that the ultimate criterion, i.e. causing no damage, must be abstracted from present data. The data as such does not actualise this notion of traffic safety.

Traffic safety can also be abstracted from accidents collectively. For instance, a researcher can compare a group of school trainees with another group of permission trainees in a before-and-after design. This method involves difficulties and danger. The students’ selection of training form precludes assuming the equal probability of elements being drawn into the sample, hindering simple comparison between the training groups. Moreover, since there are no driver accident statistics before driver training and licensing, quantitative methods require assumptions which are liable to bias.

The definition of an accident is a convention which varies. It may be understood as a harmful consequence of a causal process in traffic. Thus an accident only negatively characterises the process. Its nature is far from being completely understood and the accident indeed often seems to happen “by accident”. However, it is only the process which can be affected not the consequence per se. While an accident results from some preceding process, it is obvious that this process is independent of the accident itself. There could be several processes resulting in the accident and it is difficult to work the accident back to the processes. Whether an accident is understood as a consequence or as the preceding process does not seem to make an essential difference. In both cases the consequence must be known in order to characterise the process.

Finally, success in traffic safety work results in diminishing the quantity of information on which the elimination of the remaining accidents should be based. It is obvious that the elimination of the “last remaining accidents” necessitates a criterion other than the lack of accidents. It is impossible to develop safety measures without accident information in the negative thinking. Accidents must happen to provide knowledge of how to prevent them. If no accidents eventually take place this state cannot be maintained since accident information is also obviated.

1.4.2. The need for a safety criterion for driving training

It is not so easy to learn to avoid something as to achieve something because of the difficulty inherent in the goal of avoiding an abstraction. Negative sanctions are typical in learning to avoid something. In education these are not as good as positive ones. It is known that rewards are preferable to punishments in learning and that indifference is the worst choice.
Focusing on accident statistics may result in objectivity of thinking declining. Fatalities and injuries are dramatic and may draw attention to aspects which do not advance safety work. An example is the expression “lives have been saved” in relation to comparing successive annual fatality statistics. In fact there are no real persons whose life were saved without suggesting that people were brought back from the dead. The phenomenon is purely arithmetical and epistemological. After all, a number of accidents will happen.

There has been a demand for driver training studies to derive a method of determining traffic safety from the data which become available when drivers are trained. It could be hypothesised that traffic safety could be explained by two criteria, the negative and the positive. If traffic safety is determined by the lack of accidents one could ask what remains when accidents are completely lacking. Is there any consensus which it is worth aiming at?

Professional training was not shown to result in drivers safer than those trained by laymen. There is strong selection for the different training forms. A simple comparison between the forms is inappropriate for three reasons. Firstly, it is enough to decide that a training form itself fulfils the legal standard which the driving exam tries to establish. Secondly, while a driving school course can be regarded as a distinct research subject, permission training is inseparable part of family life. Thirdly, the training forms are mutually dependent or at least correlative through the family functions.

Driver training research also encounters methodological difficulties with the before-and-after design. As mentioned above the selection of the training form hinders comparison between the training groups. Moreover, since driver training has introduced drivers into the traffic system, there are no driver accident statistics applicable to this kind of research before licensing.

The expert interviewees conceived danger as chaos and safety as order. An unorganised life was dangerous while organised life was safe. Organisation improves the anticipation of traffic incidents, which improves safety. However, danger and safety were related to context, including a component to be determined, which impairs the ability to anticipate. Danger and safety were dynamic, having no fixed point. Safety meant intelligently safeguarding life, i.e. the certainty that life continues. Its neglect increased the potential for damage, i.e. danger.

1.4.3. The concept of chance

A concept of unexplained and unpredictable factors in traffic called chance in this study, emerged in the safety literature and the preliminary work. Chance was some kind of description of personal chaos which the conceive did not control. Its opposing force was anticipation (see “Experts opinions about driving and training in the lifelong context”, p. 16). It is also a fundamental principle of road traffic legislation (Lehtimäki 1995,1996). Arguments concerning this in the literature were as follows:
• Some unexpected component involved in an accident according to the safety literature (see “Traffic safety in the literature”, p. 4).
  - Tillman and Hobbs (1949) concluded: “We must wait until society is convinced that accidents are not always chance happenings, and that sometimes they reflect the basic personality of the individual.”
  - Häkkinen, S. (1958) anticipated sudden inactivity, speeding, and the tension of a driver trainee if he or she was taken into real traffic without any initial practice on an isolated place (see Driver training in the literature, p. 8).
  - Baker & Ross (1960) stated “Accident - An event, occurrence, or happening which is unexpected or undesigned, which has an element of chance or probability, and which has undesirable or unfortunate results”.
  - Brown et al. (1987) concluded “Lack of information is reciprocally related to safety.” The instructors could have provided the novices with information, which would have depended on the success of the investigations. Thus drivers’ skills and safety could have been maximised. The concept called “chance” here corresponds with this lack of information.
  - Rothe (1991) stated “Accidents, by definition, are unexpected, uncontrollable events.”
  - Groeger & Rothengatter (1998) referred to a “forgetting factor” and “driver error” in accidents.

1.5. Clarification of the research task

Since society considers traffic to be dangerous, it demands driver training for drivers, who must be able to drive carefully. In practice, there are two driver training forms, school training, and permission training. The question was whether the latter produced drivers provided with proper safety knowledge and skill. However, the previous contributions revealed no reason to doubt permission training. The training forms have to fulfil the accepted safety level individually. The preliminary work produced these tasks:

1.5.1. Establishing a traffic safety criterion

Although the driving exam is the legal means of assessing the competence of a driver, it could not be utilised for the safety criterion. The aim of the exam includes “that the examinee master the matters included in driver training...” (Driving Licence Decree 845/1990, 26.1§). This clause is questionable because it relates the aim to training not to traffic. Seemingly, this clause had resulted in the calibration of the exam with school training because of the vested interest of school training. Lehtimäki (1998) also found that while the permission trainees in fact succeeded in the driving test with fewer errors than the school trainees, their applications, however, were more often rejected (also see p. 14).

The main difficulties of the accident criterion were also stated previously (see “Traffic safety in the literature”, p. 4). The safety criterion for this research had to be formed on an empirical basis.
The training forms had to be tested:

1.5.2. Comparison between the training forms and the safety criterion

The training forms had to be compared with the safety criterion and with each other in order to establish their degree of safety. A qualitative approach was followed, trusting in people’s expertise on their own life and in their ability to account for it. Since this approach is also known for its potential to produce surprising findings, possibly very useful ones, the task was remained rather open and no strict hypotheses were formed. Thus the main research was planned as an expedition into the “wilderness” of road safety and driver training, i.e. to the unknown land where we do not take our familiar laws and rules for granted (See “Land of phenomenography”, an internet link). However, the researcher preliminarily studied corresponding topics in “civilisation” in order to enable critical comparison of these with what may be found in the unknown land. This main research was largely focused on young male drivers.

1.5.3. Comparison between the conceptions of young male drivers, young female drivers, and master drivers

Understanding the opinions of the young male drivers demanded some point of comparison. In comparing the conceptions of some driver types, the characteristics of the training forms were described. While the young males are notoriously often involved in damage, the females are well known for their safe driving (about the accidents of the young drivers and differences between male and female drivers, see, for instance, Brown et al. 1987 and Laapotti 1991). Naturally, the opinions of the young females provided a good point of comparison. The opinions of the master drivers, who were concerned with safety matters in several other aspects of their lives as well, provided another.

1.5.4. Elaboration of the conception of chance as an example of an application

Since the literature review and preliminary experiences suggested that some unexpected element or lack of knowledge is usually a factor in an accident, the expedition to the unknown land was inevitable. This task was the least clear. It became plain soon after the start of the interviews that one of the most significant findings of this research was a phenomenon identified as chance and defined as an unexpected or unknown factor surprising a driver, which plays an essential role in safety thinking.
The scheme of the main research was:

<table>
<thead>
<tr>
<th>Research task</th>
<th>Method</th>
<th>Material</th>
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<tr>
<td>(1) Establishing a traffic safety criterion.</td>
<td>Modified phenomenographic analysis subsumed into systematic analysis.</td>
<td>Interviews applying inquiry principles of brief therapy and modified for phenomenographic data acquisition</td>
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<tr>
<td>(2) Comparison between the training forms and the safety criterion.</td>
<td></td>
<td>The themes of the interviews covered the conceptions of traffic safety and driver training more extensively than was needed to note the context (performance in traffic vs. traffic safety and driver training).</td>
</tr>
<tr>
<td>(3) Comparison between the conceptions of young male drivers, young female drivers, and master drivers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Elaboration of the conception of <em>chance</em> as an example of an application.</td>
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Chapter 2. Method – systematic analysis, including phenomenography

The following methodological viewpoints were established in the preliminary work:

- The negative safety criterion is not very conducive to evaluating the driver training forms. While a driver produces no unbiased driver accident data before licensing, comparison between individual before and after statistics on the accident criterion is inappropriate. While a trainee selects his or her driver training form, it is difficult to randomise the school and permission training groups.
- The surrogate criteria have been used to compensate for the deficiencies of the accident criterion. Ideas about the positive criterion are implicit.
- It is a question of generally promoting driver training and its forms, not rating them in order. It is enough that a candidate properly passes the driving exam, i.e. be a competent driver.
- Parenting, being dependent on the family functions, supports both training forms. It is not easy to match research subjects from each training form.
- A driver seems to have a traffic safety conception which directs his or her action.
- Danger and safety are regarded as activity and the lack of activity, not static features. These concepts are not anchored.
- We may rely on the competence of road users to report their own rules.
- Driver training and education extend over a person’s whole life.
- Driving is a social function.
- Differences exist on other criteria than safety, e.g. skills.

The methodological restrictions suggested research into the mental processes of road users in order to understand their mental potential. Their conceptions of safety were preferred to road accidents as evidence. This emphasised techniques by which data was acquired through language.

The core of data acquisition was interviewing drivers about traffic safety and driver training. They have encountered the safety problem and must have views on it. The rules and principles, properly derived from interview data, indicate how drivers cope with safety and danger. The appropriate conceptions of interviewees might help to complete the research tasks. Such qualitative and conceptual information was also easily merged with legal science. Both education and law tend to understand a person and his context. Usher and Bryant (1989) suggested that the intrinsic function of adult education concerns applications, while ‘foundation disciplines’ such as psychology and sociology contribute to these according to their paradigms. Legal science and related disciplines contribute the legal models, demands, and principles of individual autonomy to driver training research. Since adult education also contributes its findings to the legislation, these two disciplines liaise.
Overly limited information, such as is often provided by a quantitative method, could have impaired comprehension. Rantanen and Vesala (1999) provided a good example. The same questions are usually given to all respondents in quantitative attitude research, but respondents may comprehend a question in various ways. They may also relate an attitude to its various cognitive contexts, producing ambiguity in analysis.

The research was designed along the lines of systematic analysis, including the interview adapted to phenomenography and phenomenographic analysis. Systematic analysis means methods which help in investigating matters included in a theory or an idea like traffic safety (Scriven 1988, 131–149, Jussila et al. 1993, 157–208). Systematic analysis was applied as a framework, which can originate with all kinds of writing. This research focused particularly on conceptions to be compiled and needed a particular form of data acquisition, i.e. an interview. Phenomenography, being “the empirical study of the limited number of qualitatively different ways in which various phenomena in and aspects of the world around us are experienced, conceptualised, understood, perceived, and apprehended (Marton 1997)”, was seen as serving those purposes. Phenomenography became the main methodological approach, while systematic analysis served as a context, as well as a controlling framework, which supplied any deficiencies in phenomenography. The modification of phenomenography is described later (see Data collection modified for phenomenography, p. 32).

Since this research synthesises the facts of driver training, it is adult education scholarship. The demand for knowledge of learning and road traffic behaviour introduces psychology. Law also tends to understand driver training, as previously mentioned (p. 27). The educational driver training system has to be adapted to the legal system in force or an explicit argument of the deviation from this has to be supplied to the legislator.

2.1. The framework of systematic analysis

The systematic analysis framework was adapted from the Finnish article “Systematic analysis as an educational research method” (Jussila et al. 1993, 157–208).

Data matching the research tasks was compiled from the interviews according to modified phenomenographic principles. The summaries of the interviews served as the main data or corpus. The interviewees checked their own summaries and made changes when necessary. The interviewees were young male drivers, young female drivers, and master drivers serving as points of comparison. The themes were partly determined by the preliminary work, and were partly open to the actual interview situation. The interviews were tape-recorded and then transcribed. Some final data was collected from the driving exam cards. The researcher kept a diary about the interviews, also jotting down ideas as they occurred. The data acquisition is described later in detail (see Data collection modified for phenomenography, p. 32).
The interpretation of interview texts proceeded as follows:

1. The meaning was ascertained. (Conversion into the research terminology.)
2. The object of names and concepts was ascertained (when, for instance, humour, irony, and slang expressions interfered with understanding).
3. Allusions were interpreted (e.g. to road rules, reports, authorities, and the conceiver)

The researcher listened to the tapes. He carefully re-read the transcriptions in order completely to familiarise himself with each interviewee's expressions and ideas. Because the purpose was sensitively to listen to the interviewees as the experts on their own lives, no strict hypotheses were formed about the state of affairs. The findings were expected to arise only from the content of the interviews.

In analysing the summaries the researcher sought concepts and their definitions on which the analysis could be based, for instance "chance is an unexpected incident." The interviewees' premises and assumptions were examined because they helped in understanding the meanings of the conceptions. A weather eye was kept on tacit premises and assumptions.

The essential propositions were explicated after having found the main ideas of the transcriptions. Adding, limiting or completing the main idea with the information on the remaining comments produced the propositions. Thus it was also possible to reconstruct the text and translate it into the research terminology. This procedure constituted the summaries. Each summary thus compressed an interviewee's propositions and arguments.

The researcher's view or theory was developed in the process of analysis. Several views or theories might be formed even though these might be at variance. Of course, the interviewees' intention could not be changed.

The researcher also encountered incongruities and flaws in expressions used during the interview process as well as in subsequent analysis. If the evidence included internal incongruity the cause had to be found. Possible alternatives were:

* The researcher's misunderstanding. (E.g. humour being misunderstood.)
* Weak coherence of the evidence. (E.g. unrelated subjects in the same context.)
* An evasion by the interviewee. (He or she wanted to hide his meaning or simply talked ignorantly.)

The practical solution to such incongruities and flaws was to ask for explanation. Incongruities were also apparent in the phenomenographic approach, since it could be applied to all kinds of conception, not only those
directed to the world around us (see p. 33). Defining traffic safety thorough existing entities seemed to be “an anathema” as shown in the introduction.

The internal incongruities were interesting because they might reveal essential weak points in the safety values and understanding. There might also be flaws when something seemed to be lacking in the interviewees’ conceptual construct. It was necessary to identify them and their meaning. As reported later, the conception of chance in traffic constituted a kind of incongruity in controlled driving or a flaw in reasoning (see Chance findings, p. 123).

Individual items of data had to be seen in their contexts in order to draw sensible conclusions. In this research there was no absolute comprehension (see Fidelity of methods, p. 30). Instead, the emerging findings could be compared with some other standpoint, for instance, the legal system.

The variety of conceptions was explicated by the categories of hierarchical description used here to describe traffic safety. Comparison between school and permission interviewees was based on both the qualities of the categories of description and frequencies of the conceivers in them. Since the number of conceivers was explicitly determined, while the number of conceptions was discrepant with their qualitative character, the former was used as an indicator of conceptual activity. The concept of chance was elaborated as well.

2.2. Fidelity of methods

Uljens (1991, 97), describing phenomenography, began with the assumption that absolute truth cannot be achieved either in phenomenography or hermeneutics in general because “such a truth does not exist.” He considered appropriate, acceptable, and defendable interpretations as the goal. “Truth becomes a question of degree, not just a question of the dichotomy true/false.” This lack of absolute truth fits into the problem that our perception does not conform to physical verity, i.e. the problem of veridical perception (see On phenomenography, p. 32). Everyone constructs his or her view of the world with his or her imperfect senses and cerebral ability. This applies to mathematical figures, which are human constructions as well (Bunge 1999). We live in the relative external truth because we cannot perceive the absolute truth even if there is any. Since the absolute truth was not presumed in this present research, the results could not have been validated or generalised with its help. On the other hand, although we cannot perceive the absolute external truth, it might still exist, and any results seeming to it were worth reporting.

The question of the intra-individual truth corresponds to the subjective function and characteristics of a person and thus to the relative internal truth excluding an objective criterion as well. Since the truth is relative, and since several truths might actually be conceived, it is alluring to the scholar, not the least because the conceptions influence road performance.
Validity collapses in the qualitative approach in its usual sense of objective comparison, enabling us to agree with Uljens that appropriate, acceptable, and defendable interpretations are the goal.

Systematic analysis applies strictly to the time at which the corpus was created. The succeeding period could not have affected it, and essential circumstances may have changed since. This also conforms methodologically with the view that the truth is a construction, and that there is no objective truth. The interviews reveal lots of things about traffic safety and driver training. The question then is what the interviewees actually thought.

Because new, positive aspects of traffic safety were wanted, the research became an expedition into “the wilderness” of traffic safety and driver training, which lent itself to the phenomenographic approach. This demanded accurate data acquisition, structured to respond to new matters sensitively. (Uljens 1989, 53.) Findings are discoveries and the research may not necessarily be replicated (Johansson et al. 1985, 251; Perttula 1997, 10). The benefit of the findings from this uncharted territory may be their newness or their potential for confirming the findings of “civilisation”.

Sandberg (1995, 161), answering his question about whether phenomenographic results are reliable, stressed the researcher’s maximal fidelity to the individual conceptions of reality. A researcher must demonstrate how he or she has dealt with his or her intentional relation to the conceptions of the individuals being investigated. The researcher has to demonstrate how he or she has controlled and checked his or her interpretations throughout the research process. Establishing the reliability of the researcher’s interpretation based on the epistemology of intentionality is crucial. The reliability of results relating to objective reality falls outside the domain of interest. Obviously, the researcher must report all essential matters affecting reliability to the reader, although too much text, particularly quotations, confuses the reader.

Sandberg recommended phenomenological reduction as a way to maintain interpretative awareness in phenomenography. “That is, the researcher should strive to hold back his or her known theories and prejudices in order to be fully and freshly present to the individuals’ conceptions under investigation” (1995, 161).

Sandberg also denied what he calls “interjudge reliability”: “as phenomenographic results express knowledge as intentionally constituted, it is a fundamental mistake to judge [their] reliability ... by using interjudge reliability as a criterion (1995, 160).”

Since this research serves the descriptive conceptions, educationists, administrators, and practitioners who know the consequences of promoting traffic safety could critically test the findings in research, planning, and implementation and recommend appropriate measures (Niiniluoto 1983, 316). This technique accepts the principle that knowledge is firm belief. The technical norms of the measures take the form:
“If you want traffic safety you have to do X.”

The ‘X’ could be, for instance:

- Practise driving (to encounter the reality of traffic).

The executive summary of “Driver training testing and licensing” edited by Siegrist (1999, 205) served as an example of the recommendations of similar form:

“In order to improve driver training it is necessary to do three things:
1) permanently monitor the driver training programmes and licensing systems
2) carefully observe the development of specific parameters in society and the economy
3) draw conclusions from other areas relevant to road safety (such as telematics).”

Discussion on educationality (“Bildsankeit” in German) in pedagogical action theory serves as a more general illustration. Kivelä (2000, 53) mentioned that “the pedagogue has to conceive the potential of the educatees, for instance, presume their learning and development potential, abilities, and anticipate their development.” Since this suggests that a complete logical deduction from premises to application is impossible, an expert impact is needed for education. The expertise obviously has to be established in a relation between the pedagogue and educatee. The former has to have crucially better potential than the latter in order to manage education.

2.3. Data collection modified for phenomenography

2.3.1. On phenomenography

The general importance of conceptions is easy to understand because our perception is not veridical, i.e. does not conform to the physical circumstances. Häkkinen, S. (1966), for instance, suggested that “The observations psychologically made and conceived do not frankly accord with the physical system of the outer world as to a measure and intensity (p. 5).” His examples were the underestimation of speed and overestimation of distance in traffic, as well as “the psychological right of way”, that is, the incidents when a driver conceives having the right of way at an intersection against the traffic rules. How we obtain knowledge from the real world is a problem in itself. Our thinking also detaches itself from immediate perception. Moreover, abstract thinking detaches itself from realistic thinking. (Nummenmaa et al. 1983, 95 – 107.) For instance, Kroksmark (1987, 234), demonstrating various ways to understand a figure, showed Ihde’s (1977) example of the side of a hexagon with three diagonals (figure 1). This stimulus can be seen as a hexagon, triangles, parallelograms, or a cube. Ihde’s illustration served as a problem of verity, arguing the need to research the conceptions directing our actions.
Ference Marton (1997) described phenomenography as the empirical study of the limited number of qualitatively different ways in which people conceive various phenomena of the world around us and its aspects. These are characterised in terms of **categories of description** logically related to each other, and forming hierarchies in relation to given criteria. Such an ordered set of categories of description is the “outcome space” of the phenomenon or an organised variety of the categories as the outcome. The dominating method for collecting data is the individual discussion interview which “has to be carried out as a dialogue”. The interviewee is encouraged to reflect on previously unarticulated aspects of the phenomenon in question. The interviews are tape-recorded and transcribed verbatim and the transcripts analysed iteratively. Distinctly different ways of experiencing the phenomenon discussed in the interview, not the individuals, are the subjects of analysis. The categories of description corresponding to those differing understandings and the logical relations which can be established between them constitute the main results of a phenomenographic study.

Conceptions of traffic safety and driver training may be objects of phenomenography. Phenomenographers are intrinsically interested in a person’s experience of phenomena, called the second-order perspective, not the phenomena as such, i.e. the first-order perspective. Phenomenography concerns the experience of the world **around us** according to Marton. (Marton 1981 and 1997, 4424.) Figure 2 shows the general phenomenographic interest in the experience, not the phenomenon (Uljen 1989)

Figure 1. Ihde’s (1977) figure may be conceived as a hexagon, triangles, parallelograms, or a cube according to the conceiver’s way of seeing it.
Figure 2. A researcher’s relation to an individual’s understanding of a phenomenon (b) according to Uljens (1989). The relation (a) is not interesting phenomenographically. General phenomenographic model.

Although phenomenography concerns the experience of the world around us (Marton 1997, 4424), no a priori assumption was made about the nature or direction of the conceptions in this research. The conceived “world” could have meant either entities of the external world, e.g. “An elk is dangerous”, intrapersonal characteristics, e.g. “I am inexperienced”, imagined matters, e.g. “I trust in God” or safety or training of some kind. Figure 3 shows this extended view which stresses intrapersonal experience.
Figure 3. The extended view of a researcher’s relation to an individual’s understanding of a phenomenon. Apart relation from (b), those at (c), (d), and (e) may be worth analysing phenomenographically. Relation (a) is not interesting phenomenographically.

The relations (b) – (e) in the figure 3 show a competent researcher interested in human abilities, skills, knowledge, habits, and other resources with which people live, if only he researches correctly. This makes phenomenography
conducive to the present research tasks. Relation (a) omits people (except the researcher himself). It is a matter of how people see the world and motivate their behaviour, not how the world really is.

Ahonen (1994, 117) also remarked that concepts, being objects of conceptions, can omit an equivalent in the external physical reality, e.g. “information”. Phenomenographers have also often restricted themselves to or concentrated on statements about the external world (e.g. Marton 1981, 1994, Uljens 1989 and Häkkinen, K. 1996). In this research, statements were made about people’s overall conceptions of traffic safety and driver training. Disregard of the restriction to the external world offered some benefits. Firstly, a deliberate view, like in an uncalibrated psychological test, on intra-individual topics could be taken. Secondly, a driver’s relation to the external world could also be compared with his or her personal resources. Thirdly, the context of traffic safety and driver training known as performance in traffic could also be observed, since it was obvious that the concepts of safety and training were not mutually exclusive. Rather they also overlapped with the concepts of fluency, efficiency, and economy. Thus the label ‘performance’ could serve as a means of developing the conceptions of safety and training. Last but not least, the number of presumptions of conceptions actually lessened and the variety of conceptions broadened somewhat.

The assumption of the collective mind serving as a superindividual system of forms of thought was adopted (Marton 1981, 196). The intersubjectivity of conceptions in that a person reports them in a language was adopted (Ahonen 1994, 121 – 122, Häkkinen K. 1996, 28). There is a close relation between language and thinking.

Marton himself (1997) and some scholars mentioned by him have also established methods and presumptions in the phenomenographic approach described as the nature of experience, the hierarchy of capabilities, and awareness. Uljens (1989, 24) separated two aspects of understanding, the what and how aspects. These methods and presumptions may help the explorer to organise his findings in “the wilderness”.

Dahlgren and Franke (1992) applied phenomenography in researching “Thoughts about road traffic”. They selected phenomenography because previous knowledge about their research object was undeveloped and because they wanted to describe the character of the phenomenon. As soon as the categories of description are known, quantitative inquiry techniques can be applied to determine the definition of the phenomenon and the area in which it occurs. For instance, psychological tests require known and defined categories of response in advance. These authors wanted to create order and structure, which meant ordering the system of categories of description, including the similarities and variation between persons. They wanted to minimise interpretation to facilitate faithful description of the data.
2.3.2. Sample and design

The presumption of phenomenography which this study employs is that the interviewees invited and interviewed properly could account for their mental capacity in traffic and hence illuminate traffic safety and driver training. The main source of data was thus the interviews designed to stimulate conceptions relevant to traffic safety and driver training. Some additional data was derived from the driving exam cards.

The main group of interviewees was new and young male drivers, a group notorious for risk-taking in traffic, violations, and damage (see p. 25, “Comparison between the conceptions of young male drivers, young female drivers, and master drivers”). Pelz & Schuman (1971, 68) also established that “young (Michigan) men (male drivers) aged 18 and 19 had more violations than men either younger or older.” This newly licensed young male group obviously remembered their training well. Some new and young females as well as proficient master drivers were interviewed for comparison. All them had to be normal within their sub-populations. They were also typical cases in not being problematic or deviating as to their vision, need for some auxiliary device.

The sample was chosen 6.11.1995 – 4.10.1997, 34 persons being interviewed in all. Since typical interviewee cases were identified very slowly, it was impossible to draw a completely random sample. The main group was 22 young male drivers sampled 4.6.1996 – 10.7.1997. Eleven of them, called here school interviewees, had trained in a driving school, while the other eleven, called here permission interviewees, were parent-trained. The members of the sub-groups were approximately matched in 11 pairs to ensure that the sub-groups were alike as far as possible. The matched characteristics were:

- They were men.
- They were 18 years old when interviewed having thus been licensed in the earliest possible year, except one number 19 (P10).
- The drivers’ exam resulted in the provisional B-category licence, for new car drivers without any previous vehicle licence.
- They all passed no later than the second attempt at the theory test (table 5):

<table>
<thead>
<tr>
<th></th>
<th>First attempt</th>
<th>Second attempt</th>
<th>Total n</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (Code no)</td>
<td>n (Code no)</td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>9 (1–3,5,6,8–11)</td>
<td>2 (4,7)</td>
<td>11</td>
</tr>
<tr>
<td>Permission</td>
<td>7 (1,2,5,6,8–10)</td>
<td>4 (3,4,7,11)</td>
<td>11</td>
</tr>
<tr>
<td>Total, n</td>
<td>16</td>
<td>6</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 5. The attempt at which young male interviewees passed their theory test. (The “code no” refers to identification of an interviewee; see also appendix 9 and explanation p. 50, “Document header”.)
They had all passed by the third attempt at the driving test (table 6):

<table>
<thead>
<tr>
<th>First attempt (Code no)</th>
<th>Second attempt (Code no)</th>
<th>Third attempt (Code no)</th>
<th>Total n</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>(1–3,5–7,9–11)</td>
<td>(4,8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>(1,2,4–7,9,10)</td>
<td>(8,11)</td>
<td>(3)</td>
<td></td>
</tr>
<tr>
<td>Total n</td>
<td>17</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 6. The attempt at which young male interviewees passed their driving test.

Pair 11 consisted of the native Swedish speakers.

The 5 young female drivers were sampled 20.4.1996 – 2.5.1997. Two of them were school interviewees and three were permission interviewees, a group approximately comparable to the young men.

The 7 master drivers were sampled 6.11.1995 – 4.10.1997. The master-driver interviewee sub-sample consisted of a senior fireman, a policeman, a professor emeritus, a car driving examiner, a motor vehicle engineer, a traffic planning engineer and a master builder. They were known traffic professionals. All of them were school interviewees. Their proficiency and the kind of interview are reported in appendix 4.

The young male interviewees were most often recruited by the driver examination stations (table 7). The young female interviewees as well as the master-driver interviewees were recruited either by the researcher himself or familiar persons.
Recruitment

<table>
<thead>
<tr>
<th>Recruitment</th>
<th>Young males n (Code no)</th>
<th>Young females n (Code no)</th>
<th>Master drivers n (Code no)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver examination station</td>
<td>Helsinki</td>
<td>17 (P01–06, 08–11; S01–05, 08–09)</td>
<td>1 (PL1)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Espoo</td>
<td>2 (P07, S07)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>A driving school specialising in Swedish speakers</td>
<td>1 (S11)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>With the help of familiar persons</td>
<td>2 (S06, S10)</td>
<td>3 (PL2, SL1–2)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Known by the interviewer</td>
<td>-</td>
<td>1 (PL3)</td>
<td>7 (M1–7)</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>5</td>
<td>7</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 7. The means of recruiting the interviewees. (The “code no” is explained in the caption of table 5.)

Having completed their compulsory education, a young person can go to work, gain an upper secondary level of education leading to the university, or to go to a vocational school. The young male interviewees were normally receiving some form of post-compulsory education (table 8):

<table>
<thead>
<tr>
<th>The young males’ post-compulsory education (normally in progress)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>School (Code no)</td>
<td>Permission (Code no)</td>
</tr>
<tr>
<td>Upper secondary</td>
<td>8 (2,3,4,5,6,8,10,11)</td>
</tr>
<tr>
<td>Vocational school</td>
<td>3 (1,7,9)</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 8. The young males’ post-compulsory education

An equal number of each group was completing upper secondary education, while only three males from each group had received vocational training. All were attending some form of post-compulsory education.

Because it was impossible to interview the subjects in detail before their driver training without a confounding effect on the interview after training, a person was interviewed only once, soon after licensing. They were interviewed about topics pertaining to before licensing as well as about their present conceptions and notions of the future. It was also convenient to recruit new drivers with the
help of the examiners once they had been licensed, the interviewees then being legally of age and no permission from their parents being needed.

Table 9 shows that the young male and young female interviewees were interviewed soon after licensing. The master drivers were interviewed after a long career.

<table>
<thead>
<tr>
<th>Time of interview</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soon after licensing</td>
<td></td>
</tr>
<tr>
<td>Young male drivers</td>
<td>School</td>
</tr>
<tr>
<td>Young female drivers</td>
<td>Permission</td>
</tr>
<tr>
<td>Master drivers</td>
<td>Total</td>
</tr>
</tbody>
</table>

Table 9. The design of the interviews

While this design gave the analysis a structure for describing conceptions, the thinking and activities of an individual were too complex and subjective to be used in causal explanation (Ahonen 1994, 122). This does not preclude the researcher’s view on causality, which may serve as a hypothesis in future research.

2.3.3. Interviews

The interviewer, i.e. the researcher, had over 20 years’ experience in traffic safety work and its training. Apart from adult education he had experience in psychology, research, teaching adults, traffic law and non-fiction writing, all skills relevant to the present tasks. He trained his 18-year old son for a provisional licence in 1994 and for the final licence in 1995.

Confidence with the interviewees was gained in the recruiting process, before and during interviewing, and when checking the summary. Utilising his relationship with his son, the researcher tended to be identified as a kinsman of the young interviewees. Being a traffic education professional, he was a colleague of the master drivers.

To maximise sampling of conceptions, the data acquisition structure had to be as loose as possible. The research budget, however, demanded a structure which obviated unnecessary data.

Francis (1993, 70 – 72) and Perttula (1997, 8) expressed concern about minimising bias by avoiding leading questions in the phenomenographic interview. It was assumed in this research project that researchers affect their interviewees’ way of understanding matters in interviewing, albeit unintentionally. An interview is an intervention which can influence an interviewee usefully or harmfully. This influence must be known, utilised, and controlled. (Tomm 1993.)
The interview was designed to be conducted as a dialogue (Marton 1994, 4427). The interview themes were based on the preliminary work. The themes or problems were represented by the key questions structuring the interview protocol, and were identical for all interviewees. The key questions were made as understandable as possible on the basis of the preliminary work, and were written on 10x15 cm cards for the interviewees. In discussion, the complementary sub-topic questions were specifically put unless they had been touched on otherwise. Probe questions ensuring understanding were asked when necessary (Rothe 1994, 96). The interviewee’s own words were then used. The checklists were used to note the all features of the phenomenon in the complementary questions. (Gröhn 1993, 18; Ahonen 1994, 136–137.)

The interviewer was an active listener who stimulated the interaction. As information was revealed, the discussion was directed to deeper or more peripheral areas of the themes (Ahonen 1994, 136).

An interview diary was kept. Apart from the personal details of the interviewee, the place and date of the interview were noted as well as the events and feelings of the interview and expressions that could not be taped.

Past, present and future phenomena were also asked about, which in an abstract way compensated for the lack of a before-and-after design.

Functional and projective means were also used to produce variation in the questions. Since young adults can be shy and may have difficulties in answering questions orally, the functional methods facilitated responding manually (photo 1, p. 42). The projective method provided an opportunity to respond to a picture or two model cars (see photo, 2 p. 43 and photo 3, p. 43. These could also be used as the key questions and a discussion would then follow. (Ahonen 1994, 141.) Functional and projective methods seemed to put the interviewee at ease.

The scale questions were also suitable complementary questions, particularly helping shy interviewees to provide and explicate their opinions (Berg 1991, 55–93). The scale questions introduced sub-themes, and offered the interviewee a quantitative option. They also gave the interviewer the opportunity to control the coherence of the answers. The scale was a strip on which the interviewee put a plaster cast representing his or her choice. There were different plaster casts for different road user forms, viz. pedestrian, cyclist, moped rider, motorcyclist, and car driver. There was a plaster cast for both a female and male pedestrian but other casts were gender-neutral. At the beginning of the interview he or she expressed his or her typical road user role by selecting the corresponding plaster cast. If there was no appropriate plaster cast, then the interviewee could select a cylindrical one. See photo 1.
Comment. The casts correspond to different types of road user. There is a female and male cast for pedestrians, as well as a blank for an unexpected choice. The negative end of the measure is visible. See also photo 4 on page 46.

The technique of using conjectural “miracle” questions, originating from brief family therapy, helped the interviewees to detach themselves from everyday reality and problems. The interviewer had the interviewees imagine that, one day, there would be no traffic safety problem at all. The interviewee had to speculate about the cause and characteristics of this kind of situation. The conjectural questions were suitable when aims and goals were discussed. (Berg 1991, 55–93.)

The photograph of the traffic situation was represented to the interviewee as a projective task (photo 2). He or she was asked to comment on it and the topic was discussed. Similarly, a pair of model cars was presented to each interviewee (photo 3). One of them represented a fast car and the other an ordinary one. The interviewee’s preferences concerning them were then discussed.
Photo 2. The traffic situation of theme 7.

Comment: The picture shows a large intersection in Reval. Part of a pedestrian crossing is seen at the lower and left part but without any legal road sign, traffic light, or zebra paintings for pedestrians. The two cars in the foreground are parked. The rear of the car on the right stands just on the pedestrian crossing. The traffic light at the upper right warns drivers about trams.

Photo 3. The model cars of theme 8. A fast and an ordinary car.

The status of a passenger instead of a car driver was accorded the interviewee in one theme. He or she could then talk freely without revealing his or her personal driving deficiencies. The “circular” questions included in Tomm’s intervention interview elaborated this idea (1993, 36). The “circular” questions elicit topics on cyclic relations between persons, including their mutual control. The “circular” questions are characterised by general curiosity about the nexus of a problem. “The therapist behaves like an explorer, researcher, or scholar who is making discoveries.”

The set of Finnish road signs was also used (see Road Traffic Decree 1982/1982 including the changes to Statute number 121/96 (i.e. as published in
The interviewee was asked to point out the most and least important signs, and justify their selection.

The language of the interviews was Finnish. Even the pair of native Swedish speakers was interviewed in Finnish for the sake of coherence.

The individual questions formed on the basis of the preliminary work are shown in appendix 5. It proved unprofitable to ask the interviewees directly: “How safe a driver are you? (Miten turvallinen kuljettaja olet?)” They either became confused or gave some “official” answer originating from instructors, textbooks, or the media. The question “How confident a driver are you?” (Miten varma kuljettaja olet?) with an additional oral reference to safety produced a good discussion. This was analogous with the example given by Kirk and Miller (1986, 25 – 26) who conducted interviews about coca in Peru. The invitation “Tell me about coca!” (in Spanish) “elicited a highly uniform, but limited, set of coca beliefs and practices.” The researcher had already read all these in such things as airline pamphlets. They then asked: “When do you give coca to animals?” and other “silly” questions. This opened up the interviewees and the research made genuine progress. However, the question “How safe a pedestrian are you?” proved to be appropriate in this research. Franke (1995), interviewing driving school trainees’ about traffic knowledge, asked “What do you mean by a good and safe driver” (in Swedish: Vad menar du med en bra och säker bilförare?). Although the Swedish word “säker” can mean in English either “sure”, “secure” or “safe” Franke apparently ensured the outcome by using the word “bra” (good) as well as “säker”.

Franke’s (1995) question “What ideals have you concerning car driving?” was modified to “Do you have any ideal drivers”, to complete theme 2. She also had a topic concerning road rules.

The interviewer constructively joined the interviewee’s experiences and understandings, which they confirmed in negotiating over the interview summary later. (Marton 1994, 4427.)

In the interview instruction the interviewer indicated that he wanted to hear just the interviewee’s opinions of traffic safety and driver training. It was simply this or the interviewee’s personal knowledge, not a matter of an examination. There were no “correct” answers. This instruction fulfilled the research description given to the interviewee when recruiting him or her. Permission to tape the discussion was obtained. The discussion consisted of the topics which were also represented by the deck of cards entitled “The subjects being discussed”. The interviewee familiarised himself or herself with the interview system and the things on the table during the first topic.

Before discussing a new topic the interviewee took a card from the deck and read the key question. During the discussion of the first topic the interviewee was allowed to adjust to the situation, familiarise himself or herself with the methods, and identify himself or herself as a road user. Most of the methods were introduced at the beginning. After the introduction, conceptions of driver status and training were discussed. Conceptions of the road rules were
discussed separately, avoiding confusion with traffic safety. Traffic safety and
danger, being the most difficult topic, were discussed in the middle of the
interview. The role of the car driver was left for a moment to discuss matters
from the passenger’s viewpoint and to begin to relax. The themes based on
the photo and the model cars (see pp. 43 and 43) also relaxed the
interviewees, as well as completing the discussion together with the remaining
topics. Some personal information was obtained just at the end, to avoid
sensitive matters such as parents being divorced or a father’s incompetence
in training, before actually interviewing. The detailed protocol is shown in
appendix 5. The order of the topics and the key questions was:

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Me as a road user</td>
<td>• An introductory topic for the interview.</td>
</tr>
<tr>
<td>(2) Me as a driver</td>
<td>• Introduction of the road user role to be researched.</td>
</tr>
<tr>
<td>(3) My opinions of the forms of driver training</td>
<td>• Comparison between the driver training forms.</td>
</tr>
<tr>
<td>(4) My opinion of the road rules</td>
<td>• While the opinion of the rules seemed to dominate other aspects of safety, they were discussed first, thus avoiding confusion with safety.</td>
</tr>
<tr>
<td>(5) How do I maintain my safety in traffic?</td>
<td>• Checking the core matter of traffic safety</td>
</tr>
<tr>
<td>(6) My experience as a passenger</td>
<td>• The circular inquiry method protected the interviewee’s driver identity and let him or her speak freely about driving.</td>
</tr>
<tr>
<td>(7) My comments on a photo of a traffic incident.</td>
<td>• Projective opportunity for the interviewee to produce his or her notions of the intersection situation. The photo was a picture of an intersection in Tallinn, Estonia, deviating from the Finnish practice.</td>
</tr>
<tr>
<td>(8) My comments on the model cars.</td>
<td>• Projective opportunity for the interviewee to produce his or her notions of the two model cars and their comparison.</td>
</tr>
<tr>
<td>(9) Remaining important topics</td>
<td>• “What else ought the interviewer to ask me?”</td>
</tr>
<tr>
<td></td>
<td>• “What do you think about the interview?”</td>
</tr>
<tr>
<td></td>
<td>• Opportunity for the interviewee to round out the interview if he or she thought that something had been missed or that something should be stressed.</td>
</tr>
<tr>
<td></td>
<td>• Feedback on the interview methods.</td>
</tr>
<tr>
<td>(0) My basic personal details</td>
<td>• Checking personal details to find possible deviating cases.</td>
</tr>
<tr>
<td></td>
<td>• The interviewee gave his or her name for the report. (One interviewee took a pseudonym.)</td>
</tr>
<tr>
<td></td>
<td>• The interviewee’s promise to check his or her summary was obtained.</td>
</tr>
</tbody>
</table>
Generally, the discussion began with the actual, real or easy matters and progressed to the abstract and difficult. The interviewee was put at ease. The interviewee’s personality was stressed, emphasising that what he or she thought was important not what anybody else thought. The key questions were written in the first person. The interviewer tended to reward the interviewee for giving information. When necessary, the interviewer summarised the points discussed in order to explicate them, which also served as a reward for the interviewee.

The interviews took place in the office of the research company Autor Oy, the drivers’ examination station in Helsinki, the interviewee’s home or the Department of Education at the University of Helsinki, depending on the interviewee. Photo 4 shows the interview table.

Photo 4. In the interview. The table with its arrangement is visible. Comment: The set of topic cards, the plaster casts, and the scale measure are on the table. Finnish road signs, the photo of the traffic situation and the model cars were shown as their topics were discussed. The interviews were tape-recorded. The interviewee is considering his answer to the question, how confident a driver am I now? He will put the model car appropriate to a driver on the measure according to his rating.

All young male and female interviewees as well as master driver M4 responded to the whole protocol. Master drivers M5, M6, and M7 responded to the themes corresponding with their expertise. Master drivers M1, M2, and M3 were interviewed in the preliminary phase of the research project.
2.3.4. Corpus – summarised interviews

All interviews were tape-recorded, transcribed and summarised. The summaries offered the following advantages:

- When summarising the interview text, the researcher had to have a detailed insight into it, to find the essentials and to write them up, i.e., it was good for familiarisation with the data.
- Summarising was a kind of pre-analysis which provided suggestions as to the indexing and analysis.
- While summarising, the structure of the documents to be indexed later could be anticipated, e.g. coherent sections.
- Since the summaries served as the intermediate research documents, they confirmed the reliability of the procedure.
- In summarising, the researcher transformed the data both into the research language and standard Finnish.
- The summaries in the research language were convenient for scholarly progress.
- The summaries in standard Finnish were convenient for translation into another language.
- The summaries served as a third source in addition to the tapes and their transcriptions.
- The concise summaries were convenient for analysis.
- Irrelevant data was avoided.
- It was easy to compare between the individual summaries. (Cf. the collective mind, p. 36, Marton 1981, 196.)
- Summarising made it easy to find deficiencies in the interview. The interviewee was asked to complete the interview.
- It was easy for the interviewees to check their opinions against the summaries and suggest changes.
- An agreed understanding of the themes between the interviewee and interviewer has been achieved with the final summaries.
- The summaries served as the main corpus of the research.

The interviews were transcribed by a specialist, and the researcher studied them in full detail. Notes were made between the lines and in the margins, as well as in the diary. When necessary, obscure points were checked against the tape. The information in the check lists and the interview diary were checked. Once the routine was established this phase took a half day per interview.

Summarising the interview aimed at a concise, explicit text in standard Finnish understood by the researcher. Summarising often meant editing and checking. The decisions applying to summarising are reported in appendix 6. Summarising an interview took half a day.

As soon as the researcher finished the summary it was mailed to the interviewee for checking. After a few days he or she was phoned. The summary was negotiated and changed if the interviewee wished. It was the interviewee who finally worded the summary. One male school interviewee,
being near-sighted and suffering from dyslexia, wanted to meet the researcher and negotiate on his summary. One female permission interviewee (PL1) wrote her summary herself based on the researcher’s draft. The male school interviewees were prone to change the draft and the male permission interviewees to accept it. The result of negotiating the summaries is shown in appendix 7.

To get the interviewee’s acceptance, at most four contacts with him or her were needed. If more than one contact was needed, the reason was generally that the interviewee had not yet read the summary. Male permission interviewees were a little quicker than the male school interviewees. All master drivers accepted the summary at the first contact. One master driver (M4) made notes on the summary paper. Appendix 8 shows the statistics concerning these contacts.

The interviewees accepted their summaries between 23.2.1996 and 29.1.1999. The summaries consisted of about 79,000 words of which 53,000 were produced by the young males. The percentage of summary words as against the number of interview words was a steady 26% among the young males. (Appendix 9.) The technique of the checking questions with the interviewees improved and the number increased. By the end the researcher’s questions had also tended to focus on continuing problems, seemingly showing his good level of familiarisation with the data.

2.3.5. Conceptions on the scale – quantitative analysis

The interviews included 11 scale questions covering 5 topics (appendix 5). The interviewees gave their answers on the ordinal 9-value scale. Since these ratings comprise a quantitative subset of the interview data, they are separately analysed to describe the sample. Appendix 10 shows the figures for young male interviewees.

The permission interviewees identified themselves most often with pedestrians, and 8/11 identified themselves with pedestrians or cyclist. However, the school interviewees identified themselves most often with motorists, and 6/11 of them identified themselves with motorists or cyclists. While the school interviewees preferred to use a vehicle, the permission interviewees preferred to walk or be driven.

The medians show that the permission interviewees rated their pedestrian safety slightly better than the school interviewees did. The interviewees also considered that they had steadily become more confident motorists since starting training. They believed that they would become still more confident.

The medians also show that the school interviewees thought that they had no confidence at all before training, while the permission interviewees believed they had some. While the confidence of both training groups grew during training, the slight difference in favour of the permission interviewees persisted when the groups became licensed. Their confidence kept on.
growing but the difference had disappeared by the time of interviewing. Both groups thought that they also continued to learn after licensing.

The training groups rated their personal training, obeying and understanding road rules, and personal and collective responsibility equally according to the medians. While the school interviewees rated permission training slightly worse than school training, the permission interviewees rated both training types similarly.
Chapter 3. Phenomenographic analysis

3.1. Preparing data for analysis

3.1.1. Indexing the interviews

Version 3.04 of the qualitative data analysis software for Microsoft Windows called “Nudist” was used to prepare the interviews for phenomenographic investigation (User’s Guide for QSR Nudist 1996). The Nudist software was particularly helpful both in indexing, i.e. coding the relevant meanings of the interview texts, and searching strings and patterns to establish categories of description.

The document system was as follows:

<table>
<thead>
<tr>
<th>Facility</th>
<th>Document system</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document</td>
<td>The summaries were introduced as on-line documents (main corpus). Some basic data was added from off-line documents.</td>
<td>The whole document could be indexed.</td>
</tr>
<tr>
<td>Document header</td>
<td>• Christian name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Interview code; “S” means driving school, “P” permission training, “L” young females (ladies), and “M” master drivers. An individual interviewee in a group is also identified with a number, i.e. P08.</td>
<td>The header, consisting of some basic data about the interview, identified the document.</td>
</tr>
<tr>
<td></td>
<td>• Date of interview</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Date on which the interviewee accepted the summary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Expression of acceptance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Number of words in the document</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The title of the summary: “Traffic safety as described by /first name/”</td>
<td></td>
</tr>
<tr>
<td>Sections</td>
<td>Each separately sub-headed section was formed from the sub-topics.</td>
<td>The whole section could be indexed.</td>
</tr>
<tr>
<td>Sub-headers</td>
<td>The numbering corresponded with the themes and the interview checklist.</td>
<td>Sub-headers divided the document into sections.</td>
</tr>
<tr>
<td></td>
<td>(1) How do I get around in traffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.4) As a pedestrian</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) What kind of a car driver am I now?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.2) Just after licensing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.3.2) Before training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.3.3) While training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.4) Will be in the future</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.5) An ideal driver</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3) My opinion of the types of driver</td>
<td></td>
</tr>
</tbody>
</table>
training. Type received. 
(3.1.4.–5) Selection
(3.2) Type not received
(3.3) Difference between the types
(3.4) Development of training
(4) My opinion of the road rules
(4.1.6) Road signs
(4.1.7) The purpose of the rules
(5) Observing safety. General
(5.1) Observing safety. Self
(5.2) Co-operation
(5.3.2&5.4) Chance and complete safety
(6) My experience as a passenger.
Feelings of apprehension
(6.2) Feeling comfortable
(6.3) My own passengers
(7) My comment about the photo
(8) Car won in imaginary lottery
(8.2) The lottery conditions
(9) Remaining important topics
(0) My personal information

Text units
The text units were paragraphs.

A complete thought was summarised in a paragraph. The text units were the main objects of indexing.

The Nudist index system was used as the category system of the meanings intended by the interviewees. The final phenomenographic categories were established from the index system as follows:

<table>
<thead>
<tr>
<th>Index system</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>Application</td>
</tr>
<tr>
<td>Index, Code</td>
<td>A reference incorporating the parts of the corpus containing a certain quality, and separating them from each other.</td>
</tr>
<tr>
<td>Node</td>
<td>A “point” or set of indexes that corresponds to certain properties of the interview.</td>
</tr>
</tbody>
</table>
Index tree All meanings including in the interviewees’ responses were systematically collected in a system formed visually like an inverted tree. The themes formed ten parent nodes. There were also auxiliary parent nodes. A visual system of categories which was easy to analyse.

Subtree The meanings of a topic were indexed at a sub-tree. Categories and their sub-categories at various levels could be indexed at a sub-tree.

Primary indexing The researcher analysed a part of the corpus, i.e. a text unit, and indexed it at relevant nodes according to its meanings. He analysed the texts and indexes manually.

Semi-automatic indexing The researcher let the computer search given strings or patterns in the texts. He accepted every retrieval or rejected it and made a node. He decides on the search argument and checks the retrievals.

Secondary indexing The researcher created new nodes on the basis of old ones. The researcher may, for instance, create nodes from given samples.

The researcher re-read every summary at the beginning of the primary indexing phase. This continued from 15.1.1996 to 3.9.1998. He re-read each theme or topic before the actual indexing. Relevant occurrences were put on the field protocol.

The interviews were indexed in thematic parts, i.e. sub-themes or themes. These topics were indexed separately without co-ordinating them with the others. The researcher commenced indexing from selected sub-themes to get practice. After primary indexing, the topic was checked to guarantee coherent indexing, particularly at the beginning and the end.

No accurate attention was paid to the research tasks, but all viewpoints emerging while indexing were indexed, only from the data. The indexing scope was broader than the research tasks in order to assemble all potentially relevant matters for the subsequent analysis. Despite the researcher’s personal background, including his knowledge of the preliminary work, he did not apply any theory to the indexing. The researcher also wrote 30 notes about indexing, which included preliminary results, methodological decisions, and any relevant phenomena which emerged. The chronology, detailed method, and preliminary results of indexing are reported in appendix 11. There were about 700 nodes in all (appendix 12).

As can be seen in appendix 11 it was not appropriate to form phenomenographic categories during indexing. It was sufficient for the researcher to achieve good nodes for the analysis and go on familiarising himself with the material. Interview questions like “What is good?” were very productive. Simplicity offered the interviewees many response opportunities. They also gave complex accounts. The responses were too crude to be
indexed dichotomously like good or bad, more detailed nodes being required. The circular theme “As a passenger” was also very productive.

As the preliminary results indicate, several topics emerged, as can be seen in appendix 11. The importance of close human relations and the interaction in the natural and long-term groups to the young male drivers, above all the family, were revealed. Other important groups were peers, school, hobby societies and work teams. The fathers dominated these relations. Peers, mostly male friends, had close mutual relationships. Female peers were distantly mentioned. However, these peers were not copied uncritically. Vaaranen (1998), who interviewed young people who really wanted to drive, believed that the inclination was inherited. She established that fathers led the sons towards a driving culture “teaching the sons to drive once their feet reached the pedals.” Mothers who rode motorcycles and other driving relatives could also serve as trainers and models. Girls learned to drive in a driving school. Since peers also had a considerable influence on the inclination according to Vaaranen’s analysis, it confirmed that the human relations of a young person, particularly a boy, influence his or her inclination to drive. Since the boys sensitively adopt such relations, it is crucial for traffic safety.

They were preliminary differences between the training groups:

<table>
<thead>
<tr>
<th>School</th>
<th>Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress on lack of complete safety.</td>
<td>Stress on complete safety</td>
</tr>
<tr>
<td>The school interviewees thought that the</td>
<td>The permission interviewees thought that</td>
</tr>
<tr>
<td>photo situation was safer.</td>
<td>the photo situation was more dangerous.</td>
</tr>
<tr>
<td>Spoke more often about alarm over</td>
<td>Vice versa</td>
</tr>
<tr>
<td>harmful incidents.</td>
<td></td>
</tr>
<tr>
<td>Specified relaxed driving more often.</td>
<td>Vice versa</td>
</tr>
<tr>
<td>Regarded moderate speeding as good driving.</td>
<td>Negation</td>
</tr>
<tr>
<td>Stressed the lack of relaxed drivers more</td>
<td>Negation</td>
</tr>
<tr>
<td>often.</td>
<td></td>
</tr>
<tr>
<td>Peers rated the school drivers.</td>
<td>Negation</td>
</tr>
</tbody>
</table>

While the permission interviewees seemed to yearn for complete safety, the school interviewees reported their various motives, e.g. the need to get feedback from their peers.

Traffic safety also emerged in the nodes:

- Safety seemed to cluster with the conceptions of necessity for rules, order in traffic, and reliance on others and avoiding harmful incidents.
- The general nodes of confidence, driving habits, following rules, interaction, avoiding damage, and prerequisites of traffic, corresponded with danger and safety.
The sections of five young female drivers and seven master drivers, serving as two groups for comparison, were indexed when necessary for the comparison. The primary indexing followed the lines mentioned and was conducted after the analysis of the male drivers’ conceptions.

3.1.2. Principles of categorisation

The idea of forming categories of description was to collate independent qualitative meanings into categories and the categories into the entire descriptive set. The researcher let the indexed text units show the aspects of safety and their classification. He moved deeper into the data supported by his knowledge and familiarity. Statements of meanings were grouped to form an adequate and coherent idea, while confusing and inadequate notions were avoided. It was possible to improve coherence by forming a new category for peripheral notions because categories consisting of even one conception can be phenomenographically as valuable as categories consisting of many conceptions. However, if a category included only a few cases, the arguments of the conceptions could differ if the conceptions themselves were coherent. This question will be noted in the analysis.

Text units were classified into the categories from the retrievals, which were developed progressively, that is, identified, merged, attached, arranged, and deleted if necessary. The indexing was a useful intermediate phase but the goal was the criterion establishing the final category. This job was not a straightforward progression to the final set of categories, lots of returns, deviations and trials being made to achieve an adequate set of meanings in a category and an adequate set of categories in the whole. This phase was particularly time-consuming.

A particular text unit was usually examined in different connections. A text unit could be classified not only into several categories but also into a category several times because, since a text unit was a paragraph, it could consist of repetitions of meanings. The demand for qualitative mutual independence was adhered to.

Categories were primarily formed from the data only. Confidence in the interviewees’ autonomous or genuine conceptions was needed. This was found particularly when the interviewees spoke subjectively without the help of the interview structure or when they deviated from it. Those answers directly tied to the structure were awkward because they lacked convincing argument. Of course, they could not be immediately considered false, because the interviewees probably spoke credibly. However, the data acquisition system incorporated mechanisms guaranteeing that the interviewees’ conceptions were spontaneous. These techniques, semi-structure and checking the interview lists, functional inquiries, stimulation, scale, conjectural and probe questions, notes and summary techniques with the interviewees’ check of the summaries were also tests of reliability. The interviewees’ meanings should have been independent of the techniques. The freely-produced conceptions were preferred to elicited ones when categorising. When conceptions tied
directly to the interview structure were as important as spontaneous ones, they were accepted.

In borderline cases, when there was doubt about forming a new category, a category was formed. Theoretically, this means the possibility of a type I error, i.e. rejecting the test hypothesis of no category when it is actually correct. Reporting a possible category was preferred to omitting such information. Normally, such categories included few conceivers.

After primary categories of description were induced from the data and their title determined briefly to describe their meaning, they were re-considered, and joint categories were induced from the adequacy and coherence principles to form a descriptive hierarchy. The extracts of the interview statements were reduced to their essentials to show the meaning. Since the extracts were translated into English after their analysis had been completed, this did not affect the analysis. Since there is nothing in English to correspond exactly with the speech of the interviewees, standard English was used.

3.1.3. Negotiating with the evidence

Familiarisation with the evidence progressed as the researcher began to live and negotiate with it. Actually, this involvement became the basis of the categorisation. Apart from the material, compiling meanings into coherent categories could not have been carried out without intense interaction with the interviewees’ statements, conceptions, and characteristics. This progress was only partially under the researcher’s control. He could live with the data and pose questions, but many discoveries simply emerged. The researcher’s creativity functioned to some extent without his full conscious participation. To save an idea it was crucially important to note it immediately after it emerged, even to the extent of interrupting a sauna.

Negotiation resembled models of scientific work (e.g. Rakitov 1978, 238; see also Nummenmaa 1983, 61). Figure 4 shows the analogies (p. 56).
The interviewees’ statements were the empirical origin resembling Rakitov’s system of objectives, noting that phenomenography does not necessarily expect the objective world. The statements were elicited by the interview. The researcher inductively identified the meanings resembling Rakitov’s induction. The categorisation of the concepts and findings, the aim of phenomenography, were the creative process. Rakitov’s deduction, being a way to refine a theory, resembled a validity check in the qualitative approach. The verification and falsification typical of quantitative analysis might resemble a good administrative plan or solution resulting in implementation based on the findings of applied human research.

The chronology of Rakitov’s model was kept in reporting the categories (see Categories of description of complete safety, p. 57).

### 3.2. Complete safety

In the last sub-theme of theme 5 concerning safety and danger, the interviewees were asked, “What would have changed if some day you had complete safety?” They were asked to take this issue conjecturally and not to be too realistic. They were asked to say the first things which came to their
minds. The researcher hoped to obtain conceptions of ideal traffic safety and its lack.

The translation of the summary extract of driving school interviewee S10:76 serves as an example of the notion of complete safety:

“If I imagine a situation where my safety is complete it would mean that vehicles get better and roads get better and co-operation begins to get better but this sounds quite an impossible idea. I don’t then know if the weather conditions are more often problems or whether people will drive a car any more.”

This text unit was considered in four categories of description as seen in the statistical table at the end of this section.

All categories of description are reported according to the scheme:

- Title
- Introduction to the category with frequencies, characterisation, and other obvious facts
- A table of the representative examples of the translations of summary extracts with the text unit addresses as an argument. If there were only a few conceptions all cases were shown.
- Notions, meanings, and direct results which identified the category. The researcher deduced these from the category, avoiding his personal input.
- Findings and preliminary interpretation and propositions involving the interviewer’s strong personal creativity were reported. These were also a transmission phase at the beginning of the theory in Rakitov’s model (figure 4, see p. 56). Findings were elaborated later. These sentences were begun with a dash “—”

The interviewee code (see p. 50, “Document header”) also associated with the extracts, here S10:76, is the address of the extracts. The code means “text unit 76 of school interviewee 10”. Correspondingly, the letter “P” means “permission interviewee”. All cases belonging to the categories are listed, together with some statistics, in concluding the concept in the section “3.3.3. Frequencies of the safety conception varieties” (see p. 89).

Altogether seven categories of description were identified in the conception variety:

0. Complete safety
  0.1. I change.
  0.2. I am alone in traffic.
  0.3. The actions of people change.
  0.4. People obey rules.
  0.5. The system changes.
  0.6. Circumstances change.
  0.7. Vehicles change.
I change. (Category 0.1.)

Three interviewees conceived some personal growth either to achieve complete safety or its consequence.

0.1. I change.
All cases

S04:99 When I drive, I also learn to anticipate better what others do.
S11:91 If I know that I am safe I do not need to be alert in traffic and my ability (to take precautions) is certainly impaired.
P08:102 (If my safety is complete) I could drive perfectly and I would know this in advance in all coming situations that happen.

A driving school interviewee (S04:99) and a permission interviewee (P08:102) thought that complete safety presupposed that they anticipate things. A school interviewee concluded that complete safety would impair his personal ability because he would no longer need to be alert (S11:91). – The former worked personally for complete safety, while the latter “consumed” it.

I am alone in traffic. (Category 0.2.)

Five permission interviewees and none of the school interviewees conceived that complete safety presupposes that the interviewee is alone in traffic.

0.2. I am alone in traffic.
All cases

P01:59 I cannot imagine such a miracle as being completely safe. Even if I drove alone, something still might happen. There is always some risk in traffic.
P02:68 ... if I drove alone it would certainly be safer.
P03:54 I cannot imagine a situation in which I could see to my safety completely. It cannot happen, because I am not alone in traffic.
P06:75 I should drive alone in a lorry.
P10:76 ... there are no other motorists on the road than me.

The notion of isolation varied from an “absolute” condition of complete safety (P10) to the nearest thinkable condition of it (P03, P01). The conceptions concerning the “I” were direct answers to the question. They did not think of anybody else, like a policeman, bus driver, or father being alone. The interviewees primarily conceived themselves. – The generalisation “There is always some risk in traffic” was apparent here.

– The fact that someone is solitary in traffic is really an absurdity because traffic is regarded as collective activity.

This notion of isolation manifested itself in numerous categories of description as will be later reported (in categories 0.5. “The system changes.” p. 60, 1.3. “Chance and traffic” p. 91, 1.4.1. “I am alone on the roads.” p. 65, 2.1.1. “Number of road users” p. 70, 2.1.3.2. “The rules guarantee safety.” p. 72, and
2.4.4. “Weather” p. 83.) This manifestation will be considered in the conclusion and discussion chapters.

The actions of people change. (Category 0.3.)

Conceptions of six school interviewees and two permission interviewees were categorised. Those human issues of complete safety were simple everyday ideas about how people could become better or how could they behave in a better way:

0.3. The actions of people change.

<table>
<thead>
<tr>
<th>Completing human issues</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Courtesy</td>
<td>S01:71 Complete safety</td>
</tr>
<tr>
<td>• Alertness and being awake</td>
<td>... then someone polite should be at the wheel; he is always completely alert in order not to doze off, not even for a moment. He must recognise dangerous situations far off so that he knows to slow in time. He must never begin to accelerate in traffic signals or otherwise. The driver must really be calm.</td>
</tr>
<tr>
<td>• Perception and anticipation</td>
<td></td>
</tr>
<tr>
<td>• Managing proper speed</td>
<td></td>
</tr>
<tr>
<td>• Calmness</td>
<td></td>
</tr>
<tr>
<td>• Avoiding hurry</td>
<td>S02:94 ... and nobody would have hurry and need to pretend, there would be no drunk driving ...</td>
</tr>
<tr>
<td>• Pretence</td>
<td>S02:95 ... people always drive carefully and slowly and they notice everything ...</td>
</tr>
<tr>
<td>• Sobriety</td>
<td></td>
</tr>
<tr>
<td>• Carefulness</td>
<td></td>
</tr>
<tr>
<td>• Knowledge of tyres</td>
<td>S09:92 People would know for instance how tyres hold the road.</td>
</tr>
<tr>
<td>• Co-operation</td>
<td>S10:76 ... co-operation would begin to improve ...</td>
</tr>
</tbody>
</table>

People seemed to have the capacity for safety.

People obey rules. (Category 0.4.)

This category of description, dealt with by three school interviewees and one permission one, was coherent, dealing only with the rules. It was separated from the previous category “The actions of people change”.

0.4. People obey rules.

Examples

P09:88 ... then everybody would at least obey the road rules.
S02:95 ... even although everybody obeyed the rules, anything can happen ...
S03:83 ... everybody drives exactly in the same way and according to same rules so that no inconsistency appears. Everybody drives completely alike as if vehicles moved by themselves and there was no danger of collision.

Obeying rules seemed to be a condition before driving a vehicle into traffic.

– The core idea seemed to be “everybody drives completely alike” meaning some kind of order or arrangement.
The system changes. (Category 0.5.)

Four interviewees in both groups adopted this category of description.

0.5. The system changes.

Examples

- No traffic and everything stationary
  - S05:59 ...there would be no traffic, everything would stay in place.
- Walking or travelling in a vehicle instead of driving it
  - P04:72 ...everybody would walk or automobiles would move on rails.
  - P05:63 ...then nobody would drive a vehicle. Everybody would go by train, bus, or some other vehicle. Trucks would transport goods ...
- Correction and avoiding mistakes
  - S08:67 ...that vehicles cannot crash into each other, no mistakes are made, somebody corrects mistakes and that things proceed in some curious way so that nobody is allowed to act erroneously or he is unable to do so.
- Computer control
  - P02:74 It would then be that some machines such as computers would control everything if only they were thoroughly planned.
- Robots instead of human beings
  - P07:96 ...people would have been replaced by robots. People would never manage complete safety.

The interviewees could leave everyday reality by talking speculatively. The idea that “There would be no motor traffic” (S05:59, P04:72) was related to the “I am alone in traffic” category 0.2. through the notion that traffic is a collective phenomenon involving a chance of conflict between individuals and that motor traffic actually means danger.

– This category of description also included the idea that “Future technical improvements guarantee complete safety (S08:67, P02:74 and P07:96)”. The statement “There is always some risk in traffic” is implied here.

Circumstances change. (Category 0.6.)

Only three school interviewees adopted this category of description.

0.6. Circumstances change.

Examples

- Perpetual summer and day
  - S02:94 ...if there was always summer and it was always day ...
- Good roads
  - S02:94 ...then the state of the roads always would be perfect ...
- Traffic separation
  - S10:76 ...and roads improve ...
  - S10:76 I don’t know if weather conditions are more often problems ...
  - S11:91 What would be improved is traffic separation ...

The school interviewees mentioned a few environmental conditions which were not so far removed from good conditions on the roads (in Northern
Finland there really is a “perpetual day” in summer, see S02:94). – If these conditions prevailed it would be easy for a driver to act correctly.

**Vehicles change.** (Category 0.7.)

Two school interviewees dealt this category.

0.7. Vehicles change.

<table>
<thead>
<tr>
<th>Category</th>
<th>S02:94</th>
<th>S02:95</th>
<th>S10:76</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle condition</td>
<td>... and all equipment would be in good condition.</td>
<td>... vehicles always in perfect condition ...</td>
<td>... then vehicles improve ...</td>
</tr>
<tr>
<td>Improvement of vehicles</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

– The main idea seemed to be “Vehicles must be in good condition for safety.”
Future technical improvements in vehicles also seemed to guarantee safety.

The categories of complete safety immediately produced remarks. An idea cluster including “Safety needs anticipation”, “I am alone in traffic”, “People have the capacity to act safely”, “Everybody drives in exactly the same way”, “There would be no motor traffic”, “Future technical improvements guarantee safety”, “Easy circumstances guarantee safety”, and “The vehicles must be in good condition for safety” was incorporated into these categories. The predominant idea was “There is always some risk in traffic.”

What is safe when “I am alone in traffic”? This situation lacks social interaction and the potential for conflict between individuals. Adaptation to traffic social life thus seemed to be unsafe to the permission interviewees. They seemed to conceive traffic safety as a social problem which they often saw as unavoidable. Since the driving school interviewees stressed the actions of people and obeying rules, they accepted the presence of others in traffic and conceived adaptation more optimistically. They also conceived some deficiencies in vehicles and traffic circumstances to which the permission interviewees paid no attention.

The main divide was the social origin of unsafety. While the permission interviewees regarded social interaction as a problem and danger per se, the school interviewees focused on the weakness in the interaction, its actors, instruments, and arena.

**3.3. Practical safety**

In addition to the text units of theme 5 concerning danger and safety, traffic safety conceptions were explicitly indexed at theme 3 “Driver training”, theme 4 “Road rules” and theme 8 “Model cars”: 61
The researcher manually indexed a text unit at a safety node if the interviewee mentioned the Finnish stem word “turva”, corresponding to the English stem “safe” and its derivatives corresponding to “safety” and “unsafe”. The term “unsafe” was defined in this research as “not safe”, i.e. what was “unsafe” was either neutral or dangerous. If the interviewee explicitly meant some aspect of safety, like life, health and property (see Traffic safety in the literature, p. 6) it was indexed at a safety node, even though the stem was not expressed. The stem “safe” was also a divide between safety and danger. The stem “danger” (“vaara”) and its derivates were not indexed at a safety node if the stem “safe” was not present.

The safety meanings were preliminarily categorised into the sequence 5, 3, 4, and 8, based on the indices. Themes 5 and 3 produced lots of safety text units. These safety text units were categorised with the help of adjacent nodes to catch the nuances of the larger evidence. This simply meant that the text units were examined by the two-way tables where the safety node and the adjacent node were the directions. The safety text units of the other themes were not so rich and were categorised without the direct help of the adjacent nodes.

A controlling string search of text units including the stem word “safe” (“turva”) was conducted over the complete database after all safety text units of these 4 themes had been compiled manually. The string was the Finnish stem word corresponding to “safe”. This run provided a few new cases mainly from pedestrian safety. Some text units of theme 3 “Driver training”, closely related to safety, were conducive to analysis only under a driver education topic.

The category hierarchy had two main sub-sets. The interviewees conceived arguments about safety performance as well as performing safely. The arguments consisted of various abstractions per se, e.g. objective definition, principles, knowledge, possibility, need and safety utopia, while still having meaning in traffic. The arguments had an epistemological stress. Performance conceptions were associated with opinions of real elements and processes, their stress being ontological. This main distinction was not completely exclusive although the individual primary categories were.

The performance main category seemingly approximates the “what” aspect of conceptions aiming at safety as the object of thinking. The argument main category approximates the “how” aspect of conceptions restricting the way in which safety was seen (Uljens1989, 23).
In the list of the categories of description below those categories induced directly from the interview structure are specially marked as “elicited”, while categories produced spontaneously omit any sign. The category titles induced directly from conceptions are in normal fonts while the titles of secondary categories, inducted indirectly from conceptions, are in Italics. The frequencies of the categories as well as the sub-categories are examined in section “3.3.3. The frequencies of the safety conception varieties”, p. 89).

<table>
<thead>
<tr>
<th>Variety of practical safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main categories of description</td>
</tr>
<tr>
<td>1. Argument conceptions of safety</td>
</tr>
<tr>
<td>Abstractions with meaning in traffic, epistemological stress</td>
</tr>
<tr>
<td>1.1. Understanding safety</td>
</tr>
<tr>
<td>1.2. No safety ever</td>
</tr>
<tr>
<td>1.3. Chance and traffic</td>
</tr>
<tr>
<td>1.4. Imagination</td>
</tr>
<tr>
<td>1.5. Knowledge of safety</td>
</tr>
<tr>
<td>1.6. The need for road rules (elicited)</td>
</tr>
<tr>
<td>1.7. Characterisation of fellow road users</td>
</tr>
</tbody>
</table>

3.3.1. Argument conceptions of safety
Main category 1.

Understanding safety (Category 1.1.)

This category, based on two school interviewees and five permission interviewees, showed the objectives of safety and its definition.

1.1. Understanding safety

Examples

S11:82 I follow the rules as well as I can. I then have a seventy percent chance of surviving in good health or much better than if I did not follow them.

P04:7 One of my strengths (as a pedestrian) is that I’m afraid of death, I don’t want to die.

P05:53 Taking precautions is in my opinion the same as avoiding danger.

P09:75 “Safe” is quite a troublesome concept as such because, in principle, I can’t really say that I’m safe anywhere.

Traffic safety, correlating with fluency, was something like following the road rules, surviving and being afraid of death, avoiding injury, damage, and danger, and feeling safe. Pedestrians were more important than cars. Everything affected everything else. The permission interviewees in particular exhibited the three legal objectives of traffic safety, namely life, health, and property (see Traffic safety in the literature, p. 6). They also talked about nuances, i.e. types of traffic misfortune, fluency, the rules, and impression.
No safety ever (Category 1.2.)

Three school interviewees and one permission interviewee conceived that traffic was never safe.

No safety ever
All cases
S01:61 There (in traffic) you are never safe, it’s pointless to imagine it in that way.
S05:57 Traffic is never quite safe. (Some of my safety remains unseen because something can always fail to be taken account of, because no matter how safe I am something fails sometimes to be noticed, for instance.) I’m surely never completely safe, (but certainly, when I drive on a highway, if the roads are good (no slipperiness), I think I am reasonably safe).
P09:75 (“Safe” is quite a troublesome concept as such) because, in principle, I can’t really say that I’m safe anywhere.

The interviewees repeated the principle of road traffic legislation that road traffic is either never completely safe or is always dangerous.

Chance and traffic (Category 1.3.)

Two school interviewees and five permission interviewees expressed conceptions referring to chance, i.e. some kind of unexpectedness in an occurrence. Unpredictable incidents and wildlife conceptions in traffic are examined as an element of the traffic in performance main category because they had an explainable context (see Category 2.6. Unexpected traffic, p. 88).

Chance and traffic
Examples
S07:60 There are always those who, for instance, by chance drive through a red light ...
P01:57 If I can’t be responsible for safety, chance prevails.
P02:62 Of course, one cannot affect someone else doing something (wrongly or oddly), but I myself have really driven on the roads (and am responsible for it).
Certainly that (my safety) depends on other road users. Something can always happen in traffic.

Chance was more typical of the permission interviewees than the school interviewees. It resulted from misperception, disobeying rules, slippery roads, and the acts of others. Chance was something unknown. It also excluded responsibility (P01:57). – This idea is reminiscent of the provision of the Finnish Criminal Code (3:5): “No punishment shall be handed down for an act which is considered as being due more to an accident than to negligence.”

P02:62 mentioned that he himself had entered traffic and accepted danger. – This view corresponded with the category “I am alone in traffic” in the complete safety variety (see category 0.2., p. 58). It also corresponded with the scope of application of the Finnish Road Traffic Act: “This act refers to traffic on the road” (Act 267/81, 1).
Imagination (Category 1.4.)

Two primary categories of description were combined because they had conjectural meaning. Some interviewees considered the idea that they were alone in traffic. A group of interviewees had a notion of a traffic safety utopia.

I am alone on the roads. (Category 1.4.1.)

Two school interviewees and a permission interviewee conceived solitariness.

Imagination
I am alone on the roads.

Examples
S04:86 I’m safe, of course, when no vehicles exist.
S08:56 Then I’m quite safe in traffic if I am alone or almost alone. ... It’s safe if there is nobody round me if there are many lanes and if I am alone in traffic.
P02:47 If I were alone in traffic I would need no road rules but when there are others I do.
P02:59 I feel I’m safe when I’ve stopped.

As in category 0.2. of complete safety “I am alone in traffic” (p. 58), some interviewees thought that they were safe if they were alone or had stopped in traffic. As against this, the school interviewees associated the notion with practical safety as well.

– These conceptions concerning real traffic demonstrated a negation of the traffic safety problem. The problem is social interaction, physical movement with dangerous machines in a restricted area. The young male interviewees obviously conceived the difficulty of adaptation to traffic social life.

– The fact that someone is solitary in traffic is an absurdity because traffic is regarded as a collective activity. It is worth noting that it was the “I” who was solitary not any other solitary person. The interviewees primarily conceived themselves.
Safety utopia (Category 1.4.2.)

There were two interviewees from both groups who expressed utopian ideas.

<table>
<thead>
<tr>
<th>Imagination</th>
<th>Safety utopia</th>
<th>All cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>S02:65</td>
<td>If everybody obeyed (the rules) completely, which is quite a utopian idea, it could perhaps guarantee (safety).</td>
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<tr>
<td>S04:70</td>
<td>If everybody obeyed the road rules then accidents would surely not occur; somehow obedience always fails.</td>
<td></td>
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<tr>
<td>P07:72</td>
<td>If everybody drove according to the road rules they could guarantee (my safety) in this case.</td>
<td></td>
</tr>
<tr>
<td>P08:95</td>
<td>My safety is certainly realised very well if everybody obeys the rules of the game.</td>
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Complete obedience to the rules was the only utopian thing in the conceptions. – Seemingly, the positive effect of total obedience would be anticipation.

Knowledge of safety (Category 1.5.)

Four primary categories of description could be identified and combined as the “knowledge of safety” category. It was classified in the main category of “Argument conceptions of safety” because knowledge as such is epistemological. Nevertheless, these conceptions also contain the knowledge-related processes like perception, and thus this category intermediates between the main categories. In fact, the primary categories were partly formed according to phases of the process. Erring was classified as misapplication of knowledge.

Lacking safety knowledge (Category 1.5.1.)

Two school interviewees and four permission interviewees spoke of themselves as lacking knowledge or experience.

<table>
<thead>
<tr>
<th>Knowledge of safety</th>
<th>Lacking safety knowledge</th>
<th>All cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>S04:96</td>
<td>My safety fails to be secured, for instance, when I don’t know the route. In principle, I know what I must do, but since I don’t know, however, all about the intersection, how it is controlled and such things (my safety fails to be secured). (When the route is familiar, no problem should occur on it.)</td>
<td></td>
</tr>
<tr>
<td>S04:101</td>
<td>I don’t know what this safety is. (My father doesn’t need to perceive as much as me. Thus my activity seems to lack important things and safety doesn’t improve, though I could drive better. But I think it generally holds true that the more routine the driver has, the better or safer he is, as well as driving according to the rules.)</td>
<td></td>
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</tbody>
</table>
... Some of my safety remains not seen because something can always fail to be taken account of no matter how safe I am, for instance, something fails sometimes to be noticed.

I have no examples yet where safety would have been largely in my own hands.

... it (an unexpected incident) is not visible in every case.

I still also haven’t got into a routine at the level it will be eventually.

I don’t quite have enough experience of when I am in safe and in danger. I haven’t been involved in incidents which might cause a collision or damage.

Some of my safety fails because I don’t know what will happen, that is, sudden situations may occur because of my mistakes or those of others.

There was an argument that inexperience meant a lack of knowledge. It was explicitly manifested at P01, P08 and P10:64. Actually, it also appeared at S04:96 (“When the route is familiar it should present no problem.”) and S04:101 (see below). There was also another argument about misperception as at S05 and P03. Surprising and unexpected incidents at P03 and P10 were associated with misperception.

– School interviewee S04:101 was worried in vain. Eye-movement studies have contributed to our knowledge on learning to see (Lehtimäki 1974). Since an experienced driver like his father has learnt to use his peripheral vision, he does not need to move his head as much. Learning to use his neck and eye muscles improves his perception economically.

Acquiring safety knowledge (Category 1.5.2.)

Three school interviewees and two permission interviewees reported acquiring safety knowledge. The cases in which pedestrians obtained knowledge from licensing were classified in the category “My pedestrian safety from driver experience” (category 2.3.2., p. 79).

Knowledge of safety

<table>
<thead>
<tr>
<th>Examples</th>
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<tbody>
<tr>
<td>S04:95 If I want to change lane, for instance, and gave a signal, observe people, and find that they don’t give me room, but just drive on (there’ll be a problem).</td>
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<tr>
<td>S09:89 From what I’ve seen in pictures, there is not much left over from a human being (totally crushed) after a collision in a small car.</td>
</tr>
<tr>
<td>S10:68 I can take precautions (driving slower) or asking a friend what he thinks. I can ask a peer advice, especially if he has more experience in traffic.</td>
</tr>
<tr>
<td>P09:79 Even performance in intersection incidents is a resource, I can see whether anyone is coming.</td>
</tr>
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</table>

A school interviewee analysed his knowledge acquisition in real incidents (S04:95, 101) showing self-reflective ability. A school interviewee (S10) emphasised his skill in asking advice, which may be difficult for many other people, while another school interviewee (S09:89) learnt from a picture.
The school interviewees showed some tendency to improve their knowledge, which meant either their deficient basis or a desire to continue driver training. The statements of the permission interviewees were not very detailed.

**Applying safety knowledge** (Category 1.5.3.)

Three school interviewees and six permission interviewees were classified here. They had eight and nine conceptions respectively.

- **Knowledge of safety**
- **Applying safety knowledge**

**Examples**

S02:80 Just controlling the car and knowing how to drive can make one feel safe.
S04:85 (In complicated situations I can’t feel safe) I must simply act.
S06:71 Seeing to my safety in traffic co-operation is a difficult question.
P04:47 Generally, if one knows the road rules one knows it is safe and one can then drive fluently ...
P07:72 I had to use my common sense (while the line of cars braked).
P09:83 I can let others in difficult situations even overtake me and give them room.
P10:69 I drive safely so that I feel that it is safe, I drive safely.

The arguments about applying safety knowledge were heterogeneous. This question seems to be included in other categories in a more coherent way.

The road rules had a part in many conceptions. Using common sense, even in contradiction with the rules, was an interesting conception in applying knowledge, e.g. P07:72. Some said they applied road rules, e.g. P04:47. Some waived their rights, e.g. P09:83, thus not applying the rules. Some thought they had just to act, e.g. S04:85. Some believed they controlled the car, e.g. S02:80. Some arguments were circular, such as P10:69, and some evaded the topic, like S06:71.

The idea of common sense was some kind of control system in applying knowledge.

**Erring in safety** (Category 1.5.4.)

Five school interviewees and two permission interviewees conceived making mistakes in safety.
Knowledge of safety
Erring in safety
Examples

S02:79  The feeling is quite safe (if I drive accordingly to the rules) and no big mistakes occur.
S07:60  Even I can make an error (in addition to the fact that it can also happen to others).
P10:56  The road rules do not guarantee my safety, because others can make mistakes.

Mistakes were normally explained by those of others, suggesting frustration (S07:60, P10:56). The rules, not safety, were a criterion of making mistakes (S02:79, P10:56).

– The rules are something to connect the interviewee’s acts with those of others in traffic. The school interviewees, who worried about errors more often than the permission interviewees, also seemed to stress the right – wrong aspect, as against the permission interviewees’ notion of appropriateness.

The need for road rules (Category 1.6.)

The need for rules, being a sub-theme in the interview, provided two categories of description. One concerned safety and the other courtesy, order and fluency.

Safety as the need for or purpose of the rules (Category 1.6.1.)

This category of description consisted of three school interviewees and five permission interviewees.

The need for road rules
Safety as a need or purpose of rules
Examples

S11:68  I need the road rules for safety ...
P06:63  I really know the purpose of the road rules; it’s generally safety, and is actually their main purpose.
P09:65  I need the road rules for safety so that I don’t collide with anybody.

There was a connection between the rules and safety among a few interviewees.

– These conceptions showed confidence in the traffic regulations as against the category “Safety utopia” (category 1.4.2.).

Courtesy, order, and fluency as a need for rules (Category 1.6.2.)

Three interviewees from each group expressed conceptions classified in this category.
The need for road rules
Courtesy, order and fluency as a need for rules

Examples

S01:53 I need the road rules in order to observe other road users ...

S10:49 The road rules are made so that everybody drives the same way and that traffic is ... more fluent.

P03:37 The road rules are needed to avoid chaos on the roads. It’d be quite crazy if there were no rules; they really control traffic completely.

Safety was not the only reason for the rules. Courtesy, order and fluency also necessitated rules. A permission interviewee also considered the self-evidence of the rules (“quite crazy”; P03:37).

– Order in traffic was emphasised.

Characterisation of fellow road users (Category 1.7.)

Five school interviewees and three permission interviewees had conceptions of their fellow road users.

Characterisation of fellow road users

Examples

S02:93 The question of drunk driving, part of obeying the rules, is associated with other people.

S06:72 One aspect of safety which fails comes simply from the fact that there are, of course, bad, rash, and reckless drivers and egoists who only think of themselves. Safety comes last.

S10:61 For instance, if I see there are idiots on the road who drive too fast and actually incorrectly I feel a little bit unsafe.

P07:93 Nothing can be done about pig-headedness even with co-operation; people run red lights, don’t give cyclists room, don’t see if somebody is in front of the vehicle when turning at an intersection. I think an attitude is usually in question.

Road users were characterised as drunk, rash, bad, egoistic, idiots, and stubborn. – Their characterisation was negative, which implied distrust of others.

3.3.2. Performance conceptions of safety
Main category 2.

General human safety (Category 2.1.)

General conceptions of performance were classified into three categories, one of them having three sub-categories.

Number of road users (Category 2.1.1.)

Three school interviewees and four permission interviewees reported conceptions of the number of road users in relation to safety.
General human safety
Number of road users
Examples

S08:61 I feel powerless about not having much effect on traffic, if it increases, if more vehicles or other kinds of traffic come onto the roads.
P01:50 I can drive safely when there are ... fewer people. Then it's a little bit safer.
P04:48 (Other people break rules, not me.) There are also other people on the road (who break rules).

The fewer road users the safer the traffic, or the feeling of being so. Two school interviewees circularly conceived a feeling of safety as safety (also see category 1.5.3., p. 68) while the permission interviewees conceived safety as an object of doing.

– The meaning of this category is on the same dimension as “I am alone on the roads.” (category 1.4.1., p. 65) in the argument main category and “I am alone in traffic” (category 0.2., p. 58) in the complete safety sub-theme. P04:48 clearly mediates between the categories. It is conceivable that only one road user on the road is safe and that while traffic increases safety diminishes. This thinking includes the legal premise “There is always some risk in traffic.”

– It is worth noting that the interviewees considered only the traffic in which they participated, not traffic generally.

Co-operation and interaction (Category 2.1.2.)

Three school interviewees and four permission interviewees had conceptions in this category dealing with co-operation and interaction in traffic. The traffic rule conceptions were categorised in “Confidence in traffic” (category 2.1.3., p. 72).

General human safety
Co-operation and interaction
Examples

S06:71 Other people don’t impair or improve my safety. ... Good drivers can compensate for the situation where I happen to make a mistake.
S09:88 Co-operation means that, for instance, if somebody is slower, he should certainly make room eventually.
P03:46 Certainly that (my safety) depends on other road users. Something can always happen in traffic.

Traffic co-operation was neutral (S06:71), positive (S09:88) or negative (P03:46) as regards safety. Only permission interviewees conceived co-operation negatively. – This matched with their opinions of being alone in traffic.
Confidence in traffic (Category 2.1.3.)

This topic included conceptions expressing confidence or reliance on traffic performance. It consisted of three primary sub-categories, two being direct answers to the interview questions.

Others obey the rules or do not (Category 2.1.3.1.)

Obeying or disobeying the rules could be conceived as safe or unsafe. This sub-category consisted of description by nine school interviewees and eight permission interviewees.

General human safety
Confidence in traffic
Others obey the rules or do not

Examples

S02:65  ... The rules aren’t quite so explicit that everybody could obey them.
S03:62  The road rules guarantee my safety quite well because people still follow them well enough ... without anybody colliding with me.
S04:95  ... The situation depends on whether everybody drives according to the rules.
S11:88  Lack of safety in traffic is thus created by wild animals and by those who don’t obey the rules. Moreover it is created by those who obey the rules too well ...
P03:37  Though I should obey the road rules absolutely ... they wouldn’t absolutely guarantee that somebody would not go through a red light and collide with me; traffic has to be observed in every case.

The core of these conceptions was that people do not obey the road rules. The particular offenders were children and drunk drivers but anyone, even the interviewees themselves, could violate the rules on purpose or unintentionally. Examples of such incidents were behaviour at intersections and lane changes. The rules also were not explicit enough to be obeyed. Only in theory, if everybody follows the rules, do they guarantee safety (cf. “Safety utopia” category 1.4.2., p. 66). - Disobeying the rules seemed to render the interviewees uncertain, which obviously resulted in their improved perception of the particular traffic situation (cf. category 2.1.3.3., p. 73).

There was an optimistic view on obeying the rules (S03:62) which however included the conditions “quite well” and “so well”. Too strict obedience could also compromise safety (S11:88).

The rules guarantee safety (Category 2.1.3.2.)

There were two school interviewees and three permission interviewees who conceived that the rules guaranteed safety.
General human safety
Confidence in traffic
Rules guarantee safety. (Elicited)
All cases

S03:62 The road rules ensure my safety quite well because people follow them enough well that ... nobody collides with me.
S09:67 The road rules guarantee my safety at least when I’m on the minor roads. I think it’s a good thing that there are rules.
P01:37 The road rules protect traffic quite well but I must also use my head. I can’t act mechanically.
P05:43 Obeying the rules guarantees my safety for my own part (but it is a different matter if other people don’t follow them).
P11:48 The road rules ensure my safety in traffic. If I drive according to the rules it is also safe.

There were quite few conceptions including the opinion that the rules guaranteed safety, but there were always conditions like “quite well”, “on small roads”, “using my head”, “for my own part” or that the interviewee meant himself. – The permission interviewees clearly emphasised their own person, which was in accordance with the ideas “I am alone in traffic” (category 0.2., p. 58), “I am alone on the roads” (category 1.4.1. , p. 65), and even the idea in “Number of road users” (category 2.1.1., p. 70).

The rules do not guarantee safety. (Category 2.1.3.3.)

Eight school interviewees and seven permission interviewees conceived that the rules do not guarantee safety.

General human safety
Confidence in traffic
Rules do not guarantee safety. (Elicited)
Examples

S04:69 I don’t know if the road rules guarantee my safety; I don’t know if anything really guarantees it as such; but they do at least help and they enhance my safety a lot. I can’t say that they guarantee my safety because although I drive according to the rules as far as possible, it doesn’t mean that I might not run into something because other people don’t necessarily obey the rules.
S07:60 The road rules don’t guarantee my safety. There are always those who, for example, happen to go through a red light or are drunk. Even I can make an error. Seeing somebody go through a red light by accident would not be the first time.
P04:48 The road rules don’t guarantee my safety, because I sometimes break them by accident or on purpose, and that something can happen to other people; I don’t really cause the crashes. There are also other people on the road.
P06:55 The road rules don’t guarantee my safety. Somebody always breaks them. I can never be sure that everybody will obey them. The matter always remains open. Somebody can go through a red light or even hit the side of my car. I can never be safe on the road.
The road rules don’t guarantee my safety a hundred percent. If everybody drove according to the rules it would be a guarantee. Or I don’t know if it (obeying the rules) is so good, however, if they (the rules) have been considered in such detail. At this moment they don’t guarantee it. Such events simply do sometimes occur where I may act completely according to the rules but where I’m forced to infringe some rule a little. (For instance, I changed lanes crossing the barrier line when the line of cars in front of me braked quickly. I had to use my common sense. This was also a question of traffic flow.)

The road rules don’t guarantee my safety completely. I never know about how other road users will behave.

The interviewees entertained the negative conception “Rules do not guarantee safety” more often than the positive one described above. The reasons for the non-guarantee were disobedience by others and even by the interviewee himself. Disobedience could occur intentionally or by accident. There might be emergencies in which the rules must be broken intentionally (P07:72). These violations may be legitimised as necessity according to the Finnish Criminal Code (19.12.1889, 3:10). Nevertheless, the rules were not regarded as meaningless because they promote safety (S04:69). The interviewees thought they compensated for disobedience with their better observation (cf. category 2.1.3.1., p. 72).

– The expression “I never know about other road users” called into question the rules whose purpose is to cause traffic behaviour to be anticipative (P9:66). The rules would theoretically guarantee safety if everybody followed them but this possibility is denied in practice (cf. category 1.4.2., p. 66).

– The statement of P06:55 implied the notion “Traffic is never safe”.

– This category of meaning was rather similar to “Others obey the rules or do not” (see category 2.1.3.1., p. 72) where some actual examples were also given.

– These categories focus on social activity in traffic. The adaptation of the young male interviewees to driving society evidently encounters difficulties such as the unexpected action by others and rules which are not obeyed.

My safety habits as a driver (Category 2.2.)

Four different categories of the habits of the interviewees as drivers, one of them having three sub-categories, were identified. These concerned the interviewees’ general mode and specific methods, drunk driving, and the interviewees’ relation to the rules.

My general safety mode (Category 2.2.1.)

Three school interviewees and four permission interviewees spoke about their safety mode in a general way.
My safety habits as a driver
My general safety mode
All cases
S02:80 (I’m not particularly endangered on the road.) I simply steer calmly enough.
S09:85 (In the elk incident) I really try to steer and slow down as well as I can.
P05:53 Taking precautions is in my opinion the same as avoiding danger.
P10:69 I drive safely so that I feel that it is safe, I drive safely. I have a feeling for when things go safely in traffic.

The interviewees described their general safety habits with adverbs like “calmly”, “peacefully”, “slowing”, “avoiding hurry”, or “driving at correct speed”. While the school interviewees described their safety mode through explicit information, the permission interviewees did so implicitly.

– There was a circular description, i.e. safety itself, which was used by two permission interviewees (e.g. P10:69; also see categories 1.5.3., p. 68, and 2.1.1., p. 70) as well as mentioning “avoiding danger”, which did not explicitly state actual measures (P05:53). Circular description was associated with speed, a non-risky driver, or a feeling.

My specific safety strategy (Category 2.2.2.)

Four interviewees from each group had conceptions in this category. The safety strategies the interviewees reported were specific.

My safety habits as a driver
My specific safety strategy
Examples
S02:83 Whether I can drive in a quite relaxed way effects safety; there should be no hurry at all. If I drive incorrectly and there is no hurry I can just take another route. I must not begin to play around with U-turns or other dangerous manoeuvres.
S08:59 I can really keep my distance and safety by slowing down and trying to maintain a leeway so that nobody drives too close alongside of my car and no dangerous situations arise. I really can affect it a lot. Among other methods there is keeping enough distance in front of and behind me.
P01:54 (I can’t take precautions in advance.) Safety must be mastered in the situation.
P02:62 I can be responsible for my safety by using the seat belts and I certainly don’t drive if someone else has not fastened his or her seat belts in the car.

The specific safety strategies were maintaining the correct speed, space and distance, selecting a better route, wearing seat belts, and keeping in the correct lane, road rules, observation and being relaxed. Two interviewees simply responded to the situations (e.g. P01:54).
Drunk driving (Category 2.2.3.)

One interviewee from each group had a conception in this category of alcohol in traffic.

My safety habits as a driver
Drunk driving
All cases

S11: 82  My taking precautions depends on situations somehow. ... I consider that I'm absolutely unsafe if I drive while drunk.
P02:62  I shouldn't drive a car if I have drunk spirits or medicine which impairs driving skills ...

Young male interviewees expressed rather fewer conceptions of drunk driving. – The general opinion is that young male drivers are often believed to use too much alcohol.

Me and the road rules (Category 2.2.4.)

A joint category of meaning with three sub-categories described the safety habits of the interviewees in relation to the road rules.

I obey the rules. (Category 2.2.4.1.)

Three school interviewees and five permission interviewees, less than a half of the sub-groups, had conceptions in this sub-category.

My safety habits as a driver
Me and the road rules
I obey the rules.

Examples

S07:78  I ensure my safety in traffic when I drive calmly and actually obey the road rules.
P03:47  Among my good points is the fact that I know that I drive safely and accurately according to the road rules ...
P04:63  The most important factor in protecting myself is that I drive according to the road rules.

Driving according to the rules was safe driving.

I disobey the rules. (Category 2.2.4.2.)

Two school interviewees and three permission interviewees had conceptions in this category.
My safety habits as a driver

Me and the road rules

I disobey the rules.

All cases

S06:54 Of course mistakes are made (e.g. disobeying rules) even by me.
S07:60 ... Even I can make an error (i.e. break the rules by accident).
P02:62 (I keep the tank filled in order not to stay on the road. I obey rules) ... and the incident may eventually arise that, I don't actually obey a rule, which may affect safety. Such an incident has not happened to me, however. Such a situation may arise, for example, if forced to stop on a motorway, which is not allowed. For instance, if an attack of illness occurs. I must use my common sense.
P04:48 (The road rules don't guarantee my safety) because I sometimes break them accidentally or on purpose ...
P07:72 The question (if the rules guarantee safety) includes the fact that there are sometimes situations where I should act completely according to the rules but where I'm forced to infringe some rule a little. For instance, I would mention a case of a line of cars in front of me which began to brake extremely quickly. When I began to slow I had to move to the next lane across a barrier line. So I broke the road rules, but if I hadn't done, the probability that I could have collided with the end of the line would have been quite high. I had to use my common sense. The question of fluency also comes to mind.

Disobeying the rules could happen by mistake (S06:54, S07:60), by accident (P04:48), intentionally (P04:48) and in an emergency (P02:62, P07:72).

The school interviewees talked about mistakes while the permission interviewees talked about chance and intention as well as emergencies.

I waive my rights. (Category 2.2.4.3.)

It is possible that a road user might waive the rights granted by the road rules, e.g. in avoiding some bad situation. One school interviewee and two permission interviewees had conceptions in this category.

My safety habits as a driver

Me and the road rules

I waive my rights.

All cases

Sometimes I must waive my own rights (guaranteed by road rules) if to avoid damage.
P08:76 Although I have the right to drive, I always have to check that nobody is threatening me because not everybody necessarily follows the rules.
Among my good points as pedestrian is my observing vehicles at a pedestrian crossing. Although I have the right to step onto the carriageway in front of a car, I wait for it and let it go and I wait until no vehicles are coming, and only then do I cross the road. I let the vehicles to go first ... I don't want to exercise my rights as a pedestrian.

If faster drivers overtake me on the motorway to our summer place, I give way, moving to the shoulder of road so that they can overtake safely.

The two permission interviewees discussed this explicitly while the only school interviewee spoke as a matter of principle.

This category and the argument of P07:72 of the preceding category 2.2.4.2. imply that it is crucial to learn to waive one's rights, deviating from the rules, in order to avoid a crash.

My safety as pedestrian (Category 2.3.)

This category combines six primary categories of description, including conceptions of safety and being a pedestrian. Four primary categories concerned critical aspects of pedestrian safety, i.e. intersection, observation, good condition, and obeying rules. There were also conceptions of driver experience and general self-assessment.

Although borderline cases, the categories “I perceive traffic as a pedestrian”, “My physical condition as a pedestrian” and “I obey the rules as a pedestrian” were separated from “My general self-assessment as a pedestrian” were kept for the sake of coherence.

My general self-assessment as a pedestrian (Category 2.3.1.)

This category consists of conceptions dealing with the general self-assessments of the interviewees. One school interviewee and four permission interviewees belong to it.

I don’t quite know why I thought this (I do not absolutely wait for the green light) but I don’t quite know how else I should consider it. ... I take the risk (running for the bus) while quite aware of it because I have to catch the bus. I don’t know of deficiencies which I couldn’t overcome in myself as pedestrian. I notice that I don’t think so much of safety as catching the bus and in order to do so I may run across the road without considering to the road rules. I use my common sense and compromise.

... I'm not really a reckless person and if I'm in a big hurry I don't run straight in front of a vehicle. I can wait, I have patience.
One of my problems is that (if I’m in a big hurry I really do cross against the red light and) I behave rashly in other circumstances. This may be a bit unsafe sometimes.

I’m quite safe as pedestrian.

...I don’t want to be injured yet.

Being in a hurry seemed to be the pedestrian problem that one respondent could resist with patience (P04:7) but two could not (S04:11, P05:8). S04:11 used common sense in following the road rules. P09:11 wanted to avoid injury.

My pedestrian safety from driving experience (Category 2.3.2.)

Two interviewees from the school group and one from the permission group gained experience from driving a car.

S02:6 Among my good points is, having driven a car myself, that I find I know (the importance of pedestrian safety in that they mustn’t cross wherever they want in the middle of the road.) Now I find more and more that I must really be alert in traffic when walking.

S07:10 I can’t say that I have always been a safe pedestrian but, having got my licence, I’ve begun to observe traffic from a different point of view ... Safety is based on the fact that I can observe other traffic.

P04:7 It (driver training) certainly improved my personal safety; I know better than before when I can cross the carriageway and when I can’t.

Licensing improved the observation ability of the two school interviewees and the decision-making of the permission interviewee. Crossing a carriageway was a critical pedestrian situation, which also emerged in the category “My general self-assessment as a pedestrian” (category 2.3.1., p. 78).

I cross roads as a pedestrian. (Category 2.3.3.)

Three interviewees from each group had conceptions of crossing roads.

... they (pedestrians) must not cross wherever they want in the middle of the road.

It happens sometimes that I run for a bus, crossing a busy road so that it’s not completely safe, but I take the risk quite consciously because I have to catch the bus.

I notice that I don’t think so much of safety as catching the bus and in order to do so I may run across the road without considering the road rules. I use my common sense and compromise.
... I know better than I did (before driver training) when I can cross the road and when I can't.

One of my problems is the fact that if I am in a big hurry I really do cross against the red light ...

I'm also safe as a pedestrian in that I select routes so that I don't often need to cross carriageways. In Tikkurila (the centre of the city of Vantaa) I can select routes so that I don't often need to cross.

I'm also unsafe as a pedestrian in that I sometimes hurry somewhat and have to cross the road a bit more quickly.

Crossing the road was a pedestrian safety problem. Hurrying compromised the safety consideration of pedestrians (S04:11, P05:8, P09:13). “Conscious risk-taking” resembled common sense (S04:11). P04:7, P09:12 and, apparently, S02:6 could consider their chances of crossing positively. P09:12 selected safe routes to avoid unsafe intersections.

Crossing roads also was implied in the categories “My general self-assessment as a pedestrian” (category 2.3.1., p. 78) and “My pedestrian safety from driving experience” (category 2.3.2., p. 79).

I perceive traffic as a pedestrian (Category 2.3.4.)

This category included only the conceptions of two school interviewees.

My safety as pedestrian
I perceive traffic as a pedestrian
All cases

Now (having driven a car myself) I find more and more that I must really be alert in traffic when walking.

... good senses ensure my safety as a pedestrian.

I see quite well that it's no problem and my hearing works, so my perception works.

A few school interviewees commented on pedestrian senses and perception.

My physical condition as a pedestrian (Category 2.3.5.)

The same two school interviewees had conceptions in this category as in the category “I perceive traffic as a pedestrian” (category 2.3.4., p. 80).

My safety as pedestrian
My physical condition as a pedestrian
All cases

... being quick on my feet ensures my safety as pedestrian.

Among my good points is that I can move quite quickly; I don’t walk very slowly in traffic; I cross the road quickly.

The school interviewees emphasised the ability to walk quickly – what did this mean? Must pedestrians give way to cars quickly? Do they need to be quick on their feet to survive?
I obey the rules as a pedestrian. (Category 2.3.6.)

Only one school interviewee conceived the rules as a safety method.

My safety as pedestrian
My obeying the rules as pedestrian
Case

S03:10 I know the road rules pretty well – it certainly also affects my safety as a pedestrian.

As against the conceptions as driver, the road rules had no great importance for pedestrians.

- The importance of haste, driver experience, crossing roads, perception, and physical conditions emerged in the conceptions of safety as a pedestrian. Pedestrians also used their common sense, but the omission of conceptions of chance was obvious. Adaptation to traffic as pedestrians is behavioural as against social adaptation difficulties experienced as drivers.

Roads, weather, and safety (Category 2.4.)

Safety conceptions of the prerequisites of driving, i.e. the road and the weather, formed four primary categories.

The road, its parts and state, including traffic lights (Category 2.4.1.)

Six school interviewees and three permission interviewees had conceptions in this category. School interviewees had ten conceptions of the road, whereas permission interviewees had only four.

Roads, weather, and safety
The road, its parts and state, including traffic lights
Examples

S02:87 The ability of the traffic lights to function and similar technical aspects can be regarded as the responsibility of others.
S03:62 (The road rules ensure my safety quite well because people follow them so well) that, for instance, I can get through the intersections controlled by traffic lights without anybody colliding with me.
S04:95 Quite a bad intersection where a lane ends if one drives straight on, is situated in our neighbourhood.
S08:56 It (my safety when driving alone) even depends on the state of roads. It’s safe... if there are many lanes.
P01:57 Aquaplaning is an example of an event that nobody can control.
P09:79 Even performance in intersection incidents are my resource, I’m able to see whether anyone is coming; I don’t hurry too much.

School interviewees in particular had an interest in intersections in various ways. Intersections were bad or unsafe (S04:95) and people drove well at them if they were controlled technically, as by traffic lights (S03:62). While the
school interviewee stressed the responsibility of others (S03:62), the permission interviewee conceived that “performance in intersection incidents are my resource” (P09:79). Slipperiness or bad road conditions seemed to be conceived as bad luck (P01:57, S08:56).

– It seemed that the school interviewees worried about intersection incidents.

Road signs (Category 2.4.2.)

Two interviewees’ conceptions from each group were classified in this category.

Roads, weather, and safety
Road signs (excluding traffic lights)

All cases

S01:56 Mandatory signs come then (in importance after prohibitory or restrictive signs). They emphasise safety; for instance, in two-lane intersections (creating good order).

S11:71 Among the most important road signs are “priority over oncoming traffic”, “priority for oncoming traffic”, “give way to vehicles on the road you’re approaching” and “stop and give way to vehicles on the road you are approaching” and speed limit signs. It’s a safety issue if these signs are not there. If a driver doesn’t stop if there is “stop and give way”, a crash (e.g.) from the side occurs, and then blood is spilt, and the victim is removed from the rear door if somebody is thrown there.

P06:59 “Airport”, “lookout” and others without any safety implications are among the less important road signs. The informative road signs only tell me where something (e.g. a hotel or service station) is.

P08:80 Some informative signs, which don’t necessary concern my well-being, are less important. They cannot be followed; in a way they’re just there as a guide.

Both permission interviewees identified less important signs, which were the informative ones. However, both school interviewees emphasised the importance of road signs of various kinds. – The school interviewees seemed to rely on the road signs more than the permission interviewees did.

Routes (Category 2.4.3.)

Only three school interviewees’ opinions were put into this category.

Roads, weather, and safety
Routes

All cases

S04:96 My safety fails to be secured when I don’t know the route, for instance. In principle, I know what I must do, but since I don’t know, however, all about the intersection, how it is controlled and such things (my safety fails to be secured). When the route is familiar, no problem should occur.
Knowing a good route seemed to be a safety issue for two school interviewees (S04:96, S10:68). Trying to avoid increasing traffic by taking a detour may prove ineffective (S08:61). S10:68 compensated for his unfamiliarity with the routes by having a local navigator.

– Familiarisation with the road network removed the safety problem as well as a local navigator in the car. The school interviewees’ interest in routes might have arisen from the fact that they get rather little driving practice in the driving school, so that they do not have time to learn routes.

**Weather** (Category 2.4.4.)

Two permission interviewees’ conceptions formed this category.

Roads, weather, and safety

Weather

All cases

P01:50 I can drive safety, when it is good weather and ... then it’s a little bit safer.
P03:51 ... very bad weather (and an unexpected incident) are things affecting safety which are considered beyond people’s control.

Two permission interviewees remarked that good weather is safe and that the weather is not under anybody’s control. – The permission interviewees, being alone in traffic as established in previous categories (e.g. category 0.2., p. 58), fought against the forces of nature.

**The car and safety** (Category 2.5.)

The interviewees were allowed to examine two model cars in theme 8 (see photo 3, p. 43) followed by the discussion. A few opinions relating to this category outside this theme and discussion were merged here (S01:53, S09:89, P02:64). This theme produced seven primary safety categories, revealing the young men’s interest in cars.

**Car maintenance** (Category 2.5.1.)

There was one interviewee in both groups to have a conception in this category formed to improve the coherence of the remaining primary categories in this joint category.
The car and safety
Car (maintenance)
All cases

S02:93  Vehicle maintenance is a safety factor even for others (than me), which, however, is a technical area.
P03:47  Among my good points is ... that I keep my car in good repair so that nothing unexpected occurs ...

Car maintenance was commented on but it was not very general.

Car safety features (Category 2.5.2.)

Three interviewees from each group formed this category.

The car and safety
Car safety features
Examples

S01:53  ... The driver of the other car (having caused a collision) had no seat belts on, which normally results in quite a bad consequence.
S02:116 ... On the other hand, I paid attention more to appearance and the ability of the sports car than whether it was tested for safety...
S07:108 ... The Citroën has no modern fittings like an airbag.
P02:64  I think it would be cute for a car to have an airbag but we have none. All the possible passive or active safety aids in a car also have an effect.
P04:90  At any rate it’s not possible for someone to drive too fast in the Citroën (Finnish nickname “Sitikka” used), and it has no special safety system ...

These conceptions were about the model cars, except S01:53 in connection with the rule discussion about the road signs, and P02:64 in connection with the danger and safety discussion. The interviewees had the safety features of the model cars in mind. The modern idea of the airbag, as well as seat belts and ABS brakes, became an instance of a safety aid. The permission interviewees considered only the safety of the Citroën while the school interviewees also thought about the sports car. – The Citroën was roughly made, without modern extras and safety systems. The sports car had safety features, but its appearance was attractive (see category 2.5.5., p. 86). The safety conceptions of both cars were critically considered.

– Obviously the Citroën was realistic for the interviewees as to price and use, while the sports car was out of reach of normal young men and their families. The Citroën was also too modest for a driving school car which have usually been expensive and attractive models. The permission interviewees were steadily realistic while the school interviewees also considered this a utopian issue.

Imaginary driving safety habits (Category 2.5.3.)

Interviewees also expressed their safe driving habits when assessing the model cars. Such responses to the stimuli are called imaginary conceptions.
Seven school interviewees and three permission interviewees formed this category.

The car and safety
Imaginary driving safety habits
All cases

S06:90  I might well drive pretty fast in the sports car.
S08:79  That (sports car) would be quite safe in my hands, once I got familiar with it.
P09:105 Perhaps the Citroën would be reasonably safe in my hands.
P11:83  The (sports) car would be safe in my hands if I drove very slowly.

The model cars stimulated the school interviewees to express their opinions more often than the permission interviewees. Most interviewees regarded the sports car as safe or safer than the Citroën but there was the condition that they had to master it (S08:79). Two school interviewees (e.g. S06:90) thought they would drive too fast in a sports car like the model.

If the interviewees assessed the Citroën they considered it safe or even safer than the sports car (P09:105). The driver had no need to restrain his speed because of its construction. In other words, there was no need in particular to control the velocity of the Citroën.

The sports car was also mostly regarded as safe by the school interviewees (S08:79 and P11:83). Its driver really needed to control his speed, which was also a weak point in the opinions of some school interviewees (S06:90).

- The fact that the model cars stimulated the school interviewees to express their opinions more often than the permission interviewees might have suggested the better imaginative ability or knowledge of the former, or that the latter tended to remain realistic.

- Should the authorities be concerned about the appropriateness and the trainee’s performance of the teaching car?

The temptation conceptions are analysed in category 2.5.5. (p. 86).

Liking for car and safety (Category 2.5.4.)

Some interviewees showed like or dislike related to safety. In this category of meaning there were two school interviewees and one permission interviewee.

The car and safety
Liking for car and safety
All cases

S05:67  ... it is always nicer to drive in that faster kind of (sports) car (than a Citroën), however, (although I need not drive at that speed very much) it also has good acceleration.
S05:67  I think the Citroën (nickname “Sitikka”) doesn’t really create a feeling of safety.
... this (sports car) is rather a prestige car than intended for safe driving ...

The Citroën would be safe in my hands in the sense that it would quite suddenly be in the yard of some car jobber, in other words, I would hardly drive it.

The Citroën resulted only in negative feelings while the sports car caused both admiration (S05:67) and criticism (S10:96). P08:123 did not want to have a Citroën at all.

The attractions of the cars (Category 2.5.5.)

Since the interviewees had obtained their licences, the cars obviously attracted them. Two school interviewees and seven permission interviewees expressed such opinions.

The car and safety
The attractions of the cars
Examples

I'd be affected by the speed of the sports car; it looks like something I wouldn't like to touch.

It occurs to me that I might drive the sports car a bit too fast, but I could drive slowly it as well.

The Citroën (nickname “Sitikka”) is also safe in the sense that it is not sure that I would drive at an excessive speed. The sports car would certainly trap me into quite an aggressive driving style.

Both school interviewees and all but one of the permission interviewees considered that the sports car would incite them to speed. Two permission interviewees thought that they could resist the temptation. Three permission interviewees also considered the question of the attraction of the Citroën. It was not considered as a temptation to speed.

– The permission interviewees expressed more conceptions of the attractions of the models than did the school interviewees who ignored the Citroën. In driving schools there are fine cars which are normally beyond the interviewees’ economic reach. The experience of these may have satisfied the school interviewees’ need.

– This category refers to the various attractions of types of car. This requires selecting the type of car for beginners properly.

General safety properties of the car (Category 2.5.6.)

The interviewees also considered technical and other safety properties of the model cars. In this category of meaning there were seven school interviewees and six permission interviewees.
The car and safety
General safety properties of the car
Examples

S05:67 .... I guess that driving safety is part of it (the sports car) even at top speed, so that it doesn’t begin to drift out of the lane.

S07:104 ... and it (the Citroën) is probably safer than the sports car where the driver is situated just in front of the car above the wheels.

S07:105 I think the sports car would be quite handy in racing but because the cabin is right in the front the driver would not certainly survive a collision. It has no roof as protection if it happened to roll over.

S07:108 It (the Citroën) represents quite old technology but it might be relatively safe compared with the sports car.

P02:88 The sports car is a more developed model; it is certainly safer.
P11:84 The car (the Citroën) does not sufficiently protect a driver. The roof is problematic.

Both interviewee groups identified both safe and unsafe properties in both model cars. The permission interviewees generally conceived the car alternatives as safer than the school interviewees did.

Negative aspects of the Citroën were the general poor quality, the old model and the fact that it does not protect the occupants. The positive safety arguments for the Citroën were its poor quality (S10:97) or implicit arguments (S07:104, S07:108) obviously referring to some kind of sympathy.

Negative aspects of the sports car were the cabin too far forward, no roof, and too fast. The only positive property conceived by the school interviewee group was road-holding ability (S05:67), while the permission interviewees found that the sports car was a more developed model and had good driving qualities.

– The cars’ properties seemed to have stimulated the male interviewees. It seemed generally that the interviewees could critically analyse the properties of cars from the model cars.

No safety difference between the model cars (Category 2.5.7.)

Some interviewees did not distinguish between the safety of each model car. In this category there were two school interviewees and four permission interviewees.

The car and safety
No safety difference between the model cars
Examples

S04:120 No safety problems would arise with either of the cars. I’d drive them like our estate car.
P03:65 It’s difficult to tell which of the cars (the Citroën or sports car) is safer.
P10:91 The sports car would be a safe car in my hands like others.
The permission interviewees saw no difference more often than the school interviewees did. – Was it reliance on the interviewees’ personal abilities or inability to see a difference?

– The car attracted the young male interviewees, who obviously also wanted to drive it. The usage of the car has to be compared with their incomplete adaptation to the driving culture.

Unexpected traffic (Category 2.6.)

The interviewees conceived unexpected things, i.e. unpredictable incidents and animals disrupting traffic. Two primary categories were formed here, the first being general, but excluding wildlife in traffic, which forms the second category.

Unpredictable incidents in traffic (Category 2.6.1.)

Two school interviewees and one permission interviewee conceived unpredictable incidents.

<table>
<thead>
<tr>
<th>Unexpected traffic</th>
<th>Unpredictable incidents in traffic</th>
<th>All cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>S09:89</td>
<td>But things like that (unpredictable incidents, drunk drivers) do not really occur normally. If I crash unexpectedly, it is certainly quite bad because I have a small car, among other things, so I try to drive completely safely.</td>
<td></td>
</tr>
<tr>
<td>S11:82</td>
<td>... And somebody could always run in front of my car ...</td>
<td></td>
</tr>
<tr>
<td>P10:68</td>
<td>I think that I cope with even sudden incidents quite well, I just drive safely, which is the core of the matter, so that I’m not a risky driver.</td>
<td></td>
</tr>
<tr>
<td>P10:73</td>
<td>Sometimes I am unsafe (because I don’t know what will happen, that is,) sudden situations may occur because of my mistakes or those of others.</td>
<td></td>
</tr>
</tbody>
</table>

S09:89 did not know any genuine methods of coping with the incidents but “to drive completely safely”. P10:68 thought of coping with sudden situations as “safe” driving, which is circular, i.e. being safe with safety. – The interviewees did not clarify safety in actual incidents (cf. category 1.5.3. Applying safety knowledge, p. 68).

– While the unpredictable incidents seemed to be concepts of some harmful traffic situation without a real or explicit experience on the part of the interviewees, chance in traffic was a more ambiguous abstraction of harmful traffic situations (see category 1.3., p. 64).
Animals are unsafe for road users (Category 2.6.2.)

Only three school interviewees conceived of animals.

Unexpected traffic
Animals are unsafe for road users.
All cases

S08:65 I can't influence animals; they are quite unexpected.
S09:85 I can't ensure my complete personal safety in the sense that when an elk runs in front of me, my control is in doubt; I obviously try to manoeuvre and slow down as well as I can.
S09:89 A sudden incident, i.e. an elk running in front of me, can occur and I can't do anything about it. It is something of a problem.
S11:82 ... And ... an elk or some other animal runs onto the road.
S11:88 Lack of safety on the road is caused by animals ...

Animals, especially the big elk (Alces alces) were examples of an unexpected incident on the road. The topic of wildlife on the Finnish roads has been discussed at length (see e.g. Lehtimäki 1981). The “animal” and the “elk” were seemingly learned concepts. However, no good method of mastering such animal situations was expressed. The method was to survive (S08:65, S09:89) or the rather unspecific “manoeuvring” or “slowing down” (S09:85). Only school interviewees conceived this question.

– It seemed that animals have been used as an example in driving school. School interviewees conceptualised the problem without offering a solution. Some ways of coping with such situations, i.e. to drive behind the elk, appear in the publicity.

– Explanations of the lack of permission interviewees in this category may be that animals have not been emphasised in their training. They have also practised in the countryside more, driving to their summer cottages, than the school interviewees have, and probably have a real sense of the problem, which is not among the worst problems.

– This category is intermediate between the main categories “Argument conceptions of safety” and “Performance conceptions of safety”. Chance and traffic (category 1.3., p. 64) and unexpected incidents seemed to be very close to each other.

3.3.3. Frequencies of the safety conception varieties

The frequencies of the safety and chance conception varieties were controlled. The frequencies matched the number of conceivers, i.e. interviewees, in a category (see p. 30 “The framework of systematic analysis”). A conceiver could be noted several times when the frequencies of the hierarchical categories were added. The frequencies indicated conceptual activity, i.e. conceptions through conceivers. Greater frequency meant better evidence, and hence more convincing results. The frequencies were small in
primary categories particularly, which hindered analysis. However, the special case of zero frequency could be interpreted as absolute.

Table 10, totalling the frequencies for the safety, shows that the conceivers were classified 283 times in the various categories. The school interviewees conceived traffic safety very slightly more than the permission interviewees did. The main performance category contained 2.4 times more conceptual activity and primary categories than the main argument category.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Conceivers (in primary categories)</th>
<th>Primary categories of description</th>
<th>Cases (text units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young males</td>
<td>S</td>
<td>P</td>
<td>total</td>
</tr>
<tr>
<td>0. Complete safety</td>
<td>19</td>
<td>13</td>
<td>32</td>
</tr>
<tr>
<td>1. Argument conceptions of safety</td>
<td>37</td>
<td>39</td>
<td>76</td>
</tr>
<tr>
<td>2. Performance conceptions of safety</td>
<td>90</td>
<td>85</td>
<td>175</td>
</tr>
<tr>
<td>Total</td>
<td>146</td>
<td>137</td>
<td>283</td>
</tr>
</tbody>
</table>

Table 10. Frequencies of the safety conception varieties

As appendix 13 shows, the conceptions of complete safety formed seven categories of description. The interviewees were classified 32 times in the categories. The permission interviewees were classified slightly less frequently in this sub-theme, as in the whole interview. The frequencies of the primary categories were small. However, the school interviewee frequency in the category “I am alone in traffic” (.0.2.) was zero as against 5 for the permission interviewees, implying that the latter were especially concerned about this question. When the change categories “The actions of people change” (.0.3.), “The system changes” (0.5.), “Circumstances change” (0.6.), and “Vehicles change” (0.7.) were added, the frequency of 14 for the school interviewees as against 6 for the permission interviewees indicated the belief in change of the former.

Appendix 14 shows that the interviewees’ argument conceptions of safety were classified into 12 primary categories, with 74 conceivers in all. The members of both training groups conceived these about as many times, though one permission trainee, P11, was silent. No category was expressed by only one of the training groups. The frequencies of the primary categories were small. There were no differences between the groups in the various argument conception categories to be considered.

Appendix 15 shows that the interviewees’ performance conceptions of safety were classified into 30 primary categories, implying plenty of nuances. All of the 22 interviewees were conceivers in the main performance conception category. The conceivers were classified 175 times in all, the school interviewees conceiving very slightly more often than the permission interviewees.
The fact that there were 5 primary categories with nothing but school interviewees, and only 1 primary category without any school interviewee implies that they had more nuances than the permission interviewees. The frequency of the existing groups in those categories was, however, not more than 3, which did not justify further analysis.

The young male interviewees mainly deliberated on the aspects of the car, confidence, and their driving habits. The joint category “The car and safety” (2.5.) included 7 subcategories and 49 conceivers. The school interviewees formed a majority in the primary category “Imaginary driving safety habits” (2.5.3.), indicating their safe driving habits through assessing the model cars. The permission interviewees were attracted by the cars, since they formed a majority in the primary category “The attractions of the cars” (2.5.5.). The joint category “Confidence in traffic” (2.1.3.), considering the road rules in three primary categories, included 37 conceivers in all. The joint category “My safety habits as a driver” (2.2.) comprised 6 primary categories and 32 conceivers.

In brief, the conceptual activity of the young male interviewees in safety had many nuances, since 49 primary categories emerged. It was also considerable, since they were classified 283 times in all. They gave their opinions on safety performance 2.4 times more than arguments about it. The permission interviewees obviously stressed the social aspect of safety performance, while the school interviewees thought of the enhancement of the traffic system. While no clear quantitative focus on the argument safety conceptions could be mentioned, the young male interviewees often deliberated on the aspects of the car, confidence, and driving habits.

3.4. Chance and traffic

Apart from chance being comprehensively dealt with in the safety literature and the preliminary work (see Introduction, p. 23), it emerged in the conception findings as follows:

- Chance was established as a safety conception in the argument conception category.
- It was a sub-theme in Theme 5 (appendix 5).
- Overall, the interviewees mentioned the unknown, surprising or unexpected factors in traffic not merely in the relation to safety and the question itself.
- The notion that chance could be utilised in the assessment of a driver motivated a search in all text units, including chance, to explicate the interviewees’ conceptions of chance.

Chance categories of meaning were also suitable for comparing young male drivers with females and master-driver interviewees. The arguments for research task 3 (p. 25) included:
• While young male drivers often are regarded as risky and reckless drivers, female drivers are considered as non-risky and steady. The master-driver interviewees, having extensive experience of safety issues in the course of their lives, are supposed to have learnt appropriate values in traffic and to have become safer.

• The chance and unpredictable incident conceptions differed strongly between the driver training groups.

• Chance was related to conceptions of causality as well as real traffic elements and processes.

• Conceptions of chance occurred both spontaneously throughout the interviews and as responses to the question “Does chance or fate affect your safety?”

• Conceptions of chance seem to be important in the safety dynamics as one pseudo-mechanism in a driver’s decision-making (see “Safety findings”, p. 113).

Three young female drivers from the permission training groups, two from the school training groups and seven master-driver interviewees were also interviewed. The first also answered the question: “Does chance or fate affect your safety?” The female answers were indexed primarily (see “primary indexing” p. 52). Their interviews were also searched for conceptions of chance. Only M4 among the master-driver interviewees answered the question. Thus the master drivers’ interviews were only searched for conceptions of chance (see “semi-automatic indexing” p. 52).

The categorisations of the young females’ and master-driver interviewees’ conceptions also were created from the data only. The categories of all interviewee groups were formed independently of each other.

The extended chance conception variety consisted of the primary categories of the male, female, and master-driver interviewees. The male sub-variety consisted of the previously identified chance category of the main argument safety category, five sub-categories of the chance category “independent of human will” and four overall categories. The female sub-variety consisted of six categories of the chance category “independent of human will” and three overall categories. The master-driver interviewees’ sub-variety had only four overall categories. Every joint category had exclusive conceptions. The frequencies of the categories are shown later on, as well as the list of the sub-categories (see “Frequencies of the chance variety”, p. 111).

<table>
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3.4.1. Conceptions of chance connected with safety

As seen in the category 1.3. “Chance and traffic” (p. 64), chance incidents could be produced by both the interviewees themselves and others.

As seen in the main performance category, it did not explicitly include a conception of chance. Next to chance was joint category 2.6. “Unexpected traffic” consisted of two primary categories focusing noticeably on “Unpredictable incidents ” (2.6.1.) and “Animals are unsafe to road users” (2.6.2.) (p. 88). Despite the definition, the unpredictable incidents were learned abstractions without real experience.

Chance “independent of human will”
Category 3.

Young male interviewees

Negative category 3.1.

The young male interviewees denied chance independent of human will in principle, but some of them had expressed hesitation, practical conditions, or some moral aspect cancelling out the denial. There were three driving school interviewees and two permission ones adopting these conceptions. A divide could be seen between rather explicit denial and ambivalent denial in two categories.

3. Safety categories of chance “independent of human will”
3.1. Negative categories of description
   All male cases
   3.1.1. Rather negative
   S03:82 I don’t know if there is any bad luck in traffic. In my opinion every one has to act correctly for himself, no game can be played with a dice, for instance, whether you should accelerate or not. Every one acts quite personally. Some human being brings his will to bear on everything.
   P05:62 I do not quite believe that fate chance or bad luck affect traffic, which does not depend on anyone.
   3.1.2. Ambivalently negative
   S04:98 (If, for instance, the brakes fail, one cannot really affect this.) As to chance, I think that it’s certainly someone doing something incorrectly. (Some technical defect could be chance, but it is very unlikely. I would leave nothing like this to chance.)
   S02:97 In principle, there is no fate or chance; I think accidents are generally caused by some factor. Well, of course, a meteor falling from the sky on the bonnet could be chance. In ordinary traffic, (excluding the state of the roads,) somebody causes accidents. On the other hand, if an elk causes a crash, is it fate or the carelessness of a person for not having driven slowly enough and not having been observant. This matter has two aspects. This is a little bit too philosophical.
In principle, I don’t actually believe in fate (but there are some cases, which are really accidents if they simply occur.) I don’t believe that fate exists (but if it just happens that suddenly something, which behaves properly, is deceptive, for instance, something in the car though it has been serviced. Something unexpected can always happen, I guess. Unpredictable incidents occur however.)

Even the interviewees S03 and P05, classified as rather negative, showed some hesitation: “I do not know...” and “I don’t quite believe...” Interviewee S02 and two permission interviewees, P05 and P07, adopted the positive conception as reported in connection with positive categories of description. All interviewees but one (S09) assessed their personal or common responsibility on the scale in theme 5 incompletely, all medians being 7 and the range 1 - 9 (see “Conceptions on the scale”, p. 48). This agrees with the total denial of chance, which explains their hesitation and qualifications.

- Although some tendency towards philosophy or conviction could be seen in the effort to exclude everything else but human will, it was not deep or comprehensive.

Positive category 3.2.

Most of the male interviewees, 8 school and all the 11 permission interviewees, adopted a positive conception of chance in traffic. Interviewees S02, P05, and P07 also shared the negative conception.

Most of the interviewees illustrated their conceptions with examples. These could be classified as “Mother Nature”, artefacts, and human behaviour. “Mother Nature” could objectively be regarded as chance independent of human will. The second category consists of artefacts and human behaviour, generally some human factor. The third category was formed of those conceptions with no example at all and usually expressed as “Traffic is dangerous.”

3. Safety categories of chance “independent of human will”

3.2. Positive categories of description

Male examples

3.2.1. Mother Nature

(Wildlife, meteors, lightning, landslides and weather conditions)

S02:97 ... Well, of course, a meteor falling from the sky on the bonnet could be chance.

P02:71 Apart from us, big animals like elk and reindeer remain and the natural phenomena like lightning, as well, although it never hits a vehicle; landslides, although these are not frequent in Finland.

P04:71 Mother Nature, independent of any human will, affects traffic. Of course, the matter is just not that a human being could not affect it at all, but that he cannot always perceive things. A new driver may, for instance, have difficulties with the state of the roads.
3.2.2. Human factor
Artefacts
(Technical matters with the car and the state and construction of the roads)
S01:70  *Chance* affects safety. For instance, the car can break down on the road.
P11:68  In traffic, there may be *chance* independent of human will, for instance, the construction of the road.

Human behaviour
(Drunk driving, guilt, the impossibility of driving slowly enough, lack of perception, freshness, fatigue, unforeseeability, unpredictable incidents like slippery conditions, and traffic violations)
P01:57  If I can't be responsible for safety, chance prevails. Aquaplaning is an example of something that nobody can control.
S07:82  Considering *chance* in traffic the car seldom breaks down if it is in good condition, but bad luck can occur, for instance a blowout caused by a nail and the car swerves off the road, or a drunk driver collides with something. It really depends on luck in that I myself can't help the collision if the other is in the wrong. *Chance* has its influence on traffic, despite my being sufficiently careful.
P04:71  ... A new driver may for instance have difficulties with the state of the roads.

3.2.3. *Chance* and danger
("Traffic is dangerous")
(Including a conception without argument)
S05:57  Traffic is never quite safe. *Chance* or fate or bad luck can have some influence.
P08:99  In traffic, it can always be thought that such a factor is independent of human will, (but if one drives correctly) such things certainly don't occur.
P08:101  There are always risky situations in traffic.
P10:75  Bad luck, independent of any human will, can exist in traffic. I can't give an example.

The sub-category of human behaviour corresponded to the categories “The actions of people change” (0.3., p. 59) and “People obey rules” (0.4., p. 59) of “Complete safety”. The sub-category of the artefacts corresponded to the categories of “The system changes” (0.5., p. 60) and “Circumstances change” (0.6., p. 60) of “Complete safety”. Absolute danger formed a *chance* category.

– The term “chance” (“sattuma” in Finnish) meaning “what happens unexpectedly, or unintentionally” does not particularly include danger or damage. However, the examples show that the interviewees confused *chance* with danger in the categories. The link seems obvious: first, even damage normally happens “unexpectedly, unintentionally” and, secondly, the concepts of danger and damage are general in traffic discussion. In the category of “*Chance* and danger”, the interviewees conceived danger so strongly that they did not illustrate their statements with examples.

Three interviewees’ conceptions were indexed in both the negative and positive category. Interviewee S02 deliberated on *chance* from various
viewpoints. He began simply with the statement that “Technical matters, bad roads and elks are beyond human responsibility”. A bit later he considered the impossibility of complete safety: “although everybody obeyed the rules all sorts of thing can happen...” seemingly adopting the conception: “Traffic is always dangerous”. He then offered the ambivalent conception “In principle, there is no fate or chance...”, which included the condition “excluding the state of the roads”. This conception was associated with both the negative and positive category, but the previous two only with the positive category. Interviewee P05, first considering his personal responsibility, accepted luck, i.e. a kind of chance, but, considering chance, he finished with the negative conception. Interviewee P07 had an ambivalent conception: “In principle, I do not actually believe in fate, but there are some cases which really are accidents if they simply occur.”

– In the category of the human factor, the term chance was also used in its dictionary sense, omitting the interview restriction “any factor independent of human will”. This category proved that it was difficult for the interviewees to accept chance as a factor independent of human will, and therefore it was difficult to deny chance affecting traffic. The viewpoint was generally personal and chance was normally beyond it but could enter it, e.g., in unpredictable incidents.

– People generally seem to evade their responsibility for their damage with the characteristics of chance, unexpectedness, and unintentionality. For instance, the word for “a motor crash” is often “accident” in English, “onnettomuus” (something lacking luck, ‘lucklessness’) in Finnish, and “olycka” (‘lucklessness’) in Swedish. Some previous authors considered the terms “accident”, “injury”, “crash”, and “collision” [(Baker and Ross (1960), and (Shinar 1978), Langley (1988); see also “The accident”, p. 5].

– The young interviewees of Vaaranen (1998) said to her that nobody learns to drive a car without speeding. “You learn how the car performs in a curve.” While they practised by making chance incidents, they learned to diminish chance. Since they understood the potential for damage, they regarded it as a cost.

– Generally, conceptions of chance concerned everyday life. Although a slight tendency to philosophise appeared, the interviewees lacked strong life values in their traffic conceptions.

Elks, being categorised in the “Animals are unsafe for road users” (category 2.6.2., p. 89), were also the school interviewee’s example of chance in category 3.1.2. (S02:97, p. 93). The permission interviewee used big animals as an example of Mother Nature in category 3.2.1. (P02:71; p. 94).
Young female interviewees

**Human shortcomings in traffic (Category 3.3.)**

This joint category included those conceptions which could be called “Human shortcomings in traffic.” The ideas of the two primary categories, “Traffic always involves the possibility of a harmful incident” and “Traffic involves chance”, were also evidenced in the male conceptions. While these were implicit among the young males, they were explicit among the young females.

**Traffic always involves the possibility of a harmful incident (Category 3.3.1.)**

Another set of conceptions included basic information, not simply a direct answer to the question. Every interviewee was categorised here.

3.3. Safety categories of chance “independent of human will”
3.3.1. Traffic always involves the possibility of a harmful incident.

All female cases

PL1:107  ... (Of course, I can affect the situation by driving slowly enough,) but even if I drove as slowly as I could, some accident may still happen.
PL1:108  ... Of course, such a situation (a pedestrian has an attack of illness) is always difficult.
PL1:109  These random occurrences (sudden attacks of illness) seldom happen.
PL2:97   ... I think that what happens in traffic really depends on very small things.
PL3:59   ... There is always some risk in practice.
SL1:64   ... If something happens, then it just happens.
SL2:69   ... If the car begins to skid on a slippery road, it’s really nobody’s fault, because the driver can’t do anything with his car.

The maxim “Traffic is always dangerous” also could be abstracted from “accident” (PL1:107), “small things” (PL2:97), “some risk” (PL3:59), “something just happens” (SL1:64) and “the driver can’t do anything” (SL2:69).

– In the interviews the young females normally began with the question of the independence of human will, giving a direct answer in their first sentence and illustrating it with examples. Finally they invoked the maxim “Traffic is always dangerous”. Their thinking was logical, chronological, and clear. The opinions in this category were general impressions. The direct answers formed the other primary category of the joint category.

**Traffic involves chance (Category 3.3.2.)**

Every interviewee could be categorised in this category, consisting of direct answers to the question on the independence of human will.
3.3. Safety categories of chance “independent of human will”

3.3.2. Traffic involves chance.

Female examples

PL1:107 Some degree of unsafety in traffic can be explained as chance which no-one can influence.

PL2:97 Things beyond human control have a part in safety. I can’t personally mention an example yet.

PL3:59 Bad luck, when I can’t influence the things by my own abilities, can happen in traffic.

SL1:64 Thinking of chance, everything is in principle our responsibility. ... If something happens, then it just happens. I could however allow for chance, even if our responsibility was assessed as 8/9 (on the scale, see section “Interviews” p. 41).

SL2:69 Chance can quite possibly have an effect on unsafety. For instance, there are some crashes which nobody causes and which are nobody’s fault.

The interviewees usually answered the question on the independence of the human will at the very outset. – This evidently meant that the matter was uppermost in their minds.

The female interviewees did not express any religious conceptions. They conceived chance in traffic as being beyond human control. An exception was SL1:64 who considered that “everything is in principle our responsibility”. She explained chance at the very end of her reply as if for reassurance. She had previously recognised in the interview that “it is my personal responsibility if something happens” (SL1:16). She repeated her view that “I am of the opinion that traffic is always entirely in our hands” when she answered the conjectural question coming next in the interview. Nevertheless she admitted that “If something happens, then it just happens” in the same text unit, SL1:64, leaving some doubt about the matter.

Chance and countermeasures (Category 3.4.)

Every interviewee knew of adequate or inadequate countermeasures against chance.

3. Safety categories of chance “independent of human will”

3.4. Chance and countermeasures

Female examples

PL1:107 ... Of course, I can affect the situation (slipperiness) by driving slowly enough, but even if I drove as slowly as I could, some accident may still happen.

PL1:108 A pedestrian might have sudden attack of illness crossing the road, and I might have no time to brake, but I anticipated him being across the road when I reached the spot.

PL3:59 ... For instance, an elk suddenly runs in front of the car, and I have no time to brake. Of course, I might spot it, but to my mind nobody can be completely safe in traffic.
... A slippery road is not completely under our control, although we can drive more slowly and do other things which are necessary.

... If the car begins to skid on a slippery road, it’s not really anybody’s fault, because the driver can’t do anything with his car.

Driving slowly (PL1:107, SL1:64) and observing (PL3:59) were seen as adequate countermeasures against chance. The time to brake short and expectations were misguided (PL1:108, PL3:59). A driver had no absolute countermeasure against chance (PL1:107, PL3:59, SL2:69). – These cases completed the categories “There is always the possibility of a harmful event in traffic” and “Traffic involves chance.”

Examples of chance (Category 3.5.)

Illness as chance (Category 3.5.1.)

One interviewee from both training groups was categorised here.

3. Safety categories of chance “independent of human will”
   3.5. Examples of chance
      3.5.1. Illness as chance
      All female cases

PL1:108 A pedestrian might have sudden attack of illness crossing the road, and I might have no time to brake, but I anticipated him being across the road when I reach the spot. Of course, such a situation is always difficult.

SL1:64 Illness and other things like that, being beyond our responsibility ... are chance.

– The cases of illness could be regarded as beyond human control.

Animals as chance (Category 3.5.2.)

One interviewee from both training groups was categorised here.

3. Safety categories of chance “independent of human will”
   3.5. Examples of chance
      3.5.2. Animals as chance
      Female examples

PL3:59 ... For instance, an elk suddenly runs in front of the car, and I have no time to brake.

SL1:64 ... (attacks of illness among other things) and an animal coming onto the road, which is impossible to prevent, are chance.

Female interviewees also noted animals in traffic but there was no difference between the training groups.
Slippery roads as chance (Category 3.5.3.)

One permission interviewee and two school interviewees were categorised here.

3. Safety categories of chance “independent of human will”
   3.5. Examples of chance
   3.5.3. Slippery roads as chance
All female cases

PL1:107 ... For instance, weather conditions are like this. If it’s very slippery, I can’t do very much if there’s an obstacle in front of me and I can’t brake.

SL1:64 A slippery road is not completely under our control, although we can drive more slowly and do other things which are necessary.

SL2:69 If the car begins to skid on a slippery road, it’s not really anybody’s fault, because the driver can’t do anything with his car.

SL2:69 considered slippery roads as something she could not avoid. The other two were not as absolute.

Human factors as chance (Category 3.5.4.)

Two permission interviewees and one school interview were categorised here.

Safety categories of chance “independent of human will”
   Human factors as chance
All female cases

PL1:107 ... If it’s very slippery, I can’t do very much if there’s an obstacle in front of me and I can’t brake.

PL2:97 ... Could the oncoming driver have been turning his radio (and caused the crash)?

SL2:69 Chance can quite possibly affect unsafety. For instance, there are some crashes which nobody causes and which are nobody’s fault.

Some human factor could also cause a chance incident to another person (PL2:97, SL2:69). The obstacle mentioned in PL1:107 could have been put there by someone. – This category matched category 3.2.2. “Human factor” (p. 95).

3.4.2. Overall categories of conceptions of chance

The chance analysis was extended to the 22 male interviewees’ remaining text units not indexed at the safety or chance nodes. These spontaneous conceptions of chance had to be found by the stems of the relevant Finnish words. The argument of the Nud*ist search was
[satu|sattu|tapah|tapau|kohtalo|tuur|luon|onn|epäonn|huono|vahin] and all of these with capital first letter.

The stems corresponded to the English words
“happen”, “occur”, “happening”, “fate”, “luck”, “nature”, “misfortune”, “bad”, “damage”
Having searched for the text units in the documents mechanically, the relevant text units were accepted or rejected manually after consideration. The expressions of the form “an accident happened” or “an incident occurred” were rejected if they only implied the process without the unexpected or unknown characteristic. There remained 56 chance text units of which 29 had previously been analysed. The remaining 27 text units, called overall chance units, were categorised in the four new chance categories. Conceptions of chance were identified in the same way in the documents of the young female and master-driver interviewees.

Male interviewees

Education and chance (Category 4.1)

Two school male interviewees and two permission interviewees formed a category involving conceptions of education and chance. The dynamic of and avoidance of chance were categorised separately.

4. Overall chance
4.1. Education and chance

Male examples

S01:16 In particular, my skill in using the controls has improved considerably. I have familiarised myself with them. A critical incident was when I took off from the lights and my car stalled. Now I don’t stall any more.

S02:28 ... Everything like this (changing into the wrong lane by accident) happened a little inadvertently. Having received training, this doesn’t happen any more.

P04:11 ... we drove quite a lot (with my father while learning) but in really various ways in various circumstances. Training like this certainly makes me drive securely and feel secure. I have driven a lot and I have been in all kinds of incidents and nothing bad has happened to me. I feel I know the road rules and I don’t drive recklessly and I don’t try dangerous manoeuvres. Security might be like this. I feel I control my car well.

P06:22 ... This simulation method (I simulated the movements in formation with the driver next to me) was developed unawares, it simply happened that I did it this way. It (essentially) helped training.

While the permission interviewees talked about education before licensing, the school interviewees did so after it. Plenty of training caused appropriate driving actions and a secure feeling (P04:11). The driver training simulation method was formed unawares, helping training and producing security (P06:22). The interviewees S01:16, and P04:11 conceived chance when they did not achieve their goals. – Conceptions of chance thus included frustration.

– Training, either driver training or post-licensing, seemed to have diminished chance in decision-making.
Social adequacy and chance (Category 4.2.)

The conceptions of chance of four school interviewees and three permission interviewees were categorised in the social adequacy category. The legal principle of social adequacy means that a road user is allowed to rely on the fact that others obey the road rules (Lahti 1982, Utriainen & Isoluoma 1986, and Lehtimäki 1995 and 1996). This category consisted of opinions about others obeying or disobeying the rules.

4. Overall chance
4.2. Social adequacy and chance

Male examples

S02:63  ... Technical errors (like the traffic lights showing green in two different directions at the same time) can occur of course. One cannot trust quite blindly, even in traffic lights. One has to watch what happens.

S04:95  My safety depends so much on the fact of who else happens to be in the situation ... The situation depends on whether everybody else drives according to the rules.

S09:89  ... Another example (of chance) is when somebody drives drunk. But such things (chance) do not happen normally

P04:68  The negative aspect of co-operation is mostly the “rally” (reckless) drivers and Mother Nature, of course

P04:96  If something happens (when driving with a peer) it’s good then that somebody (the peer) is with me.

P06:68  Once when I adjusted my radio, my friend luckily drew my attention to the “pass this side” road sign, which I was about to ignore.

Chance could be explained by an elk, drunk or reckless drivers or Mother Nature (S09:89, P04:68). A technical system like traffic lights could also mislead, requiring a driver to be alert (S02:63).

The permission group conceived the support of peers in chance (P04:96, P06:68).

– Chance meant an essential deviation in the social adequacy principle.

Chance and insurmountable obstacles (Category 4.3.)

One school interviewee and four permission interviewees conceived chance as an insurmountable incident, “a force majeure”, about which they could do nothing. “Force majeure” is also a legal term meaning an insurmountable obstacle which may release a person from his obligation.
4. Overall chance

4.3. Chance and insurmountable obstacle

All male cases

S09:89 A sudden incident, i.e. an elk running in front of me, can occur and I can’t do anything about it. ... Another example is a drunk driver.
P01:59 ... Even if I drove alone in traffic, something still might happen. There is always some risk in traffic.
P04:68 The negative aspect of co-operation is mostly the “rally” (reckless) drivers and Mother Nature, of course. In traffic, there are those who can’t follow road rules and those who simply don’t know the rules.
P05:57 ... For instance, if I drive when tired in the dark and an elk runs in front of me the situation then depends on luck.
P06:33 The fact that something can always happen, the possibility of human error or something like that, is still my deficiency.

The insurmountable elements were elks (S09:89, P05:57), Mother Nature (P04:68) or human error, ignorance and drunk driving (P04:68, P06:33, S09:89). – The maxim, “There is always some risk in traffic” characterised chance. Force majeure was regarded as a deviation from the social adequacy principle (cf. category 4.2., p. 102).

– The permission interviewees again showed their cynicism about traffic interaction per se. A human being or an animal could produce damage which the interviewee could not avoid. Traffic is dangerous in every case.

The notional dynamic of chance and its avoidance (Category 4.4.)

Only three permission interviewees conceived chance as having some dynamic or structure and as avoidable. Educational points of view were excluded here while they were included in the “Education and chance” category (4.1., p. 101). Moreover, this category complemented the previous categories (4.2., p. 102) and (4.3., p. 102).

4. Overall chance

4.4. The notional dynamic of chance and its avoidance

All male cases

P02:43 If I act appropriately I may not sometimes follow a rule but not very often by accident as far as I know. I was once nearly run over by a tram and it would have been my fault, but it is really the only occasion I remember.
P04:48 The road rules don’t guarantee my safety, because I sometimes break them by accident or on purpose, and something can happen to other people, I don’t really cause the crashes.
P04:51 ... They (mandatory signs) show the permitted directions and prevent drivers running into others by mistake or turning in the wrong direction ...
P10:73 Some of my safety fails because I don’t know what will happen, that is, sudden situations may occur because of my mistakes or those of others.

The interviewees thought that a chance incident might occur because of lack of knowledge (P10:73), personal fault (P02:43) or despite the road rules
This can be avoided with the help of mandatory road signs (P04:51). A chance conception may also include frustration (P04:48).

It was previously mentioned that the permission interviewees obviously conceived traffic interaction as a social problem per se. In this category, they explained chance as a cause of the problem. Chance may be unavoidable and cause a harmful occurrence; i.e. chance may be unsafe.

Female interviewees

Twenty-four adequate text units accepted for examination in all.

Human shortcomings in traffic (Category 4.5.)

This joint category described human failings.

Traffic always involves the possibility of a harmful incident (Category 4.5.1.)

The conceptions of two permission interviewees and one school interviewee were categorised here.

4.5. Human shortcomings in traffic
4.5.1. Traffic always involves the possibility of a harmful incident

Female examples

PL2:68  ...In the situation (slowing for a construction site) I easily confuse the speed limits, but this always happens inadvertently, and is caused by lack of attention.

PL2:112  There is something very confusing and uncertain in the situation (in photo 2) because cars are clearly moving where those people are also walking without any order.

The interviewees stressed processes like performance in these conceptions and the object less so (cf. 3.3.1., p. 97). There were two types of conception. The interviewee may conceive that she herself has caused some incident (PL2:68). In the other type, the interviewee PL2:112 commented on the traffic situation in photo 2 (p. 43). – The idea “Traffic is always dangerous” is obviously implied in the conceptions.
Traffic involves chance (Category 4.5.2.)

All of the interviewees had some conception in this category.

4.5. Human shortcomings in traffic
4.5.2. Traffic involves chance.
Female examples

PL1:94 Something dangerous may happen because I have inadvertently done something wrong (disobeyed the road rules).

PL2:29 The difference between now and being licensed is that I have begun to be more afraid that something may happen. Before the driving exam, I concentrated on the fact that I could drive. Now I have also begun to think that something may also happen. I have the feeling that the car is the problem and that it depends on such small things that something bad may happen.

SL1:16 I began to observe more carefully after licensing, I had to do that. What happens is in my own hands.

SL1:20 ... (In driver training) I was afraid and felt somehow that I might hit an oncoming vehicle because my own car was very wide. I feared that something might happen even to pedestrians. My instinct for self-preservation manifested itself all the time.

SL1:55 In traffic, I’m not entirely safe. There is always the danger that something might happen. ... I couldn’t say that I’m in danger, but I’m not safe either, perhaps in between.

SL1:65 ... I think that traffic is entirely in our hands. Although I wouldn’t seek a chance incident, something might always happen.

Chance could result from disobeying the rules (PL1:94) and some kind of “back to home” phenomenon after licensing (PL2:29, SL1:16), which could manifest itself in driver training (SL1:20). Responsibility was also conceived (SL1:16, SL:65). Chance was largely in human hands. SL1:55 abstracted the principle “There is always danger in traffic.”

Chance and countermeasures (Category 4.6.)

The conceptions of two permission interviewees and one school interviewee were categorised here.

4.6. Chance and countermeasures
Female examples

PL2:112 (Commenting on photo 2, see p. 43) The intersection seems to be somewhere on the right, people could cross there if there is a pedestrian crossing, which there does not seem to be. There is something very confusing and uncertain in the situation because cars are clearly moving where those people are also walking without any order.

SL1:16 I began to observe more carefully after licensing, I had to do that. What happens is in my own hands.
Pedestrians would have selected a pedestrian crossing to avoid *chance* in a confusing situation (PL2:112). SL1:16 began to observe more carefully to avoid bad luck.

Examples of *chance* (Category 4.7.)

Slippery roads as *chance* (Category 4.7.1.)

The conceptions of one interviewee from both training groups were classified here.

4.7. Examples of *chance*
4.7.1. Slippery roads as *chance*
Female example

PL1:100 If I begin.... to drive recklessly on slippery roads..., it makes driving more dangerous, which I try to avoid, and if I forget to do something it can be dangerous.

Slippery roads may be grouped with *chance*.

Human factors as *chance* (Category 4.7.2.)

Conceptions of two interviewees from both groups were classified here.

4.7. Examples of *chance*
4.7.2. Human factors as *chance*
Female examples

PL1:94 I know I am in danger if some dangerous person is around, for instance, if some drunk driver drives close to me. Pedestrians can also be dangerous, if they do not consider what they are doing. I may be a little bit frightened when I find that some person walks across the road and does something surprising.

PL2:94 A dangerous situation happened to me. A three-year-old child ran out from behind a car in front of my car. Luckily I was only doing twenty kilometres per hour.

SL1:46 No matter how many road rules there are, if a driver ignores them and does not watch the traffic, accidents will always happen. However, accidents may happen even when drivers do follow the rules.

Various other people could be associated with *chance*: some dangerous person like a drunk driver, a pedestrian (PL1:94), a child (PL2:94) or a careless driver (SL1:46).

Master-driver interviewees

Nineteen adequate text units were accepted for examination. Master-driver interviewees M1, M2, M3, and M4 produced *chance* text units, M4 producing half of these.
Human shortcomings in traffic (Category 4.8.)

Traffic always involves the possibility of a harmful incident (Category 4.8.1.)

Three master-driver interviewees had one or more conceptions in this category.

4.8. Human shortcomings in traffic

4.8.1. Traffic always involves the possibility of a harmful incident

Master-driver interviewee cases

M1:11 ... He (the interviewee) once crashed his Mercedes Benz into the rear of the car turning in front of him, in his leisure time. “But you never know when it will happen.” “So you can only hope that nothing will happen.” – If you could become completely sure in traffic, no crashes would ever happen there.

M1:27 (They did not really follow the road rules when they collided with an animal, because the situation was not anticipated. They should adjust their speed.) “those animals and everything like them are the statistics where some accidents always remain.”

M1:40 He did not notice this situation (the tandem-axle of a lorry had stuck between the upper and lower position) but he discovered when driving “that this thing swings”. He had however to drive to his destination “but I drove really carefully and slowly on the curves.” The vehicle might have tipped over.

M2:27 I do not stubbornly stress getting there in time and taking big risks, for instance, on an emergency escort because damage can happen, and perhaps I wouldn’t get there at all.

M4:24 A pedestrian’s speed is lower than a driver’s which means that, driving a car, my responsibility is certainly greater, if some harmful thing occurs, then it becomes more important.

M4:43 Thus (collectively obeying the road rules) accidents are, of course, avoided when no unforeseeable incidents occur to the frightening extent they would if there were no rules.

M4:55 There is really always the risk that somebody else will do something unforeseen, for instance, somebody swings round in front of you on a slippery road. If some unpredictable incident happens, keeping a normal safety distance is no longer necessarily enough for me, I can still be involved in an accident.

M4:59 The distance between my personal and co-operative potential (to take precautions) is explained simply by the occasional drivers who do not follow the rules and cause these unpredictable incidents, for instance, when they do not avoid me like they should. Of course, I myself waive my rights in these situations, if possible, but such situations always involve the risk that some harm will be done.

M4:68 To a certain extent, I let the situation progress but when it seems to be quite probable that the driving no longer ensures the occupants’ health, I certainly remark on driving too close behind a car, for example. I do so because there is an obvious danger of something harmful happening.

M4:72 As a rule, I don’t interfere with anybody’s way of driving if I do not really feel some threat.
The interviewees conceived the possibility of a harmful occurrence as a phenomenon not stressing an unpredictable aspect like *chance*. This category also reflected the maxim “Traffic is always dangerous.” This and the next category “Traffic involves *chance*” could also be seen as aspects of the conception about the failure of human ability to ensure traffic safety.

M1:11 was fatalistic “But you never know when it will happen”, M1:27 “those animals and everything like them are the statistics where some accidents always remain” and M4:55 “There is really always the risk that somebody else will do something unforeseen.”

The master drivers’ long experience provided good examples. There were cases like M1:40 in driving a fire engine, M4:43 after disobeying road rules and M4:59 with “the occasional drivers”. M2:27 and M4:55 stressed the connection between risk and damage. Responsibility was stressed by M4:24 in the driver’s relation to pedestrians and as a passenger by M4:68 and M4:72.

Traffic involves *chance* (Category 4.8.2.)

All of the four master-driver interviewees with *chance* conceptions were classified in this category.

4.8. Human shortcomings in traffic
4.8.2. Traffic involves *chance*
Master-driver interviewee cases

M1:11 – If you could be completely certain in traffic, no crashes would ever happen.
M1:15 I have had luck (for instance, driving through puddles on dangerous bends).
M1:26 In the first place, he thinks about elk and situations where somebody drives in the wrong lane, which are completely surprising factors to which nobody can respond, but then they have not followed rules.
M1:38 Safety has not been in his mind before these near-accidents. Taking account of it happens after the experience; the situation “is what it is”.
M2:27 They have too often driven with luck (taking big risks on an emergency escort).
M3:39 A driver cannot be responsible for everything, some part is left to fate or *chance*. For instance, a sudden break-down or an elk suddenly appearing or broken road surface or things like these have their part (in safety). The driver should, however, face responsibility as far as possible. He cannot rely on anybody else. You can hardly know in advance what to do if something happens, except racing drivers perhaps. The driver has to try to manage the situation and he cannot rely on his instincts or good luck. He has to accept the over-takers who over-take dangerously without hindering them at all, which needs, of course, good road manners.
M4:22 A surprising factor is also included here: if something unexpected occurs (for instance, on the normal trip to work) it is unclear whether I have then been as vigilant as possible.
M4:61 Chance independent of anybody’s will has its part (in safety). If all the worst things occur at the same time in the same situation, which is entirely possible, this is really bad luck or fate.

M4:65 Generally, I should add that damage occurs more easily the worse precautions a person has taken. Chance remains however.

Chance had some mysterious or inexplicable element as in M1:38 “it is what it is”, M3:39, M4:22, M4:61, M1:15 and M1:26. Elks were unexpected factors as in M1:26 and M3:39. – Elks were a symbol of chance and a general symbol for harmful incidents.

M2:27 worried that “They have too often driven with luck.” M1:11 said “If you could be completely certain in traffic, no crashes would ever happen” relating a driver’s ideal development to precautions against crashes. M4:65 seemed to agree with this: “damage occurs more easily the worse precautions a person has taken”. He then concluded that “Chance remains however.”

– No master-driver interviewee referred to an absolute human power in protecting traffic. Although some chance in traffic always seemed to remain, there is still potential in human hands.

Chance and countermeasures (Category 4.9.)

Chance and the lower nervous system in countermeasures (Category 4.9.1.)

All four master-driver interviewees mentioned the lower part of the central nervous system.

4.9. Chance and countermeasures

4.9.1. Chance and the lower nervous system in countermeasures

Master-driver interviewee examples

M1:44 He (the interviewee) knows some cases when he must focus on traffic safety and manoeuvring but, as a rule, action takes place automatically. He thinks that it is impossible to drive very alertly for safety. He conceives that handling a car must be “an instinctive reaction, that it must not be thought.”

M2:13 I guess it is impossible for me to be a complete driver. Firstly, I should really train my driving skills for things happening through automatic functions. I should have good driving skills in all emergency escort situations, where I drive fast and must understand other road users and where I get into unexpected incidents. I cannot get such skills with the practice potential I have.

M3:39 The driver (who should face responsibility as far as possible) has to try to manage the situation and he cannot rely on his instincts or good luck.

M4:22 Among my weak points is the fact that I have a routine like old drivers. For instance, the route from home and the office has been programmed into me. Driving does not need much thought, for instance, about where I go and where I turn. My observation suffers. A surprising factor is also included here: if something unexpected occurs (for instance, on the normal trip to work) it is unclear whether I have then been as vigilant as possible.
Two master-driver interviewees thought that the lower parts of the central nervous system were crucial in manoeuvring (M1:44 and M2:12). They used the terms “instinctive reaction” and “automatic function” implying that the cortex and thinking had not enough time to respond to rapid traffic stimuli. This seemed to be knowledge from learning theories involving the idea that well-trained, i.e., ‘automatic’, skill reacts quickly. M1:44 used “instinctive reaction” synonymously with “automatic reaction” as in everyday language.

M4:22 referred to the fact that in routine driving the route is “programmed” into the driver, which detracts from observation. M3:39 used the term instinct in its scholarly meaning, mentioning that instincts are irrelevant, even deceptive, in traffic behaviour.

– However, driving is always a learned skill excluding an instinctive function that is regarded as hereditary and unlearned. The master drivers seemed to think of common sense (see also next category 4.9.2.).

**Common sense in countermeasures** (Category 4.9.2.)

One master-driver interviewee stressed common sense in driving.

4.9. Chance and countermeasures
4.9.2. Common sense in countermeasures

**Master-driver interviewee cases**

M2:13 Understanding (for instance, in managing unexpected situations) is important to how fast one can drive.

M2:27 I do not stubbornly stress getting there in time and taking big risks, for instance, on emergency escort because damage can happen, and perhaps I wouldn’t get there at all. ... You must use your head despite the hurry ...

The driver must manage the car on emergency escort, and his colleague must comprehend what the task demands.

M2:13 and M2:27, having stressed automatic function in the previous category 4.9.1., still emphasised common sense in driving. It was related to his duties as a policeman. – Driving seemed to demand both good thinking and quick automatic responses at the same time.
3.4.3. Frequencies of the chance conception variety

The character of the frequencies, i.e., the numbers of interviewees in a category, was reported in the section “Frequencies of the safety conception varieties” (p. 89) and “The framework of systematic analysis”, p. 30).

Table 11 shows that all of the young male interviewees conceived chance in some context. Every sub-variety revealed that the permission interviewees reported chance more often than the school interviewees did. All but two (S06 and S09) answered the question about chance. The remaining two simply had no idea. The other two sub-varieties included fewer conceivers.

<table>
<thead>
<tr>
<th>The chance conception sub-varieties of the young male interviewees</th>
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<tbody>
<tr>
<td>Young male sub-varieties of chance</td>
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<tr>
<td></td>
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<tr>
<td>1. Argument safety category</td>
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<tr>
<td>1.3. Chance and traffic</td>
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<tr>
<td>3. Safety categories of chance</td>
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<td>“independent of human will” (elicited)</td>
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<td>4. Overall categories of chance</td>
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<td>(spontaneous)</td>
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<td>Total</td>
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Table 11. The chance conception sub-varieties of the young male interviewees

Appendix 16 shows that a third of the young male interviewees put chance in the safety argument category. This category showed the considerable tendency of the permission interviewees’ to conceive chance.

Appendix 17, concerning “Chance independent of human will”, shows that there were only five young male conceivers in the negative categories, which were almost equally balanced. As against the average, the permission interviewees were in the majority in every positive category. The permission interviewee majority was largest in the “Mother Nature” category, implying that they perceived not merely the social interaction but natural forces as well. They took precautions against fate. This matched with their considerable majority in “Chance and danger” (3.2.3.) and its content “Traffic is dangerous”.

Appendix 18 shows that every female interview was included in this examination. All of them also had conceptions in the categories “Traffic always involves the possibility of a harmful incident” and “Traffic involves
chance.” The total balance between the training groups was almost equal. In the young female primary categories there were only unimportant quantitative differences between the training groups.

As appendix 19 shows, this joint overall chance category, not particularly connected with safety, covered about half the young male interviewees (cf. category 1.3. Chance and traffic, p. 64). This implied that chance was essential in general traffic decision-making as well. Only the permission interviewees considered the notional dynamic of chance and its avoidance, mainly regarding chance as unavoidable in traffic, which matched the finding that they thought that traffic per se was dangerous (see the concluding remarks on “Complete safety” section, p. 61). The permission interviewees were also greatly concerned about chance as an insurmountable obstacle, and they were prepared for events caused by fate.

As shown in appendix 20, every female interviewee was included in this analysis. All of them had conceptions in “Traffic involves chance” category. The total balance between the training groups was slightly towards the permission category.

This spontaneous conception variety corresponded with the conception variety which was a response to the interview question at the end of theme 5 “Danger and safety”. This variety completes this question.

As appendix 21 shows, all of the master-driver interviewees who were interviewed completely according to the protocol expressed conceptions of chance. The interviewees handling only the themes concerning the photos of the traffic situation and the model cars (see pp. 43 and 43) expressed no conceptions of chance. The quantitative stress was on the joint category “Human shortcomings in traffic” and the primary category “Chance and the lower nervous system in countermeasures.”

In brief, all young male interviewees conceived chance in some context, the permission interviewees considering it more often than the school interviewees did. Their maxim was “Traffic is dangerous”. They analysed chance as being caused either by social interaction or natural forces.

The young female interviewees and the master-driver interviewees also conceived chance. Although their evidence was small, their thoughts seemed to be more straightforward than the young male interviewees. The master-drivers also considered chance as a question of the lower nervous system.

The use of the chance concept separated the permission interviewees from the school interviewees, revealing different thinking between the young males on the one hand and the young females and master drivers on the other. The concept also revealed thinking such as “Traffic is dangerous” and “Traffic always involves the possibility of a harmful incident.” The chance concept will be considered in the conclusion and discussion chapters.
Chapter 4. Safety findings

Research task 1 was to explicate traffic safety for comparison between the driver training forms (p. 24). The conceptions of safety were split into 49 different primary categories, these providing a dynamic although heterogeneous description of traffic safety. The categories show that the safety issue means processes, preserving safety, without any explicit notion of the intrinsicality or state of safety. As reported later in this chapter, the core of the safety findings was that the interviewees had maxims, i.e. rules of thumb, affecting their thinking about driving and performance in traffic. Although the objective of traffic safety, i.e. protecting life, health, and property, was understood, there was no explicitly positive method of recognising the static intrinsicality of traffic safety. However, many aspects of preserving safety could be identified. These corresponded with the concepts of the evaluative criteria (Raymond, Jolly and Risk 1973, Shaoul 1975), contributory factors and surrogate behavioural measures (Brown et al. 1987) reviewed in the traffic safety literature section of the introduction (see p. 6).

4.1. The origin of the traffic safety question

The first research task is to explicate positive traffic safety from the conceptions, finding information in drivers’ intra-individual relations and their relations to the world around them, and to define traffic safety in advance or in real time.

The interviewees answered the question “What would have happened if safety was one day entirely in your own hands?” They could think of complete safety removed from everyday reality as in a fairy-tale. Such conjectural questions are used in brief family therapy to help clients to overcome their problems (Berg 1991). Here the method applied was to let the interviewees show their knowledge of traffic safety and to reveal deficiencies in the actual situation. Both training groups joined in reporting the ideas:

0.1. I change.
0.3. The actions of people change.
0.4. People obey the rules.
0.5. The system changes.

All of these thoughts suggested safer human dynamics in traffic than at present.

Only the school interviewees imagined that

0.6. Circumstances change.
0.7. Vehicles change.

These interviewees meant that the conditions of the traffic improve.
Only the permission interviewees imagined that they would achieve complete safety if

0.2. I am alone in traffic.

The permission interviewees imagined avoiding damage if they were alone in traffic, i.e. each of them alone. Social interaction would then also be omitted. This was an impractical solution because "traffic" implies a lot of road users and the roads are open to all road users. Road damage cannot, in practice, be avoided like this. The permission interviewees surely knew the reality. They conceived explicitly that adaptation to driving society absolutely meant accepting the possibility of damage, i.e. danger.

The school interviewees did not consider that the adaptation as such and joining the driving society was crucial. Instead, they reported the potential for improved traffic system conditions. They also stressed human potential. This positiveness of safety is related to the driving school role conflict which Siegrist (ed.) noted: "Driving schools depend on the fact that people need licences" (1999). This vested interest obviously produces such a positive educational conception of danger that it could always be overcome somehow.

In brief, the permission interviewees in practice excluded complete traffic safety. The school interviewees conceived its potential in the conditions of the traffic system and in human performance.

The sub-theme of complete safety also produced a cluster of topical issues:

(1) Solitude, social interaction, anticipation, confidence and personal influence in traffic, i.e. how to share the roads.
(2) Chance, unexpected incidents in traffic
(3) The potential for safety, people improving, people following the rules, technical improvements, vehicles in good condition, easy circumstances
(4) There is always danger in traffic, i.e. absolute danger, lack of motor traffic

All of these issues must be controlled in real traffic.

4.2. Understanding safety

The interviewees did not report any exhaustive definition of traffic safety in the primary category of meaning "Understanding safety" (1.1., p. 63). The permission interviewees based their understanding directly and explicitly on the legal safety definition, while the school interviewees did so implicitly and with the road rules. The permission interviewees talked about nuances in understanding, i.e. types of traffic misfortune, fluency, rules, and anticipation and feeling.
While an exhaustive definition of traffic safety is lacking, there can be no rule absolutely producing safety if obeyed. However, safety can be approximated, and maxims seem to be its mechanism.

In “Lacking safety knowledge” (1.5.1., p. 66) inexperience and misperception were the argument. The permission interviewees seemed to stress inexperience. Misperception could be an explanation of unexpected things. The interviewees had to cope with destructive potential not only around them, i.e. wildlife, but also as part of their identity, e.g. misperception. They coped by means of their safeguarding ability, e.g. experience, and preventative factors, e.g. other people obeying the rules. They had driving resources, but their learning was incomplete.

In “Acquiring safety knowledge” (1.5.2., p. 67) the permission interviewees generally claimed to have acquired knowledge from traffic situations, while school interviewees showed a larger variety of acquisition sources, including peers and pictures. The latter also were inclined to theoretical thinking. While mentioning that licensing provided knowledge of pedestrian safety, both groups indicated the importance of licensing to their pedestrian safety.

In “Applying safety knowledge” (1.5.3., p. 68) arguments concerning obeying, disobeying and waiving rules and rights varied. Some used common sense, some conceived that they had simply to act, some evaded the question or fantasised. There was no simple means of applying safety knowledge, implying some hesitation in traffic performance and incompleteness in learning.

The category “Erring in safety” (1.5.4., p. 68) consisted of conceptions of the interviewees’ personal or general human mistakes in both groups. The school interviewees more often worried about errors than the permission interviewees. Human characteristics, particularly those of others, excused their personal mistakes. The road rules were the criterion of mistakes. While the school interviewees seemed to stress the right – wrong aspect, the permission interviewees emphasised appropriateness.

4.3. Solitude and the interviewees' personal influence

The idea of the category “I am alone in traffic” (0.2., p. 58) was also manifested in the category “I am alone on the roads.” in “Argument conceptions of safety” (1.4.1., p. 65). The interviewees imagined that traffic safety was actualised in the absence of other road users. The interviewees also found that the fewer the road users, the safer the traffic or the greater the feeling of safety (2.1.1., p. 70). In fact, this idea of solitude paradoxically meant that there was complete safety if there was no traffic, only a single car. Their message was that complete traffic safety was abstract, confirmed by the identified maxim: “Traffic is always dangerous”. This notion focuses on social interaction and adaptation and the rules required by them.
The interviewees described their general safety habits, like “calmly”, “peacefully”, “steering”, “slowing”, “avoiding hurry” or “driving at the right speed” (2.2.1., p. 74). There was also a circular description, i.e. safety itself, which characterised two permission interviewees as well as their mentioning “avoiding danger”, which does not clarify taking precautions. While the school interviewees described their safety mode with informative comments, the permission interviewees did so implicitly.

The specific safety methods were skills taught in driver training like keeping the correct speed, space, and distance (2.2.2., p. 75). Some interviewees just reacted to situations.

Young male interviewees expressed relatively little conception of drunk driving compared with the fact it is generally believed to be their particular problem (2.2.3., p. 76).

4.4. Road rules and social interaction

The interviewees could conceive traffic co-operation as positive or neutral but only the permission interviewees thought it could also be negative (2.1.2., p. 71). This fitted with the finding that the permission interviewees stressed that undertaking traffic was dangerous as such. Social interaction in traffic stressed not only the conceptual difference between the school and permission interviewees but did so strongly as an activity requiring rules. There were as many as 11 primary categories, showing that the rules were deeply deliberated on by the interviewees. These were primary safety categories:

<table>
<thead>
<tr>
<th>Category code</th>
<th>Title</th>
<th>Page</th>
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<tbody>
<tr>
<td>0.4.</td>
<td>People obey rules.</td>
<td>59</td>
</tr>
<tr>
<td>1.5.4.</td>
<td>Erring in safety.</td>
<td>68</td>
</tr>
<tr>
<td>1.6.1.</td>
<td>Safety as a need or purpose of rules.</td>
<td>69</td>
</tr>
<tr>
<td>2.1.2.</td>
<td>Co-operation and interaction.</td>
<td>71</td>
</tr>
<tr>
<td>2.1.3.1.</td>
<td>Others obey the rules or do not.</td>
<td>72</td>
</tr>
<tr>
<td>2.1.3.2.</td>
<td>The rules guarantee safety.</td>
<td>72</td>
</tr>
<tr>
<td>2.1.3.3.</td>
<td>The rules do not guarantee safety.</td>
<td>73</td>
</tr>
<tr>
<td>2.2.4.1.</td>
<td>I obey the rules.</td>
<td>76</td>
</tr>
<tr>
<td>2.2.4.2.</td>
<td>I disobey the rules.</td>
<td>76</td>
</tr>
<tr>
<td>2.2.4.3.</td>
<td>I waive my rights.</td>
<td>77</td>
</tr>
<tr>
<td>2.3.6.</td>
<td>I obey the rules as a pedestrian.</td>
<td>81</td>
</tr>
</tbody>
</table>

The findings that complete obedience to the rules was the only ideal thing (1.4.2., p. 66) and that complete safety would have demanded that “People obey the rules” were related to the legal principle of social adequacy (see p. 102). This principle seemed to serve as a loose maxim for the interviewees without any strong confirmation. Perhaps the social adequacy principle applies best to the legal process after any damage, helping to find the person responsible and liable for compensation.
Those who said they drove according to the rules conceived that this was safe driving (2.2.4.1., p. 76). Those reporting that they disobeyed explained it by errors, chance, intentions, or emergencies (2.2.4.2., p. 76). An emergency, such as illness, may justify to breaking the law (cf. Finnish Criminal Code (19.12.1889, 3:10). Common sense, which meant appropriate reactions at the critical moment when the rules seemed not to be valid, also served as a reason.

The school interviewees particularly associated their personal disobedience with the disobedience of other drivers regarding an established custom as a legal norm. The arguments about mistakes and chance were also some excuse. The school interviewees also mentioned disobeying by mistake. The reasons of the permission interviewees were chance, intentions, and emergencies.

A few interviewees noted the possibility of waiving their rights. The legal principle of individual autonomy allows a citizen to waive his own rights though he is not justified in violating those of others. It is in fact expected in traffic if damage can be avoided. No justifying emergency situations are then needed but fluency is considered a good reason.

Generally, the interviewees conceived that people do not obey the road rules (2.1.3.1., p. 72). Typical disobediers were children, drunk drivers and over-careful drivers, all of whom were some kind of scapegoat. Normal drivers, including the interviewees themselves, could also disobey the rules, intentionally or unintentionally. The rules were not explicit enough, guaranteeing safety only in theory (2.1.3.2., p. 72; cf. 1.4.2., p. 66). This again questioned the legal principle of social adequacy in driving situations (see pp. 102 and 116). This criticism emerged again in the finding that quite a few conceptions included the opinion that the rules guaranteed safety and there always were conditions like “quite well”, “on small roads”, “using my head”, “for my own part” and restrictions on personal action. The permission interviewees clearly emphasised their own person.

The interviewees preferred the negative conception “Rules do not guarantee safety” to the positive one described above (2.1.3.3., p. 73). The reasons for the failure to guarantee safety were the disobedience of others and even the interviewee himself. Infractions could occur intentionally or by chance. There may also be some emergency. The criticism of social adequacy in actual incidents was broad.

When the interviewees were asked explicitly “What you need road rules for?” they usually answered to ensure safety or order (1.6., p. 69). The meaning of safety was avoiding damage and the result of order was safety. In other words, order meant the opportunity to anticipate events. Anticipation also meant minimising or eliminating the potential for damage, i.e. danger. Although the rules did not provide mutual confidence in operational decision-making, they were important in the constitution of the traffic system and in avoiding chaos. People generally follow the rules, although some road user
may violate them, so that the interviewees could not rely on any fellow road user. Avoiding damage is a road user’s general obligation (the Road Traffic Act 267/81, 3:1).

The road rules were not very important to the interviewees’ safety as pedestrians (2.3.6., p. 81), only one of them mentioning this topic. They preferred the topics of crossing roads, general self-assessment, driver experience, observation, and good physical condition. The conceptions did not generally reveal very much driving experience relating to walking but some positive improvement in behaviour as a pedestrian seemed to occur.

While the interviewees individually considered neither the basic rule, the remaining road rules or other road traffic norms in connection with safety, they did speak about the road rules in principle. (The Road Traffic Act 267/81).

Although the road rules were widely considered, they did not provide confidence among road users. However, they were not conceived as meaningless because they improved safety through order and anticipation. The interviewees compensated for disobedience by their perception ability. Thinking of safety and solitude revealed that the interviewees themselves were concerned with the legal rights of others. Traditional criminal law protects the rights of others. Being alone in traffic, a citizen need not take account of these rights. He or she can also only waive his or her own rights. The problem is rather enacting hands-on legal norms than understanding of the rights themselves.

4.5. Conceiving the road and the car

The considerable interest of the school interviewees in performance on the road (2.4.1., p. 81) and routes (2.4.3., p 82) seemingly indicated inadequacy in hands-on driving practice. The school interviewees got less driving practice than the permission interviewees on average. Familiarity with the road network solved this problem and a guide in the car assisted the driver.

Cars were a popular topic among the interviewees because they spoke a lot about them (2.5., p. 83). The model cars also seemed to stimulate the interviewees, who could use them to analyse the characteristics of the cars and be critical (2.5.6., p. 86). Both interviewee groups found both safe and unsafe features of both model cars, although the permission interviewees considered only the safety features of the Citroën, while the school interviewees considered those of the sports car as well (2.5.2., p. 84).

Most interviewees regarded the sports car as safe or safer than the Citroën in relation to their safety habits, but on the condition of being able to master it. The safety properties of the Citroën were, however, considered as good or better than the sports car. (2.5.3., p. 84). The permission interviewees conceived the car alternatives as generally safer (2.5.6., p. 86) or found no difference (2.5.7., p. 87) as against the school interviewees.
The Citroën produced only negative feelings while the sports car caused both admiration and criticism (2.5.4., p. 85). An attraction of the sports car was its speed (2.5.5., p. 86). Some permission interviewees, however, could resist it, and also considered that the Citroën was not a temptation to speed.

The permission interviewees identified themselves with the Citroën and the school interviewees with the sports car. The former thought in quite a realistic way, while the latter fantasised. This provoked the issue of the car and training and the first cars of new drivers.

4.6. Maxims achieving safety

While an exhaustive definition of traffic safety did not emerge, the interviewees, however, did report a kind of thinking process, which guided behaviour in taking precautions. These were called maxims by the researcher. They can direct performance in two ways:

1. They clarify and crystallise some piece of knowledge, thus motivating performance.
2. They themselves are rules of thumb revealing appropriate action.

The maxims had content which the interviewee could express or the interviewer could identify in conceptions and transcribe. They were not always consciously articulated by the interviewee. If the interviewees recognised the maxims, they realised that they were rules of thumb, not absolute rules inevitably producing safe driving. While affecting thinking, they seemed to correspond with the “how” aspect of the conceptions (Uljens 1989, 23). Both an ideal or mythical and a practical aspect of the maxims was identified. The following maxims were transcribed:

<table>
<thead>
<tr>
<th>Ideal, mythical</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am alone in traffic. There is no motor traffic. The rules guarantee safety if everybody obeys them.</td>
<td>There is always some risk in traffic. Traffic is never completely safe. There are unpredictable and unexpected incidents.</td>
</tr>
<tr>
<td>Future technical improvements guarantee safety.</td>
<td>Driving according to the rules is safe driving. Use your common sense. (To act sensibly or to explain deficiencies.) Everybody drives in exactly the same way. Safety needs anticipation. People have the potential to act safely. Vehicles must be in good condition for safety. Good circumstances guarantee safety.</td>
</tr>
<tr>
<td></td>
<td>People do not obey the rules.</td>
</tr>
<tr>
<td></td>
<td>Pedestrians need to be in good condition to survive. The car may tempt a driver to speed. Animals are dangerous.</td>
</tr>
</tbody>
</table>
The maxims might have different written versions, suggesting that they were not conceived accurately by the interviewees. The ideal aspect suggested abstract goals. The various maxims might also be inconsistent, like “People do not obey the rules” and “Driving according to the rules is safe driving.” While it was easy to identify the maxims, the conceptions did not reveal the basic traffic rule (the Road Traffic Act 267/1981, 3) or any individual traffic rule (see also “Traffic safety in Finnish road traffic legislation” p. 6).

Absolute obedience to the road rules, relating to social adequacy (p. 102), was considered as utopian. Common sense was needed to find an appropriate action in a situation involving contrasting requirements. Common sense also seemed to serve as an excuse for mistakes. It would be useful for researchers and trainers to study the common sense phenomenon.

“There is always some risk in traffic” was a fundamental conception and maxim in road traffic. This did not hold for “I am alone in traffic” or “There would be no motor traffic,” which were known to be unreal, as well as “The rules guarantee safety if everybody obeys them.” In practice, the risk is small when “I am alone on the roads” and “The fewer road users the safer the traffic.” While chance was such a factor, there were also some notional prerequisites and a way of acting which resulted in safety. These prerequisites were “People have the potential to act safely”, “Vehicles must be in good condition” and “Good circumstances guarantee safety”, corresponding with man-machine-environment thinking. “Everybody drives in exactly the same way” because “Safety needs anticipation” was also relevant. Anticipation correlated with safety but the first of the maxims did not inevitably result in the second. Traffic involved chance and unexpected incidents. Anticipation and surprise (being taken by surprise) were conceived as opposing forces. The interviewees did not want the latter, while the former was what they did. The corresponding pair, order and chaos, was identified in the preliminary work “Expert opinions about driving and training in the lifelong context” (see Introduction, p. 16). Chaos prevails in the absence of order. This was the general explanation of why a risk is always conceived to be in traffic.

The interviewees also believed that “Pedestrians need good condition to survive”. They needed good legs to run cross the carriageway and alert senses to spot a vehicle. The young male interviewees also admitted that “The car may tempt me to speed”, depending on its performance. A very interesting finding was the consistent perception of animals, especially elks, that “Animals are dangerous”. Elks had also appeared in the preliminary work “Expert opinions about driving and training in the lifelong context”. Elks were a symbol of danger and a scapegoat for damage. The conceptions of elks, common sense, chance, and unpredictable incidents may also include frustration with traffic.
4.7. Decision-making and pseudo-mechanisms of the interviewees, and theoretical drafts

The interviewees often described or explained the phenomena of traffic in certain coherent ways, conceptualised in this report by *chance*, unpredictable incident and common sense. It was mainly a question of function, not content. While they did not have a genuine correspondence with the human cognition mechanism, they could be regarded as the pseudo-mechanisms of the interviewees’ decision-making. While directing thought, they seemed to correspond with the “how” aspect of the conceptions (Uljens 1989, 23).

<table>
<thead>
<tr>
<th>Pseudo-mechanism</th>
<th>Definition</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chance</td>
<td>An ambiguous and unexpected factor surprising a driver.</td>
<td>Factors like poor observation may create a <em>chance</em> conception. <em>Chance</em> is notional.</td>
</tr>
<tr>
<td>Unpredictable incident</td>
<td>An unexpected incident surprising a driver.</td>
<td>The unpredictable incidents happen in the “real world”.</td>
</tr>
<tr>
<td>Common sense</td>
<td>The natural ability to judge well and behave in good way.</td>
<td>Common sense appeared particularly in critical incidents of disobeying rules and could also serve as an excuse. Corresponding expressions: head, brains, sense, horse sense, acumen.</td>
</tr>
</tbody>
</table>

The conception of *chance* was some kind of description of personal inability or chaos, i.e. what the conceiver could not control. In the conception of unpredictable incidents chaos was restricted to a problem such as elks. The conception of common sense typically emerged in critical incidents, e.g., when the conceiver did not or could not follow the road rules. The conceiver then justified his moral or legal decision by common sense. When the pseudo-mechanisms emerged in the discourse, the conceiver often spoke about the next sort of problem he was solving or learning, or revealed his inability in some other way. The pseudo-mechanisms serve as the indicators of the conceivers’ level of growth. This offers a good opportunity to evaluate their growth and to plan teaching.
There were some clusters of ideas which also served as the drafts of continuing theoretical work.

<table>
<thead>
<tr>
<th>Draft</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity conflict</td>
<td>The tendency of a driver to regard his personal action in traffic as appropriate but that of others as inappropriate.</td>
</tr>
<tr>
<td>Original or absolute danger</td>
<td>The principle “There is always danger in traffic.”</td>
</tr>
<tr>
<td>Social problem</td>
<td>The tendency to see traffic safety as a social problem per se instead of characteristics and functions of some social problem. “I am not alone in traffic.” This is evidently related to absolute danger.</td>
</tr>
<tr>
<td>Transformation function</td>
<td>The legislator regulates performance negatively through the concepts of the lack of damage, but the resources of driving, e.g. stimuli, abilities, and vehicle, are positive and available. These negative regulations have to be transformed into real resources.</td>
</tr>
</tbody>
</table>

The identity conflict reflected personal responsibility. A researcher may also use the interviewees’ conceptions of themselves and of others as the data sources among the population. Since self and society are fused, the adaptation of an individual to road culture and the population of the road users can be confirmed as an approach to the traffic safety question (cf. Gecas 1992). It can be assumed that a person characterises others negatively more often than himself, but that such characterisations match with the whole population. The identity conflict phenomenon serves as an assessment, for example, for education.

Since absolute danger is a fundamental assumption of traffic, it is a primary objective in traffic education, not merely because it is also a legal basis of the road traffic legislation. The social problem is an explanation of absolute danger.

The transformation function results from the need to regulate social life by observing individual autonomy. The legal rules are mainly refusals and restrictions indicating what is to be avoided but not what has actually to be done. The road user must know what he wants and do it according to the rules. The maxims seem to transform abstract goals into available resources.
Chapter 5. Chance findings

Chance findings corresponded to research task 4.

5.1. Chance, unpredictable incidents and safety

Primary category 1.3. “Chance and traffic” (p. 64) generally described chance in an ambiguous way, while joint category 2.6. “Unexpected traffic” on the performance main category conceptualised unexpected things at 2.6.1. “Unpredictable incidents” (p. 88) and 2.6.2. “Animals are unsafe for road users” (p. 89).

Chance resulted from the actions of the interviewees themselves, e.g. misperception, slippery conditions, or others, such as drunk drivers or disobeying the rules (1.3.). Chance was something unknown, which could just happen, i.e. “by accident”. It seemed to signify the principle of absolute danger, as in “Damage can always happen”. Chance also excluded responsibility.

It also seemed that the unpredictable incidents (2.6.1.), being concepts about harmful traffic situations, were not underlain by real or explicit experience. The school interviewees simply anticipated that there were incidents with which they would have had difficulties coping. This anticipation and the need to cope emerged in the conceptions “Animals are unsafe for road users” (2.6.2.). Wildlife was seemingly abstract to the young men living in the capital area. Since the interviewees lacked the ability to respond to wildlife appropriately, they encountered it like an unexpected thing. It seemed that wildlife was a concept in the driving school curriculum and that the students had not learnt to apply it on the roads.

While the permission interviewees conceived that the traffic safety was not complete because they were not alone in traffic (see category 0.2. “I am alone in traffic.” (p. 58), the school interviewees conceived that there was no safety ever in traffic (category 1.2., p. 64). The safety assessments of the groups were similar but, while the permission interviewees implied social interaction and co-operation on the roads, the school interviewees made a bald statement. The permission interviewees also gave some arguments and context in “Chance and traffic” (p. 64) which matched with the bald “no safety ever in traffic” of the school interviewees.

While the conceptions of unpredictable incidents and chance shared the unexpected aspect, they actually formed a joint chance category intermediating between the main categories.

The conceptions of chance were related to driver status. The interviewees did not report conceptions of chance about walking. Pedestrians hurrying, resembling drivers’ chance, defined the kind of incident where the speed element could cause some chance. – The stress on chance and unpredictable incidents in driving meant that the interviewees’ knowledge of their limits and resources were inadequate, not supporting actual actions in traffic.
In the primary category “Chance and danger” (3.2.3., p. 95) the young male interviewees thought that traffic was dangerous. They tended to regard human impact as a possible factor in chance (3., p. 93). The overall young male conceptions of chance implied the maxim “There is always some risk in traffic” (4.3., p. 102)

The maxims could be proved clearly in the comparison between the young male interviewees, young female interviewees, and the master-driver interviewees. As indicated later, while the males thought divergently, the females and the masters thought convergently.

5.2. Characteristics of the master drivers’ conceptions of chance

The professor specialising in road traffic studies expressed chance only once (M3:39), stating that “some part remains to fate or chance” and used the term “instinct” in its academic sense. The policeman, who among his other duties trained other policemen on emergency escort duties, mentioned chance twice (M2:13 and M2:27). He also stressed automatic reactions and was the only master driver to mention common sense. Ostensibly there was a contrast in that common sense needs the cerebral cortex, which functions more slowly than the automatic reactions of the spinal cord. However, he meant that both kinds of abilities had to be adequate.

The senior fireman expressed conceptions of chance seven times, mainly categorised in the joint category “Human shortcomings in traffic” (4.8., p. 107). He emphasised fatalism “But you never know when it will happen” (M1:11) and “the situation is what it is” (M1:38). He was the first master-driver interviewee who was interviewed for the construction of the final interview protocol. At the beginning of his interview, the researcher mentioned the purpose and asked him to help. The interview was very open, thus stimulating him to express plenty of ideas.

The examiner (M4) produced almost half of the conceptions of the master-driver interviewees. There were two reasons for this. Firstly, the topics of the interview were completely within the forms of his profession. Secondly, he was the only master-driver interviewee who responded to the actual interview protocol and was thus exposed to the stimulating inquiry techniques of brief therapy. His conceptions were mainly categorised in the joint category “Human shortcomings in traffic” (4.8., p. 107). He considered chance as a problem and tried to resolve it: “A pedestrian’s speed is lower than a driver’s which results in the fact that my responsibility is undoubtedly greater driving a car (than walking), if something harmful occurs, then it becomes more important.” (M4:24). He behaved like a teacher, using problems and solutions as aids. This kind of instruction also appeared in expressions of M2 and M3, also teachers. M4 was also fatalistic: “Chance remains however.” (M4:65)

All master-driver interviewees offered ideas from their expertise. The chance conception was rare in the scientist’s and policeman’s worlds. They had
processed safety knowledge in a scholarly way. The former had conducted plenty of scholarly work on traffic safety and the latter had trained policemen in emergency driving. The *chance* conception was however often in the examiner’s and fireman’s mind. The fireman’s knowledge originated from experience, there being less actual driver training in his vocational education. He was, however, not used to processing safety information in a scholarly way. It is now possible to state that chaos is a concept rather than a real entity, and that the scholarly ability is a resource for solving chaotic traffic prerequisites, resulting in order. The examiner’s case did not match in that he had numerous and detailed *chance* conceptions and that his knowledge must also be scholarly, as one who rates the outcomes of driver training. His teacher role might have caused his repeated *chance* expressions in the interview situation.

All master-driver interviewees accepted *chance* as a part of traffic. There was not the faintest suggestion of a person’s ability to control traffic completely.
Chapter 6. Comparison between school and permission training

Research task 2 required a comparison between school and permission training (p. 25). Except on the safety criterion, this comparison was carried out on conceptions of chance. It is obvious that these conceptions have to be incorporated into the consideration of safe driving.

6.1. Safety

Since no exhaustive and simple definition of the intrinsicality of traffic safety could be established, the comparison between the training forms was based on the safety conception varieties (“Complete safety”, p. 56, and “Practical safety”, p. 61) and the safety findings (p. 113). The typical characteristics of a training group could be found by comparing between the frequencies of the training groups (see frequencies of the various safety conception varieties, p. 89). A category was then entirely occupied by the group or nearly so. Where there were qualitative differences in a category, the qualities of the conceptions differed between the groups.

The safety characteristics of and differences between the training groups were as follows in table 12:

<table>
<thead>
<tr>
<th>Category</th>
<th>School</th>
<th>Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2.</td>
<td></td>
<td>Only these thought that they would be alone in traffic in circumstances of complete safety.</td>
</tr>
<tr>
<td>0.6.</td>
<td>Only these thought that the circumstances can be changed for complete safety.</td>
<td></td>
</tr>
<tr>
<td>0.7.</td>
<td>Only these thought that the vehicles can be changed for complete safety.</td>
<td></td>
</tr>
<tr>
<td>1.1.</td>
<td></td>
<td>Mentioned the legal objects of traffic safety, i.e. life, health, and property.</td>
</tr>
<tr>
<td>1.2.</td>
<td>Conceptions of “No safety ever” typical.</td>
<td></td>
</tr>
<tr>
<td>1.3.</td>
<td>Conceptions of chance typical.</td>
<td></td>
</tr>
<tr>
<td>1.5.1.</td>
<td></td>
<td>Stressed inexperience.</td>
</tr>
<tr>
<td>1.5.2.</td>
<td>A variety of sources of acquisition of knowledge, e.g. peers and pictures.</td>
<td>Knowledge derived from traffic situations.</td>
</tr>
<tr>
<td>1.5.4.</td>
<td>The right – wrong aspect of obeying the rules.</td>
<td>Appropriateness in obeying the rules.</td>
</tr>
<tr>
<td>1.6.1</td>
<td>Often considered safety as a need for the rules.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>2.1.1.</td>
<td>Safety was often a feeling of safety.</td>
<td></td>
</tr>
<tr>
<td>2.1.2.</td>
<td>Only these conceived co-operation negatively as well.</td>
<td></td>
</tr>
<tr>
<td>2.1.3.2.</td>
<td>Emphasised their own person while reporting rules guaranteeing safety.</td>
<td></td>
</tr>
<tr>
<td>2.2.1.</td>
<td>Described their safety mode informatively, having <em>explicit knowledge</em> of safety.</td>
<td></td>
</tr>
<tr>
<td>2.2.1.4.</td>
<td>Described their safety mode implicitly, having <em>implicit knowledge</em> of safety.</td>
<td></td>
</tr>
<tr>
<td>2.2.4.2.</td>
<td>Mentioned mistakes while reporting that they disobeyed the rules.</td>
<td></td>
</tr>
<tr>
<td>2.2.4.3.</td>
<td>Mentioned waiving their rights in a general way.</td>
<td></td>
</tr>
<tr>
<td>2.3.2.</td>
<td>Reported that licensing improved perception ability.</td>
<td></td>
</tr>
<tr>
<td>2.3.4.</td>
<td>Only these noted pedestrian senses and perception.</td>
<td></td>
</tr>
<tr>
<td>2.3.5.</td>
<td>Only these emphasised a pedestrian’s ability to walk quickly.</td>
<td></td>
</tr>
<tr>
<td>2.4.1.</td>
<td>Concerned intersection driving.</td>
<td></td>
</tr>
<tr>
<td>2.4.2.</td>
<td>These emphasised the importance of the various types of road sign.</td>
<td></td>
</tr>
<tr>
<td>2.4.3.</td>
<td>These noted route selection. Knowing a good route was a safety matter.</td>
<td></td>
</tr>
<tr>
<td>2.4.4.</td>
<td>Noted the weather. Said that good weather was safe and that it was not under anybody’s control.</td>
<td></td>
</tr>
<tr>
<td>2.5.2.</td>
<td>Considered both reality and fantasy while examining the model cars.</td>
<td></td>
</tr>
<tr>
<td>2.5.3.</td>
<td>The model cars often stimulated them to express opinions.</td>
<td></td>
</tr>
<tr>
<td>2.5.5.</td>
<td>The Citroën CV4 did not tempt them.</td>
<td></td>
</tr>
<tr>
<td>2.5.6.</td>
<td>Conceived the model cars as safe more often.</td>
<td></td>
</tr>
<tr>
<td>2.5.7.</td>
<td>Often found no difference between the model cars.</td>
<td></td>
</tr>
<tr>
<td>2.6.2.</td>
<td>Only these conceived animals as unexpected traffic.</td>
<td></td>
</tr>
</tbody>
</table>

Table 12. The safety characteristics of the training groups including the differences between them
As table 12 shows, while the characteristics accounted for 3 of the 7 complete safety categories and 6 of the 12 argument primary categories, these described as much as 20 of the 30 permission primary categories. The differences were larger in the conceptions of practical driving than the abstract objectives. The projective interview method evidently had a bearing on some of the differences, since the model cars were among the topics producing most of these. However, the remaining productive topics, i.e. aspects of the road and weather as well as pedestrian confirmed the stress on practical driving.

The particular notions were as follows:

- The model cars produced lots of conceptions. The permission interviewees accepted even the Citroën CV4, which did not tempt the school interviewees (2.5.2., 2.5.3., and 2.5.5.).
- The real aspects of the road and weather also provided many conceptions. Obviously, the school interviewees lack some practice in intersections and route selection. The permission interviewees seemed to keep a weather eye on the forces of nature. (2.4.4.)
- Licensing seemed to improve the perception of the school interviewees and the choices of the permission interviewees as pedestrians. The former noted the pedestrians’ senses and ability to walk quickly. (2.3.4., 2.3.5.).
- While the school interviewees talked about mistakes, the permission interviewees mentioned chance in reporting disobeying the rules. (2.2.4.2.).
- Safety was often a mere feeling to the school interviewees. It was an object of doing to the permission interviewees, who could conceive co-operation negatively as well. (2.1.1., 2.1.2.).
- Conceptions of chance were typical of the permission interviewees (1.3.), while the school interviewees conceived that there was “no safety ever” (1.2.). (See also the notion “while the permission interviewees implied social interaction and co-operation on the roads, the school interviewees made a bald statement” in “Chance, unpredictable incidents and safety”, p. 123.) They also considered the rules as a matter of appropriateness, while the school interviewees regarded them as a matter of right or wrong. (1.5.4.).
- Only the school interviewees conceived animals as an unsafe factor (2.6.2.).
- While thinking of complete safety, only the permission interviewees reported solitude in traffic (0.2.).
- While thinking of complete safety, only the school interviewees reported the circumstances and vehicles (0.6., 0.7.).

The permission interviewees thought that road traffic per se inevitably resulted in the possibility of harmful occurrences, while the school interviewees saw positive opportunities of improving traffic interaction, its actors, instruments, and arena. Have the driving school interviewees not seen the fundamental basis of interaction in traffic or have the permission interviewees not seen ways of managing this basis?

The school interviewees emphasised abstractions and concepts, rules, correctness and mistakes, feelings, information, and imagination. This
emphasis appeared in their evident lacks, such as driving practice relating to animals, intersections, and route selection. They could identify their problems, but not necessarily solve them. Where they were conceptually intellectual, the permission interviewees dynamically stressed performance, change, appropriateness, and practicability. While the school interviewees had learned concepts in tuition, the permission interviewees learned by doing, e.g., analysing change incidents. The permission interviewees knew the legal objects of safety and their limited personal resources in traffic. Each group processed traffic safety in a different way. Neither knew the intrinsicality of safety better than the other. Traffic safety was a guess which was possible to approximate in various ways. Obviously, learning by doing has a closer bearing on taking precautions than learning of concepts, since taking precautions is doing, but the concepts are intermediate between doing and a learner.

The interviewees' personal characteristics after licensing may have resulted either from their life since birth, from their driver training or from both. However, the difference between the group's conceptual – dynamic thinking resulted rather from driving training forms than from their post-compulsory education, which was similar in the groups (see table 8, p. 39). It seems that the driving school curriculum packed the trainees with lots of concepts and abstractions, but that there were insufficient resources to practise them.
6.2. Chance

The quantitative differences between the training groups and their deviating qualities (table 13):

<table>
<thead>
<tr>
<th>Training group</th>
<th>School</th>
<th>Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chance variety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3. Vice versa</td>
<td>Report chance more often.</td>
<td></td>
</tr>
<tr>
<td>2.6.2. They perceived animals as unpredictable incidents.</td>
<td>Conceptions of chance typical.</td>
<td></td>
</tr>
<tr>
<td>3.2. Vice versa</td>
<td>Conceived chance in traffic much more often.</td>
<td></td>
</tr>
<tr>
<td>3.2.1. Vice versa</td>
<td>Conceived chance like “Mother Nature” much more often.</td>
<td></td>
</tr>
<tr>
<td>3.2.2. Vice versa</td>
<td>Conceived chance as a human factor slightly more often.</td>
<td></td>
</tr>
<tr>
<td>3.2.3. Vice versa</td>
<td>Conceived chance with danger more often.</td>
<td></td>
</tr>
<tr>
<td>4.1. They talked about post-licence training in connection with chance.</td>
<td>Talked about driver training in connection with chance.</td>
<td></td>
</tr>
<tr>
<td>4.3. Vice versa</td>
<td>Conceived chance as an insurmountable incident more often.</td>
<td></td>
</tr>
<tr>
<td>4.4. (They conceived unpredictable incidents such as animals.)</td>
<td>Conceived the notional dynamic of chance and its avoidance.</td>
<td></td>
</tr>
</tbody>
</table>

Table 13. The chance characteristics of the training groups including the differences between them

The differences in table 13 were mainly quantitative, being of the type “The more P the less S” or vice versa. In the most respects, i.e. “Mother Nature”, human factors, chance and danger, insurmountable incidents, and process and avoidance, the permission interviewees thought of chance more often than the school interviewees, who perceived animals as unpredictable incidents. Both groups deliberated on the problem of driving anticipation. Both groups utilised the notional tools they had obtained. The permission interviewees missed what the other obtained from the driving schools, which was traffic educational concepts. The school interviewees also talked about post-licence practice and the permission interviewees about the methods of their driver training in relation to chance and about the notional dynamic of chance and its avoidance. This might be interpreted to mean that while the school interviewees wanted additional tuition to learn to solve their problems, the permission interviewees were solving their problems. The permission interviewees were certainly closer to their problems than the school interviewees. The statement “The permission interviewees were more learned than the school interviewees were” was obviously true, but it is false if the latter have learned more but unnecessary things. It also seems that concepts are not necessarily conducive to driving.
The conception of an unpredictable incident was more definite than that of chance. The finding that the female permission interviewees noted chance slightly more often than the female school interviewees also suggested the difference between permission and school training. In this respect the school interviewees seemed to have advanced further in scholarly and abstract thinking than the permission interviewees. Some master interviewees had developed still further in scholarly thinking, but they accepted chance in traffic although it was not their particular interest. Great interest in the chance concept was typical of the masters not used to very scholarly thinking as well as of the young male permission interviewees. While the better educated master drivers definitely accepted chance, the practical master interviewees and the young male interviewees revealed their lack of understanding in the form of chance.

While the training of the driving schools was based on concepts and abstractions, the fathers and other family members told the learners what to do. The most educated master drivers accepted chance, like the permission interviewees and used concepts, like the school interviewees. This justifies both training forms.

This research implies the potential of the chance conception as an indicator of driving education. This indicator could particularly serve as a method of identifying a person’s lack of knowledge and skills. When “the categories of description are known, quantitative inquiry techniques can be applied to determine the intensity and extension of the phenomenon. For instance, the psychological test requires the known and defined categories of response in advance.” (Dahlgren & Franke 1992).
Chapter 7. Conceptions of chance between the young males, young females, and master-driver interviewees compared

In research task 3, some comparison between the problematic young male drivers and the young female drivers and master drivers had to be put into its social context (p. 25).

7.1. Overall chance

The female and master-driver interviewees conceived overall chance similarly. They shared the ideas of the possibility of a harmful occurrence and the existence of chance. They also focused on the countermeasures against chance (4.5.1. – 4.9.2., pp. 104 - 110).

Although the young female and master-driver interviewees accepted chance in traffic, they still strongly stressed human ability to cope with it, even though not absolutely. It was found that chance could be independent of human will, but could be compensated for by a road user. Their thinking applied the maxim “Traffic is dangerous” to the countermeasures in a direct and convergent way. The master-driver interviewees had learned these from their experience of the nervous system and common sense. The females had experienced some instances of chance but had not yet produced very clear countermeasures against it. The master-driver interviewees’ thinking advanced more explicitly than the females’ from the maxim to the countermeasures.

The young male interviewees’ thinking was divergent (4.1. – 4.4., pp. 101 - 103). However, the ideas of the possibility of a harmful occurrence, the existence of chance and dangerous traffic were implied in their opinions. The males knew instances of chance, e.g. disobeying rules and insurmountable incidents, as well as countermeasures such as education. Still, no clear sequence from maxim to performance could be based on the primary categories. The male overall thinking in practice concerned the notional dynamic of chance and its avoidance. While they also seemed to have caught onto some obvious factors, they did not explicitly report any philosophical ideas, nor did they note the maxims appropriately.

Keskinen et al. (1999) also stressed the young male drivers’ driving strategy that “it often demands high quality vehicle manoeuvring skills and mastery of traffic situations.” While they characterised this matter as a question of motives and controlling oneself, they placed this problem at the highest level of goals and skills for living in their hierarchial model.

It is obvious that the experienced master-driver interviewees are safe and secure. The difference in chance conceptions between the young males and the master-driver interviewees, also men, revealed that the young males can develop their thinking. The young females’ thinking was close to the level of the master-driver interviewees.
There were clearly qualitative differences and characteristics between the groups, which serve as evaluation resources. The evaluative measure based on the chance conceptions shows what the driver does control or what he or she has to learn. It shows what his or her level of skill and ability is. The measure can be developed in relation to the conceptions of unpredictable incidents, common sense, and other possible pseudo-mechanisms.

7.2. Chance “independent of human will”

The young female comprehension revealed in the answers to the question “Do chance or fate affect your safety?” accorded with that in overall chance. Only this group gave two or more examples. Their answers were still more deductive than their overall conceptions of chance, seemingly because of the explicit task.

The comprehension of the young males deviated from both the young females’ answers to the question, their own and the females’ overall chance conceptions. The young male thinking diverged into various aspects of chance both independent of human will and dependent on it. Their attempts to deny chance independent of human will were ineffective. They reported the maxim “Traffic is dangerous” but did not produce countermeasures. The female thinking converged from the maxims to the countermeasures without any hesitation. (See “Chance and traffic”, p. 91.)

The thinking of the young males was divergent, while that of the young females was convergent.

Chance of the type “Mother Nature” had an absolute core, though meteors (which were actually mentioned) and other such unpredictable phenomena are very rare. One could only encounter such an event, not reduce its likelihood. It really meant some inexplicable factor in traffic, which could result in harmful incidents like crashes. The absolute core could also result in danger, as conceded in the maxims “There is always the possibility of a harmful incident in traffic” or “Traffic is always dangerous.” These are also the maxims in Finnish road traffic legislation.

7.3. Who encountered chance?

The interviewees usually thought that people might also behave unpredictably in traffic. Such people may be other road users but also the interviewee him- or herself who chanced a situation, for instance, by disobeying the road rules. This human chance, sometimes involving frustration, was general. This finding provokes two remarks. Firstly, this involved a psychomachia, i.e. an intra-individual struggle between two urges, which would have put the traffic at risk. The one urge extended uncertainty from the core chance while the other tried to diminish chance. The struggle took place within the range of human chance which is possible to diminish and even eliminate. Trainers and trainees who
identify the weak and strong points of the contending urges can utilise these. Secondly, other road users and the “I” can critically be regarded as the same object in acquiring information about conceptions of interaction especially in discovering proper measures. The self and society fuse (Gecas 1992). It just happened that some who were interviewed spoke about others. While not very willing to report their negative personal characteristics, people had no difficulty telling the researcher about the weak points of anonymous and absent outsiders.

The knowledge of the conception of “Unexpected traffic” (category 2.6., p. 88) supported the finding of intra-individual dualism. The ideas of chance and unexpected traffic were mutually related. For instance, when something was mis-perceived, it could cause an unpredictable incident, leaving only a little time to react in driving. The incident could thus take place “by chance”. The road, the vehicle, wildlife, and other such often surprised a driver. The better response was perception, performance, braking, and improving skills and knowledge of these. The master-driver interviewees did not report such problems because they were sufficiently trained to control the situations. They used to report actions like the use of the nervous system and common sense. It really seemed that the training of the young male interviewees was not sufficient at the time of interviewing. Actually, this finding has been accepted by a legal presumption. Once licensed, the new Finnish drivers are still presumed to require autonomous practice in the intermediate phase. In the second phase, the drivers’ competence is finally established and a final driving licence granted. – It could be suggested that actual driver training should incorporate practice into the contemporary intermediate phase, for instance, tutoring or parenting. Active human relations should support trainees until they are ready for licensing and autonomous driving.

Since the conceptions of chance and unpredictable incidents were general, it could be inferred that the interviewees’ conceptions and knowledge of their personal limits, responsibility, and resources were insufficient to support safe driving. Educational measures are highly applicable to the conceptions.

In brief, the young female and master-driver interviewees started with the maxims and finished with preventive measures. The young male interviewees thought about the assumptions and the elements of the problem. The former thought functionally, while the latter did so less coherently and purposefully. The young females and master interviewees had explicit maxims for sensible decision-making but these might have been invalid. The young males were prone to develop the decisions with the driving tasks. Because decision-making is strongly related to time, the excessive rationalisation of the young males put them and others in the situation at risk. Male risk-taking seems to consist in developing, selecting and testing – and sometimes losing.

The type of driver training did not seem to change the divergent male trend towards convergent thinking despite the conceptualisation in driving schools. By the standard of the master-driver interviewees, the male interviewees would have needed automatic reactions, the maxims, and developed thinking. They need not reject the chance concept, but the permission interviewees
particularly need to learn how to minimise it. The cause of the young male interviewees’ conceptions evidently lies in the education of boys, who are required to prove themselves and take risks. Driver training with a more enduring impact is needed.

There was no consistent consideration of the principal values of life, health, or property. Ethical systems like religions offered no norms pertaining to traffic performance.

*Chance* meant an essential deviation from the social adequacy principle. There were drunk and reckless drivers and elks causing the interviewees to disobey the rules and to produce *chance*.

Opinions of *chance* were prominently manifested in the analysis of the interviews, and these were examined in detail. It seemed that these opinions reflect the conceivers’ resources of knowledge about traffic and driving. This might suggest a method of evaluation that helps to diagnose a person for education and develop a curriculum.
Chapter 8. Fidelity of findings

8.1. Trust

The researcher demonstrated throughout the report how the research was done, according to the principle of reliability as interpretative awareness (Sandberg 1995). The techniques of reliability shown in appendix 22 included comprehensive preparation for the main study, two simultaneous methods, extensive data acquisition and principles of brief therapy, sub-samples for comparisons, a proficient researcher, natural themes and varied questions, checked interview summaries, and indexing the data by computer. Moreover, thinking and writing in a foreign language forced the researcher to criticise and check his expression.

Although the present phenomenographic findings are impossible to assess with absolute truth as a criterion (see p. 30), other research provides some corroboration of the present findings.

Literature review:
- Brown et al. (1987) concluded that “Lack of information is reciprocally related to safety”, corresponding with the chance conceptions which emerged in the interviewees.
- Many of the previous authors stressed the process resulting in damage (see Introduction, p. 4). This process proved to be a special case of taking precautions explicitly identified as dangerous by its harmful consequences, not by experience of life.
- The conceptual phenomena called the maxims in this study accorded with internal representations (Nummenmaa et al. 1983) and (Mikkonen & Keskinen 1980, Keskinen 1998) although not precisely coinciding with them (see p. 146).
- Hatakka (1998a) and Lehtimäki (1998) found in the preliminary work (see p. 14) that there was selection between the driver training forms.

On an expedition it is impossible for many results to correspond with previous knowledge, otherwise it would not be research into the unknown wilderness, but rather a replication of previous research. (see pp. 25 and 31.)

The present findings corroborated the preliminary work on the following points:

The preliminary work “Expert opinions about driving and training in the lifelong context” (p. 16):
- Both analyses produced positive and dynamic essentials of traffic safety and a lack of positive and static characteristics. Traffic safety is continuous precautions, which coincides with road traffic legislation attempting to regulate these precautions.
- The principle “Traffic is always dangerous” was common not only to both analyses but to road traffic legislation.
• Both analyses suggested a chaos – order model. There is chaos unless order is deliberately achieved.
• The preliminary work revealed the great importance of family in driver training, no matter which form of training was undertaken. The importance of the father particularly emerged in indexing the interviews of the main study.
• Elks, symbolic of danger or the scapegoats of traffic, also emerged as an essential common element of both analyses, perhaps somewhat absurdly.

The conceptions on the scale:
• The young male drivers considered that they had become more secure motorists since starting training and that they would still become more secure. – It is obvious that training has a positive effect.
• The school interviewees thought they had no security at all before training, while the permission interviewees believed they had some. – It is obvious that the sons interested in driving and allowed to gain experience of driving and training with family members are likely to choose family training because it is convenient and economical. The sons without previous good training experience by their family members are apt to choose school training for lack of strong confidence in family training.
• Only one young male interviewee reported taking complete personal responsibility and none of them absolutely denied chance in traffic.

Safety findings:
• Traffic safety meant continuously taking precautions. – Not doing so was largely prohibited by the legal norms (see consideration of Finnish road traffic legislation, p. 6).

Driver training findings:
• The school interviewees expressed abstractions more often than the permission interviewees did. – It is easy to understand that the schools utilise a lot of concepts in teaching, while the family members generally let the trainee drive, and comment during driving without employing particular concepts.

Chance findings:
• The conceptions of the master-driver interviewees involved more advanced maxims than those of the young male interviewees did. – Obviously much driving practice and experience of life promote knowledge and driving skills.
• The scholarly-oriented master-driver interviewees repeated chance minimally, while the practically-oriented master-driver interviewees did so often. – Obviously advanced scholarly thinking significantly reduced subjective uncertainty, i.e. chance.

Kirk & Miller (1986, 22) mentioned that “in the best of (all) worlds, a measuring instrument (e.g. a professional test) is so closely linked to the phenomena being observed that it is “obviously providing valid data”. They call this idea apparent validity. “Conclusions of apparent validity are not entirely out of order, but they can be illusory.” The data is also understood here as results or
findings. The obviously valid findings were the importance of the family members and peers in driver training. – Since people share a close mutual relationship, they influence each other.

The numerous techniques, correspondence, and coherence assure the reader of the genuineness of the phenomena elicited from the interview. Continuing research is called for.

8.2. Doubts

This report was based on the interview expressions, i.e. text units, mentioning safety, or chance. Research into danger, as well as other viewpoints, was excluded temporarily. The reason for this restriction was, apart from financial restrictions, the current stress on the positive aspect of traffic safety. However, research into conceptions of danger will doubtless flesh out the present contribution.

Once the interview had been taped, the corpus of the study was transcribed by an expert, summarised and edited by the researcher, and checked by the interviewee. Although the transcription only changed the form of expression, the summarising and editing changed the expression as described (see p. 47 and appendix 6, p. 202). It was a must to let the interviewee confirm his or her expression and ideas, because the interview could include incongruities and flaws, being essential objects of systematic analysis. The option of letting the interviewees listen to the tape or read the transcription was practically impossible because only a few of them would have been available. The original interview recording also embarrassed the interviewee because a person’s spoken expressions sound strange to him or her. The technique adopted produced the corpus accepted by the interviewee and edited by the researcher.

A researcher’s cognitive dynamic also affects research. Firstly, the researcher’s creativity operates unconsciously. This human characteristic suggests that there may be some important things omitted from the report. This is impossible to deny precisely because the process is unconscious. Improvements in the report text seem to emerge continuously. The research must, however, be finished sometime and a report produced. Since the researcher’s intention is to analyse new aspects of the interview data, new insights may be taken into account later. Secondly, learning more and more about the themes meant improved production. In particular, the final stages were carried out better than the first in those functions where tasks are repeated, i.e. in indexing the 22 young male interviews. This bias was eliminated by final checking. Once the checking was carried out the outcome was not essentially changed any further. The categories of meaning in relation to all the groups were checked particularly carefully because of the difference in their maxims. While some maxims emerged only sporadically from the summaries of the young males, they characterised the categories of the young females and master drivers. The notes on categorising ensured that the former’s maxims really were weak and divergent and that the latter’s were
strong and convergent. It was not simply a question of the researcher’s experience.

The interviewees were genuine cases of young male and female and master drivers, forming no random sample, although the difference between the sample types was not large. While the results originated with the conceptions not with the conceivers, they could not be generalised in the sense familiar in a quantitative approach because randomness of conceivers does not ensure randomness of conceptions. This research confirmed the genuineness of the conceptions.

The phenomenographic method allows us to understand how conceiving may direct performance, but it does not explain behaviour. While the characteristics of precautions were reported by the conceptions not by perceptions, the connections between *chance* and unpredictable incidents and actual behaviour have to be further analysed in continuing studies. For instance, phenomenographic analysis suggests that it is not wise simply to conclude that *chance* thinking results in less sophisticated performance on the roads than unpredictable incident thinking. It may be so but might also be the reverse: perhaps *chance* conceivers recognise reality, while unpredictable incident conceivers do not know their abilities.

8.3. Model of applications

Administrators, researchers and practitioners who know the consequences of promoting traffic safety will be able to test critically the findings in planning and implementation and recommend appropriate measures (see Fidelity of methods, p. 30). The technical norms of the measures, as well as research hypotheses, take the form:

If you want traffic safety you have to do X.

The ‘X’ could be:

- Practise driving (to encounter the reality of traffic).
- Deliberate on traffic circumstances (to obtain explanatory maxims but not while driving!).
- Deliberate on traffic performance (to obtain guiding maxims but not while driving!).
- Research the trainee’s conceptions of *chance* (to rate his or her level of knowledge and skill).
- Develop convergent thinking among young men (to let them focus on driving).
- Give young men a plain car (to avoid the temptation to speed).
Chapter 9. Discussion

9.1. Safeguarding traffic – research task 1

9.1.1. Traffic safety as a process

The interviewees’ understanding of traffic safety was doing only, being positively based on real processes. Since no absolute and perpetual state of traffic safety was attainable, there was thus a distinct difference between essence and process. Absolute traffic safety is impossible to establish, but taking precautions can be done better or worse. As a dynamic process, traffic safety is difficult to balance against transportation and the safety of other domains, and an ideal state of affairs is a chimera.

The conceptual world primarily included forces with potential for harmful occurrences. Supporting or neglecting them by inappropriate action could result in damage. The negative forces could also be produced by the interviewees themselves, normally in the form of lack of knowledge or skills often called chance. Compensating for the negative forces by appropriate action enabled the interviewees to utilise their knowledge and skills better, improve their survival and health, and preserve their property. It is obvious that the better the interviewees’ comprehension, the better their precautions, and the better they maintain safety. While precaution is appropriate action, balanced between life, health, and property, in effect the present findings stress appropriate understanding.

Driving was primarily transporting persons and goods. Preparedness in driving was the quality or condition of driving, i.e. how successful driving must be done. There is no problem of traffic safety beyond the traffic system. The permission interviewees noticed that if they entered the system they accepted its forces and potential for damage. In driving they stressed chance, i.e. some unexpected factor beyond their control, and its process and avoidance. They preferred the dynamic response of challenges to deliberating on problems. The school interviewees thought they could manage driving by traffic interaction, its actors, instruments, and arena. Being more cerebral in their approach, they utilised concepts in analysing problems. They also stressed unpredictable incidents in some known setting, but often failed to resolve them.

The interviewees were motivated to organise chaos to achieve order through their understanding. They could anticipate harmful entities and avoid them, this process of anticipation and avoidance being preparedness. Breaking it, normally “by chance”, resulted in the potential for damage. Lots of conceptions dealing with safety activities could be identified. These implied fewer maxims, i.e. rules of thumb, giving reasons for performance or directing it. The dominant maxim was “There is always some risk in traffic”, but there were several others like “Use your brains” and “Animals are dangerous”.
Constructing maxims was the interviewees’ response to continuous doing, like the notes in music. They could formulate instructions appropriate to the real elements and processes of the traffic system. They could also make the prohibitions imposed by the road rules correspond with the real elements and processes; for instance, when the prohibitions meant refusals or restrictions (see the transformation function in Safety findings, p. 122). Since the cerebral demand of the basic rule and the 43 road rules of the Road Traffic Act (267/1981), leaving aside the remaining road traffic legislation, exceeded the interviewees’ capacity, the maxims substituted for them. They were fewer and more general than the road rules. The interviewees joined the road traffic legislator in agreeing that “There is always some risk in traffic”, without reserve. Since the basic rule and the individual rules and legal norms were not assimilated like the maxims as such, it seems that the interviewees could not assimilate the rules or rely on others obeying them.

Traffic safety, being a complex element of life, is achieved in an infinite number of ways. The interviewees showed that they were very involved in success in driving and that the dominating academic approach based on the accident criterion was normally limited to processes identified by some harmful consequence. Preparedness was conceived as intentional actions aiming at survival, maintaining health, or utilising property. Endangerment was regarded as passivity or unintentional actions neglecting life, health, or property. Having resulted in damage, a performance can be identified as dangerous. In the absence of damage, a performance can be believed to be dangerous or safe by one’s general experience of life.

While action like transporting and being prepared was essential, learning by doing was also taking precautions, stressing driving practice. Since the old Finnish curriculum was considered as insufficient to prevent accidents, driving practice was added as the autonomous driving in the intermediate phase and as special driving in the continued training. Keskinen et al. (1999, 79) state that “the driver needs experiences and active reflection of [sic] experiences”. They meant that experiences enable understanding of driving as mental construction, thus ensuring performance. However, it is impossible to find any proficient driver who claims that he or she absolutely controls his car in all situations. An optimal degree of safety is required, while complete safety remains a chimera.

9.1.2. Traffic safety and socialisation

The conception of socialisation lends itself to traffic safety, providing a comprehensive basis for accumulating driver training knowledge. If socialisation is understood as adaptation of an individual to driving society, the following findings confirm the applicability of the socialisation conception to traffic safety thinking:
<table>
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<tr>
<th>Page</th>
<th>Section</th>
<th>Finding</th>
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<tbody>
<tr>
<td>61</td>
<td>Complete safety</td>
<td>“What is safe when ‘I am alone in traffic’? This situation lacks social interaction and potential for conflict between individuals. Adaptation to traffic social life thus seemed to be unsafe to the permission interviewees.”</td>
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<tr>
<td>65</td>
<td>Argument conceptions of safety - imagination</td>
<td>“These conceptions (category 1.4.1. I am alone on the roads.) concerning real traffic, demonstrated a negation of the traffic safety problem. The problem is social interaction, physical movement with dangerous machines in a restricted area. The young male interviewees obviously conceived a difficulty in adaptation to traffic social life.”</td>
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<td>74</td>
<td>Performance conceptions of safety</td>
<td>“These categories (2.1. General human safety) focus on social activity in traffic. The adaptation of the young male interviewees to driving society evidently encounters difficulties such as the unexpected actions of others and the rules which are not obeyed.”</td>
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<td>81</td>
<td>Performance conceptions of safety</td>
<td>“Adaptation to traffic as pedestrians is behavioural as against social adaptation difficulties as drivers.” (Category 2.3.6. I obey the rules as a pedestrian.)</td>
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<td>88</td>
<td>Performance conceptions of safety</td>
<td>“The car attracted the young male interviewees. Obviously, they also want to use it. The use of the car has to be compared with their incomplete adaptation to the driving society.” (Category 2.5. The car and safety.)</td>
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<td>114, 114</td>
<td>Safety findings - The origin of the traffic safety question</td>
<td>“They [the permission interviewees] conceived explicitly that adaptation to driving society absolutely meant accepting the possibility of damage, i.e. danger.” “The school interviewees did not consider that the adaptation as such and joining the driving society was crucial. Instead, they reported the potential for improved traffic system conditions. They also stressed human potential.”</td>
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<td>115</td>
<td>Safety findings - Solitude and the interviewees’ personal influence</td>
<td>“In fact, this idea of solitude paradoxically meant that there was complete safety if there was no traffic, only a single car. Their message was that complete traffic safety was abstract, confirmed by the identified maxim: “Traffic is always dangerous”. This notion focuses on social interaction and adaptation and the rules required by them.”</td>
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<td>122</td>
<td>Safety findings - Interviewees’ decision-making, pseudo-mechanisms, and theoretical drafts</td>
<td>“The identity conflict reflected personal responsibility. A researcher may also use the interviewees’ conceptions of themselves and of others as the data sources among the population. Since self and society are fused, the adaptation of an individual to driving society can be confirmed as an approach to the traffic safety question (cf. Gecas 1992).”</td>
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This applicability is also confirmed more theoretically by comparing the present research with the definition of socialisation which Gecas (1992) provided:

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<th>Characteristics of socialisation in traffic safety and driver training</th>
<th>Gecas 1992</th>
<th>Example of the present research</th>
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<tr>
<td><strong>General</strong></td>
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<td>Societal continuity</td>
<td>Parenting in training.</td>
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<td>Human development</td>
<td>Development from behavioural adaptation of a parent to the social adaptation of a driver.</td>
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<tr>
<td>Self and society are two sides of the same coin.</td>
<td>A researcher may also use the interviewees’ conceptions of themselves and of others as the data sources among the population.</td>
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<tr>
<td>Socialisation is not merely the process of learning rules or norms or behaviour patterns.</td>
<td>Formation of maxims.</td>
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<td>The mark of successful socialisation is the transformation of social control into self-control.</td>
<td>The transformation of the road rules into appropriate rules in actual situations.</td>
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<td>Commitment to identities. Identification with one’s group.</td>
<td>Young male drivers are risk-taking as against young female and master drivers.</td>
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<td>Social comparisons</td>
<td>Peers are supportive but not absolutely trustworthy.</td>
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<td>Self-attributions</td>
<td>Passengers are unwilling to advise drivers.</td>
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<td>Process of identification</td>
<td>Fathers are absolute models for young male drivers (including the school interviewees).</td>
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<td>Content and contexts of socialisation</td>
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<td><strong>(a) Family context</strong></td>
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<td>The initial or primary socialisation</td>
<td>Fathers are absolute models for</td>
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<td>of the individual takes place in</td>
<td>young male drivers. Driving school</td>
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<td>the family context.</td>
<td>instructors were hardly mentioned.</td>
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<td>Parental support and control</td>
<td>Parents support their children’s</td>
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<td>traffic performance through</td>
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<td>childhood, adolescence, and</td>
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<td>Lack of parental support</td>
<td>Vaaranen (1998) found that those</td>
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<td>[young drivers] who desire to speed</td>
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<td>grow up under circumstances of</td>
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<td>early orientation to cars, socio-</td>
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<td>economic difficulties, and one</td>
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<td>guardian (parent) missing or absent.</td>
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<td>Parents are most effective as agents</td>
<td>A good basis for a continuing</td>
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<td>of socialisation when they express</td>
<td>research hypothesis. Since parents</td>
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<td>a high level of support and exercise</td>
<td>support their children in</td>
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<td>control [i.e. control according to</td>
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<td>the general rules based on</td>
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<td>incidents].</td>
<td>educative models.</td>
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<td>Parental involvement with the child.</td>
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<td>The importance of sex and age roles</td>
<td>Young male drivers notoriously</td>
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<td>for the child.</td>
<td>differ from young female and master</td>
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<td>Sex-role socialisation.</td>
<td>drivers.</td>
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<td>Different treatment of boys and</td>
<td>A continuing task is to make young</td>
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<td>girls.</td>
<td>male drivers safer in traffic.</td>
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<td>Socialisation is a reciprocal</td>
<td>This is obvious in peer groups at</td>
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<td>process of influence [in families</td>
<td>least.</td>
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<td>as well].</td>
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<td>Television, peer group, and school</td>
<td>Television was not very evident in</td>
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<td>as agents of socialisation.</td>
<td>the present study.</td>
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<td><strong>(b) School context</strong></td>
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<td>The school context is more involved</td>
<td>Obvious.</td>
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<td>in secondary socialisation (i.e.</td>
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<td>knowledge and skills, not values,</td>
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<td>beliefs, motivations, and</td>
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<td>conceptions of self).</td>
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<td><strong>(c) Peer group</strong></td>
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<td>Voluntary association and status</td>
<td>Obvious.</td>
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<td>Peer group as an arena for the</td>
<td>Obvious.</td>
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<td>exercise of independence from adult</td>
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<td>control.</td>
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<tr>
<td>Peer groups are typically segregated by sex. Strongly but not absolutely. Socialisation over the course of life. Obvious. Developmental or maturational considerations. Young male drivers can become master drivers. Other agents and contexts of socialisation than parents become important to the adolescent. Peer groups of young male drivers take the position of family members. Periods of transition, e.g. driving licence. Licensing is a kind of transition from childhood to adulthood.</td>
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In brief, safeguarding traffic may be the road users’ adaptation to the social life of traffic. Road users utilise their resources to conceive it and manage it. Driving tasks are often too difficult for them. They do not then control their driving but other agents of the situation, if at all. These incidents are characterised as chance. Experienced persons like parents, teachers, and educationists can facilitate the adaptation and control abilities of young drivers.

Socialisation is obviously not the only function which lends itself to traffic safety. Functions such as transport, maintenance of public health, economic activity, training, amusement, and risk-taking also constitute safety – or safety is included in numerous other functions.

9.2. Preparedness and the driver training forms – research task 2

The permission interviewees focused relevantly on action, i.e. driving and preparedness. They did not show as much ability as the school interviewees in utilising concepts to analyse phenomena, but they could analyse chance incidents meaningful to them. The school interviewees’ abstract thinking would be fine in learning, but the concepts would have to be assimilated into driving practice, which was obviously beyond the temporal resource of the first phase of the actual Finnish curriculum. The permission interviewees’ logical procedure would result in minimising driving and in assessing its needs. The school interviewees’ logical procedure would result in good planning before driving and in driving carefully, but they could accept driving as leisure.

The interviewees’ mind function was constructive and appropriate, and their thinking was detached from direct perception (Nummenmaa et al. 1983, 100). Conceiving the world as including the conceiver himself or herself was the interviewee’s Anticipation resource. When the interviewees accumulated what they conceived they formed useful knowledge, i.e. the potential for acting and taking precautions. The mutually related parts of the driving perplexities were formed into concise and easy maxims, both justifying action and directing it. For instance, the road rules and other road traffic legislation were perplexities impossible for the interviewees to master as such. The essence of the legal norms was information received but not adopted by the interviewees, implying that a subject cannot utilise objective influence without personally conceiving it. The mere information about danger to the interviewees was also insufficient to produce a response to unpredictable incidents. However, they enabled identification of such incidents at least in a discussion.

Manoeuvring a moving car demanded maxims which were a compromise between a small amount of knowledge and explicit content. Normally, the interviewees’ knowledge and maxims enabled driving without insurmountable difficulties. Every now and then the interviewees’ knowledge and maxims failed, however, to match a situation, and to supply reasons for their actions or direct them. The interviewees expressed surprise or described an unexpected
incident, i.e. *chance*, simply because their maxims were deficient. When not mastered, the incident could result in damage.

The maxims, being expiatory, accorded with the internal representations. While Nummenmaa *et al.*'s internal representations, i.e. general views (1983), stress the picture from the outer world, the maxims were not restricted to the outer world but could also deal with the conceiving himself or herself. The internal representations presented by Mikkonen and Keskinen (1980) mainly functioned in relation to a driver and his or her environment, but their later extension also includes personal motivation and self-control (Keskinen 1994 & 1998, 3; Keskinen *et al.* 1999). The maxims do not presuppose restriction of their content or object. The a priori separation between areas such as the I, the outer world, and the imagination is not necessary.

The maxims often overlapped and conflicted with each other. There was also conflict with the road rules like “Driving according to the rules is safe driving”, “People do not obey rules” and “The rules guarantee safety if everybody obeys them”. The road rules were generally observed but disobeyed because of common sense, intentionally, or by *chance*.

In all, the licensing system passes drivers who every now and then lose their knowledgeable control in driving. This disability decreases with experience but it does not completely vanish. Since the assimilation of essential concepts evidently progresses strongly during the intermediate phase, the kindly support of some positive relationship such as a father, friend and familiar traffic instructor is still needed. Driving on one’s own after the relatively brief first phase is risky. Who answers the new drivers’ questions, who gives feedback, and who intermediates driving culture?

Näätänen (1972, 231) almost three decades ago suggested that “The duration of the [driver] course has considerably to be extended.” Since then the driver training system has been renewed according to the principle that the duration not be substantially extended. An extension would however enable gradual socialisation and learning processes. This also confirms the idea of Evans (1991, 156) that “Safety cannot be learned by direct feedback, but requires the absorption of accumulated knowledge and the experience of interactions with others.” He established that the few weeks of professional driver education makes “but a modest increment to the large pool of knowledge” received in the family automobile environment of motorised countries (105–106). He also considered that safety will not be learned by experience in the same sense that people are unlikely to learn by experience that the earth is spherical (108). Among the best practical effects of extension of the period would be not only a new course design, but also a long practise period with a good and familiar driver. Although this present study has no actual longitudinal design, the interviewees also reported notional and temporal improvement (see 48). The master-driver interviewees had also improved their comprehension of driving since they were novice drivers (see 124).
9.3. Divergent and convergent thinking – research task 3

A crucial difference was established between the thinking of young male interviewees, considered as dangerous, and young female and master-driver interviewee groups, regarded as calm drivers. The thinking of the latter about chance in traffic was convergent. Their thinking about driving produced appropriate maxims, i.e. “Traffic always involves the possibility of a harmful incident” and they produced examples and preventive measures. This way of thinking minimised uncertainty and was quick. The young male drivers used to deliberate on the aspects of driving, i.e. education and chance, but they failed to produce adequate preventive measures quickly and effectively. The young males thought of the same maxims as the others, but implicitly. This divergent thinking often results in futility or failure.

Divergent thinking obviously relates to male risk-taking, competition, and proving things, which may even have an inherited origin. Road traffic, dealing with life, health, and property, is really not a desirable laboratory for testing a road user’s divergent thinking. Since the young males in this research were aged 18 or 19, it is easy to accept the finding of Pelz & Schuman (1971, 68) that “young men aged 18 and 19 had more violations than men either younger or older.” This notorious young male phase could also be overcome, which is confirmed by the example of the male master-driver interviewees. When these young men get their own families it normally lessens risk-taking. Particularly the army, a duty of Finnish men, trains convergent thinking in order to minimise futility and failure. – It seems either that convergent traffic thinking could be taught to young men or that control of inherited divergent thinking could be taught.

Vaaranen (1998) found that her speeding young drivers, being mainly males, had a maxim in the sense of this present research that “Nobody learns to drive a car without speeding” and that they were thus interested in improving their driving skills. These findings show that the goal of risk-taking may be skilful performance. They conceived danger and damage as the price of their skill. Vaaranen also established that the development of a speeding young driver may end negatively with a traffic fatality or becoming a “crazy driver”, but also positively with responsibility. The cost, however, is not only theirs but also that of others involved in the damage. Since the young males have interest and energy, society and families could develop education appropriate to their nature. A worse option is simply to raise the age limit for licensing but it would obviously increase driving without a licence.

This finding of divergent thinking raises questions about concepts as a way to instruct young males in driving. If educational resources are limited, like time in the contemporary driving school curriculum, some concepts may fail to be assimilated before autonomous driving. These concepts then serve as objects of divergent thinking and introduce the need to test them in driving, leading to chance incidents. The argument that a new driver can assimilate his concepts while driving autonomously and solitarily is critical. As stated previously, the contemporary system does not support assimilation in the intermediate phase. In fact, the legal system, which punishes the new drivers on the basis of fewer
offences than the experienced drivers seems to work negatively (the Road Traffic Act 267/81, §75.3). Punishment is poor education, easily leading to frustration and extra educational difficulties.

9.4. **Chance, unpredictable incidents, and common sense – research task 4**

Conceptions of *chance* were incorporated into driving, not walking. Walking is conceptually controllable, but driving demands more than drivers can control. Pedestrians’ experience of driver training, licensing, and driving improved their comprehension of traffic.

Apart from the various stages of the interviewee’s anticipatory resources, there is considerable interindividual variety. In this research the conceptions of *chance*, i.e. lack of resource in the interviewees, were particularly elaborated. The generality of the conceptions of *chance* implied that road traffic was beyond full human control. All interviewees, including the scholarly-thinking master drivers, conceived *chance* in traffic, which characterised the permission interviewees in particular. The interviewees also reported that Mother Nature, e.g. in the form of a meteor, could influence road traffic. This rarely happens, but there is an objective basis for conceptions of *chance*.

*Chance* meant perplexity to the young male interviewees, while the scholarly-thinking master-driver interviewees considered it as an explicit phenomenon. Unpredictable incidents, typical of the school interviewees, included some recognisable elements, but they remained beyond their control. It could be supposed that conceiving *chance* and unpredictable incidents improved the conceivers’ *Anticipation resources* because the scholarly-thinking master-driver interviewees had constructed appropriate driving maxims. They also mentioned automatism, which could actually mean appropriate and quickly applied maxims.

Speaking of *chance*, the interviewees often meant the next thing or skill they should learn and master. It seems possible to construct an inquiry method to assess what a trainee thinks of his or her knowledge and skills. This would enable individual, accurate, and effective learning to construct appropriate maxims. Critical attention must be paid to the implementation of the maxims in driving training. The principle could also be applied in other areas than traffic safety.

The interviewees could solve critical incidents by their common sense, but this concept was also used when they needed to explain some mistake they had made. They could reason and learn. They could also become frustrated after the failure of correct or sensible performance. While the scholarly-thinking master-driver interviewees spoke of common sense rather objectively in relation to the central nervous system, the young interviewees showed frustration. Similar frustration could sometimes even be found in the conceptions of *chance*. 
Although the conceptions of unpredictable incidents and common sense were not elaborated, they obviously also could serve as indicators of a trainee’s educational level after proper study and calibration.

Danger in Finnish road legislation simply means “the potential for damage”. The idea of road traffic legislation is to avoid endangerment. However, the ultimate task of legislation is to prevent incidents of damage which have real and harmful consequences, through those incidents characterised as danger. Danger as such is epistemological. Danger incidents have two legal aspects. Firstly, the aspect of actuality means that a driver can identify danger immediately in the circumstances and that he or she has a duty to do so, e.g. an oncoming car in his or her own lane. Secondly, although the driver cannot identify abstract danger directly, he or she must not omit it, since the real circumstances otherwise imply the potential for damage, e.g. a crest might prevent a driver view of an oncoming car. Actual danger incidents conceived as chance reveal a crucial lack of driver training, such as a deficiency in the trainee’s perception or understanding of his or her own state. An abstract danger incident as a conception also means some lack in training, but at a more advanced level. In reporting their chance conceptions, drivers normally reveal their lack and level of training. Characteristically, chance is not only harmful, since good luck is also involved. However, while luck is also unexpected and uncontrolled, it cannot be an aim of traffic education.

The chance conception also has direct links with two legal principles. Firstly, an actor not understanding the illegality of his or her act cannot be punished (see Criminal Code 3:3). Secondly, so far as an unlawful act was beyond human control, i.e. an act has been more due to accident than to negligence, it cannot be an reason for punishment (see Criminal Law 3:5). “Accident” in this provision has a general meaning, and is not synonymous with “a motor accident”. Since a chance incident is not understood and is conceived accidentally, these viewpoints raise the question of whether the driver, having conceived it as chance, should not be punished, although his or her act as such is against a legal norm. Obviously, it would result in chaos because conceptions of chance are general and a judge has as a rule no reliable method of determining if reported chance really was chance. A road user entering road traffic is obliged to “exercise whatever care the circumstances require in order to avoid danger and damage” (the Road Traffic Act 267/81, 3§). A driver or a rider has to meet the appropriate requirements, such as health standards (the Road Traffic Act 267/81, 63§). A driver also needs a proper licence as the certification of his or her competence (the Road Traffic Act 267/81, 64§). The driver primarily accepts the possibility that his or her chance makes himself or herself guilty. He or she can lessen this possibility by practise, careful behaviour, and considering his or her need to drive. The driving exam, accepting or rejecting drivers, is a crucial protective social measure in ensuring traffic and driving.
Chapter 10. Safeguarding traffic – a reconstructed story of a young male driver

In order to illustrate the findings and to give a realistic representation of safeguarding traffic, the story of a young male driver was reconstructed. His story was composed as he himself would have done it. The composition is an abstract of the summaries of the interviewees, which served as the corpus of the research. The narrator relates himself to traffic safety, walking, driver training, female peer drivers, master drivers, and other road users. His person comprises both a permission and a school trainee. His name, “Veli Suomalainen” means “Brother Finn” in English and is roughly equivalent to “John Citizen”.

“

My traffic safety

I am an 18 or 19 year old Finnish man. I got my driving licence not more than 3 months ago. I have to get some more driving experience before I get the final licence.

Walking is easy for me. I only use my head, senses, and muscles. I feel no mystery. Every now and then I take a risk when I am in a hurry. Since various unexpected people and chaotic road rules are impossible to control, driving a car is a mystery to me. I rely only on myself. I cannot say what traffic safety is. Having received my driver training from my parents, I just act as well as I can in driving. Having been professionally instructed, I also try to put concepts into effect in driving but because of limited training and experience I have not succeeded yet. Chaos, an uncontrollable state, always lurks. I could perish, be injured, or destroy property. I always have to keep myself in the order away from chaos. I have a good chance of survival but there is always a small possibility that natural forces, like a meteor or landslide, could hurt me. This is not all that is mysterious in driving. Because I am not alone in traffic and because the traffic system is not complete, there are always road users and things with the potential to harm me.

When driving, I meet unexpected, unknown, and uncontrollable incidents. I call them chance. I think it is like damage because damage results from them. Natural forces could cause chance in traffic. The other road users such as drunk drivers, children, and reckless drivers, could also cause chance. Even I myself may cause chance; for instance, because of the deficiency in my knowledge, skills, and perception. This feeling of chance is strong if I have been trained by parents. I try to control chance by learning, perception, and relying on somebody like my father and friends. If I am professionally instructed I seldom conceive chance. Instead, I think about elks and other unpredictable things, which are not completely unfamiliar. I do not quite know how to manage these. Having trained in a driving school I also feel uncertainty about intersections and selecting routes.

Mere driving is not enough for me. I want to experience new things. Although I know that there is always potential for damage in traffic I also think about various options, try
out things such as speed, and braking. I do not avoid the possibility of a harmful occurrence like my female peers and master drivers.

Having got my instruction from a driving school I regard the road rules as a matter of right or wrong. Having been trained by parents I think about their appropriateness. Not everyone always obeys them. I do not rely on the rules. Chance and unpredictable incidents often occur. The rules might only provide some general guidance in traffic. In fact, I do not use the legal rules. My main rule is “Use your head” which I justify by “There is always potential for damage in traffic” just as the legislator justifies his road traffic legislation. I have also constructed a few minor maxims justifying for my decisions in driving and directing them. Training diminishes chance but it takes time. I think of driving, not of the possible harm.

No wonder that I encounter difficulties and damage. I like speed and action. There is no clear rule for traffic safety and the driving training tuition is too short. Every now and then I encounter driving incidents which I cannot control by using my brains. Since I test various things to understand them and to practice driving, I necessarily take risks. Since other road users may do anything, I do not rely on them. I do not rely on the traffic rules.

Veli Suomalainen
Chapter 11. Summary

A Finnish adult usually has two options in getting driver training for a car driving licence. These are a driving school or driver training with an individual permit. Since a family member trains in the latter, its influence on traffic safety has been publicly questioned. Previous research provided no methodologically sound means of assessing this question.

An expedition was undertaken to explore traffic safety in the context of driver training among young male, female and master drivers. “Traffic safety” is legally an auxiliary concept for “life”, “health”, and “property”, which are the things protected by the legislator. An individual is free to act but not permitted to violate the rights of others. The licensing system guarantees the knowledge and skills a driver requires to observe the rights of others.

The literature questioned the contemporary accident criterion in road safety, since accidents mean the lack of safety, while a driver trainer needs positive elements and means. Since trainees select their training form, such as professional or parenting training, driver training accident research, based on random samples, also encounters methodological difficulties in comparing the training groups. Moreover, since driver training introduces drivers into the traffic system, there are no driver accident statistics applicable to comparison before licensing. While many arguments for and against professional training have been advanced, family training is still “a blank spot on the map”. The literature and the preliminary work also raised the concept of unexplained and unpredictable factors called chance. It was some kind of description of personal chaos which the conceiver did not control.

The literature and the methodological restrictions suggested research into the conceptions of drivers in order to understand their mental potential. They have encountered the safety problem and must have views on it. The research was hermeneutically designed along the lines of systematic analysis. The research resembled an expedition, the purpose of which was to keep a weather eye on everything which might be important. It included an interview adapted to phenomenography and phenomenographic analysis. Four research tasks were designed in order to keep an inductive weather eye on the phenomena encountered on the expedition but not to limit their scope or comprehension:

1. A new positive criterion was determined by questioning the accident criterion for car driver training.
2. Driving school and permission driver training were compared in terms of the positive criterion.
3. The safety thinking of young male drivers, young female drivers, and master drivers was compared.
4. The content of chance, incorporated into traffic safety conceptions, was elaborated.
The summaries of the interviewees of 22 newly licensed young males served as the main data, while the summaries of 5 newly licensed young females and 7 master drivers provided the comparison. In all, 49 categories of safety description were identified in the young males’ conceptions, as well as 25 categories of chance description in the conceptions of all groups, 1 of which overlapped with safety.

Phenomenography demanded that the researcher exploited his personality and proficiency in discovering and conceiving the results. However, this meant reporting as concisely and clearly as possible. The reliability of the analysis should also be reported as transparent as possible. The purpose of phenomenography is description.

This approach, deviating from the usual hypothetically deductive one, produced a new view of traffic safety. The traffic safety understanding of the young male interviewees agreed with the understanding of socialisation in road traffic. They did not conceive of an absolute or perpetual state of traffic safety as possible to achieve. The young male permission interviewees focused relevantly on driving and taking precautions. The young male school interviewees, however, utilised concepts in analysing problems but could not necessarily solve them, obviously because their driver training was too short to complete the assimilation.

The interviewees conceived chance, which represented a lack of resources in their driving. The objective core of the forces of nature were incorporated into chance but normally it was caused by some person, even the “I” him- or herself. Thus traffic was at least conceptionally beyond complete human intellectual control. These chance conceptions were very characteristic of the permission interviewees. The school interviewees conceived unpredictable incidents which involved lack of resources in some identifiable event, typically an elk on the road. The interviewees tended to manage critical incidents by common sense, but they also used this concept when they needed to excuse some mistake.

The interviewees constructed an appropriate thinking process, called maxims. These served as rules of thumb justifying some piece of driving or directing performance. The maxims, approximating to internal representations, were few. It was noteworthy that none of the numerous legal road rules actually corresponded with a maxim. The legislator and the interviewees agreed on the fundamentals of road traffic legislation in that traffic is always dangerous.

The young males thought of chance divergently, i.e. they deliberated on various aspects of driving, which was prone to result in experimentation and taking risks. The young females and the master drivers thought convergently about driving, i.e. they began with appropriate maxims ensuring as safe behaviour as possible.

Phenomenographic findings are conducive to future research, such as chance as an indicator of the level of knowledge, the function of maxims and their application in driver training, the confirmation of divergent and convergent
thinking in risk-taking and its importance in training, and the elaboration of common sense in traffic training and performance. Moreover, the data collected will enable continuing analysis of the forms of driver training.
## Index of terms

The main dictionary was Collins Cobuild English Dictionary (Sinclair et al eds. 1998). The other essential dictionaries were: Finnish-English General Dictionary (Alanne 1977), Tie-ja liikennesanasto (Road and Traffic Vocabulary, Suomen Tieyhdistys r.y. 1985), and Lakikielen Sanakirja (Dictionary of Legal Language, Joutsen 1985).

<table>
<thead>
<tr>
<th>Term</th>
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<tr>
<td>Accident</td>
<td>Since this term may mean either a car accident or chance, both being essential terms in this research, its use is minimised in the literature studies and citations. The terms damage, crash, or collision are used instead.</td>
</tr>
<tr>
<td>Anticipation resource</td>
<td>Conceiving the world as including the conceiver himself or herself was the interviewee’s Anticipation resource. When the interviewees accumulated what they conceived they formed useful knowledge, i.e. the potential for action and precautions.</td>
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<tr>
<td>Category of description</td>
<td>The categories of description are qualitatively different characterisations of various phenomena, which people conceive. A phenomenographic term.</td>
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<tr>
<td>Chance</td>
<td>Chance in this research means something unexpected or an unknown factor surprising a driver.</td>
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<tr>
<td>Circular</td>
<td>The “circular” questions elicit interview topics about cyclic relations between persons, including their mutual control.</td>
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<tr>
<td>Complete safety</td>
<td>Complete safety refers to the answers to the interview question: “What would have changed if some day you were completely safe?” See also “conjectural question”.</td>
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<tr>
<td>Conceptual activity</td>
<td>An auxiliary term for conception related to the number of conceivers in a category of description, rather than the number of conceptions, which is discrepant with their qualitative and uncountable character, since there may sometimes be no reason to identify whether several expressions serve as the same conception or an expression of several conceptions.</td>
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<tr>
<td>Conjectural question</td>
<td>• When an interviewee was asked to answer conjecturally he or she could answer freely without any need to be realistic, as in a fairy-tale. This term particularly refers to the inquiry technique presented by Berg, who used the term “Miracle question” (1991, 55–93).</td>
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<tr>
<td>Convergent thinking</td>
<td>If a person’s thinking is convergent it advances from a problem to a solution straightforwardly.</td>
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<tr>
<td>Danger</td>
<td>The potential for damage. The legal premise of road traffic is that it always is dangerous to some extent. Endangering road traffic is criminalised.</td>
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<tr>
<td>Divergent thinking</td>
<td>If a person’s thinking is divergent it gropes for solutions to his problems, for instance, he tests alternatives or largely deliberates on the problems.</td>
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<tr>
<td>Driver training</td>
<td>The educational process of training a person to manage a vehicle in traffic. There are two main types of driver training in Finland, driving school and permission training. Driver training is mandatory in Finland.</td>
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<tr>
<td>Driving exam (examination)</td>
<td>An official assessment of a drivers’ knowledge and skills in using a vehicle in traffic. The driving exam, consisting of theory and driving tests, is mandatory in Finland and follows driver training.</td>
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<tr>
<td>Driving licence</td>
<td>Official permit to use a vehicle of a certain category in traffic. Passing the driving exam normally suffices to obtain the driving licence.</td>
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<td>Driving school</td>
<td>A commercial enterprise in which drivers are trained.</td>
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<td>Driving test</td>
<td>The second part of the driving exam, relating to vehicle handling skills.</td>
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<tr>
<td>Legislator</td>
<td>This term refers to the system which prepares the legal norms and enacts them. In a democracy there is no single person who is the legislator.</td>
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<tr>
<td>Licensing</td>
<td>The administrative process of allowing a person to use a vehicle in traffic. Licensing is based mainly on the driving exam. In Finland normally drivers first get a provisional licence to become acquainted with independent driving</td>
</tr>
</tbody>
</table>
and then a full licence. Here a driver who is proficient in traffic safety.

Maxim

Maxims guide performance as rules of thumb in two ways. Firstly, actions can explicate some essential aspects of traffic thus justifying and directing performance. Secondly, they themselves can be rules. Maxims are the names of a finding in this research.

Overall chance

The term “overall chance” technically refers to the general occurrences of chance in interview expressions, not in those given to the deliberate questions.

Permission driver (interviewee)

Here in the sense of a driver (interviewee) trained by a family member with permission to do so.

Permission training

A synonym for “private training”, or “lay training” indicating that the training is based on official permission and not on driving schools. In Finland driving schools are private organisations.

Practical safety

“Practical safety” refers to the expressions elicited in the spontaneous interview discussion excluding the answers to the interview question: “What would have changed if some day you were completely safe?”

Preparedness

Preparedness is a state of being ready for something to happen, in this research, for damage. One of the expressions of safe action.

Risk

If there is a risk of something unpleasant, e.g. damage, there is a possibility that it will happen. The term is preferred by scientists, and is synonymous with danger.

Safeguarding

To safeguard something or someone means to protect them from being harmed. Safeguarding happens when the harmful factor is present. One of the expressions of safe action.

School driver (interviewee)

Here meaning a driver (interviewee) trained in a driving school.

Social adequacy

The legal principle of social adequacy means that a citizen is allowed to rely on the fact that others obey the law, such as road rules.

Theory test

The first part of the driving exam, relating to knowledge of road rules, etc.

Traffic safety

Traffic safety in its general sense is the state of being safe from harm or danger in traffic. Its clarification was a research task. The term is synonymous with “road safety”.

Unsafe

The term “unsafe” was defined in this research as “not safe”, i.e. “unsafe” meant either neutral or dangerous but not safe.
References and literature

References


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Driving Licence Decree 845/1990.

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Appendices

Appendix 1

Road safety in the literature

Defining road safety as the lack of damage, accidents etc., or the lack of potential damage was called the negative definition. If the definition was based on existing entities it was called the positive definition. Some essential reports since World War II have been included in the review. Translations from Finnish and Swedish were done by the researcher.

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<tr>
<td>1949</td>
<td>Tillman &amp; Hobbs</td>
<td>“A man drives as he lives” and related findings were based on the accident criterion. The author concluded that “We must wait until society is convinced that accidents are not always chance happenings, and that sometimes they reflect the basic personality of the individual” (p. 329).</td>
<td>The negative criterion.</td>
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<td>1958</td>
<td>Hänkinen. S.</td>
<td>As the title of the report, “Traffic accidents and driver characteristics” indicates, the author began with accidents. “One result of industrial and technical development has been the great increase in the frequency of accidents” (p. 7).</td>
<td>The negative criterion.</td>
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<td>1959</td>
<td>Lindegård</td>
<td>“Of all fatalities occurring among males at 15 – 25 years between one out of two to one out of three results from traffic accidents” (p.9).</td>
<td>The negative criterion.</td>
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1960 Baker, J & Ross  “The necessary and sufficient cause of an accident is a combination of simultaneous and sequential factors or variables each of which is necessary but none of which is by itself sufficient” (p. 11-6).
“A traffic accident is a failure of the road-driver-car system to perform one or more operations necessary for completing a trip without damage or injury and causal factors will be found at the points where these operations ‘go wrong’ ” (p. 11-6).
“The successful trip is one which is completed approximately as planned without unforeseen and unfortunate events” (p. 11-25).
“Accident - An event, occurrence, or happening which is unexpected or undesigned, which has an element of chance or probability, and which has undesirable or unfortunate results” (p. 11-25)”
“Traffic accident – Any accident involving a traffic unit in motion on a trafficway that results in death, injury, or property damage. A traffic accident involves as many traffic units as come in contact one with another while at least part of either is in contact with the road or sidewalk” (p. 11-25).

1960 Lauer  “Accidents are the result of certain patterns of behaviour which may be of a temporary or permanent nature” (p. ix).

1966 Häkkinen, S. While considering “A man in traffic” the author analysed various driving incidents, accidents and other harmful occurrences. For instance, a driver incurred a fatal accident on average, once in 10 million km which means about once in 650 years (p. 19).

1967 Andréasson, Halldin & Lindgren (eds.) “The frequency of the individuals annually lost or severely injured can be compared with the loss in an extensive war and the economic consequences for society reach the sum of many billions [Swedish crowns]” (p. v).
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<tr>
<td>1967</td>
<td>Björkman, Englund &amp; Johansson</td>
<td>“Traffic safety is, of course, the same as ‘a small number of accidents’ or preferably ‘no accidents at all’” (p. 9).</td>
<td>The negative definition.</td>
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<tr>
<td>1968</td>
<td>Blumenthal</td>
<td>“Traffic safety is described as a problem with technological, behavioural, sociological and value dimensions. Accidents are viewed as ‘localized system failures’, symptomatic of an underlying problem that includes: an imbalance between driver capabilities and the demands of the motor vehicle transportation system; the absence of functional communication between the administrative units responsible for the input and functioning of men, vehicles and environment; and the lack of recognition and resolution of the trade-offs between safety and other desired outputs and characteristics” (abstract).</td>
<td>The negative definition with some analytical consideration. Accidents are negatively defined by imbalance, absence, and lack.</td>
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<td>1969</td>
<td>Häkkinen, Kaukinen &amp; Tallqvist</td>
<td>The authors of previous Finnish research into “The causal research into road traffic accidents” stated “The costs of [road] accidents [in 1966] are 450-fold compared with the amount of money used in [road] safety research [in 1967]” (p. 6).</td>
<td>The negative definition.</td>
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<td>1970</td>
<td>Gunnarsson &amp; Lindström</td>
<td>The authors wrote a fairy-tale about a pothole as a preface. “Once upon a time there was a town where there was a deep pothole [in the road] and a great number of people passed it.” There were hazards and once some people fell into it and were injured seriously. “Traffic increased and so many accidents happened that people began to speak of a traffic safety problem” (p. 7).</td>
<td>The negative definition. The pothole, i.e. the circumstance, was not seen as a primary problem by the authorities, but the increased number of the accidents was.</td>
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<td>1970</td>
<td>Norris et al.</td>
<td>An extract from the scope of the authors’ assignment: “We propose to undertake an analytical study of the state-of-the-art of traffic safety. This will entail a thorough review of the existing domestic [U.S.] and pertinent foreign literature on the causes and prevention of automobile accidents” (p. 1).</td>
<td>The negative definition.</td>
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<td>1971</td>
<td>Baker, R.</td>
<td>“Safety provided better mobility by reducing accidents or their consequences” (preface).</td>
<td>The negative definition.</td>
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<td>1971</td>
<td>Shaw &amp; Sichel</td>
<td>The title of the book was: “Accident proneness: research in the occurrence, causation and prevention of road accidents”. “The man in the street definitely subscribes to the idea that certain people are far more likely to have accidents than others - and he is quite emphatic on the subject of road accidents” (p. 3).</td>
<td>The negative definition.</td>
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<td>1972</td>
<td>Näätänen</td>
<td>The author, having researched road accidents in Finland, suggested ways of improving safety. “Road accidents comprise an ever-worse social problem” (p. 9).</td>
<td>The negative definition.</td>
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<td>1973</td>
<td>Raymond et al.</td>
<td>The title of the report: “An evaluation of the effectiveness of driver education in reducing accidents to young people”. “In a previous report it was remarked that the risk of death or injury on the roads is not equal throughout the normal life span” (p. 1). The authors suggested of three kinds of evaluative criteria: short-term, e.g. knowledge of driving matters and attitudes towards driving and safety; intermediate, e.g. success rates in driving tests, driving experience, and long-term, e.g. accidents and offences.</td>
<td>The long-term criteria correspond to the negative definition. The short-term and the intermediate criteria compensate for the deficiencies of the long-term criteria with positive potential.</td>
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<tr>
<td>1973</td>
<td>Risk</td>
<td>“Safety as reflected in accident records does not result in a direct fashion from any simple performance measure” (p. 9). “For driver education the ultimate objective is safety assumed to be measured by accident records, which appear to constitute an indirect or negative measure of safety – safety in other words is indicated by the results of its absence” (p. 11). (See also Shaoul 1975 &amp;1976.)</td>
<td>The negative definition with an analytical insight. Performance does not result in safety, at least not measured simply. In driver education there may be objectives other than the ultimate one. Safety is understood negatively. The reader asks for “a direct and positive measure of safety” (cf. Raymond et al. 1973.)</td>
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“The central problem of the driver, road, vehicle and traffic system is one of reducing the rate and severity of accidents” (p. 1).

“This procedure [the evaluation of driver education] is necessitated by the nature of the ultimate objective, namely safety. Safety is assumed to constitute an indirect or negative measure of safety – safety in other words is indicated by the results of its absence. An accident may be defined as certain types of outcomes of a collision between two objects in the road transport system, which will result in damage to property and/or injury to the road user. Thus accidents are defined by their outcomes rather than their antecedent behaviour. They belong to the wider class of collisions. Various factors such as energy absorbing bumpers, seat belts, efficient ambulance services, an unoccupied vehicle may in fact prevent a collision from being classified as an accident, because they reduce the consequences of such a collision” (p. 11; see also p. 135).

The author also mentioned three kinds of evaluative criteria: ultimate criteria, i.e. safe or risk-free driving; intermediate criteria, e.g. collisions and conflicts, and “practical” criteria, e.g. accident records.

[The suggested basic motivational conflict:] “A conflict between ... efficiency and safety” (p. viii).

“In considering the figures on road-traffic accidents we always have to remember that we are dealing with [a] system devised by man only for moving from one place to another; we are not, for example, dealing with incurable illnesses or hereditary deficiencies” (p. 1).
“The nature of accidents – that they are the results of activities of road users, rather than ... activities per se and that accidents are used inversely as indices of safety – requires that the focus of research interest be shifted to the activities that give rise to them, if one is ever to understand their occurrence. This in turn implies that any evaluation of accident countermeasures must be carried out in terms of these activities (abstract).

“Safety, in other words, is measured by the results of its absence. An accident is usually defined as certain types of outcomes of a collision between two objects in the road transport system, which result in damage to property and/or injury to a road user. Thus, accidents are defined by their outcomes rather than their antecedent behaviour [cf. Shaoul 1975]. They are homogenous only with respect to outcomes. They are a heterogeneous group with respect to causes. They belong to the wider class of collisions” (p. 575). [See Shaoul 1975.]

“Since the assumption is made that unsafe practices [behaviour] on the part of a road user may lead to an accident, these considerations lead to the use of collisions, rather than just accidents, as a criterion for safe practices. However, even this criterion cannot be viewed as a representative sample of safe practices in a study which is concerned with the behaviour and activities of a driver on the road, but rather as an intermediate criterion for the ultimate criterion – namely safe, i.e. risk free, driving practices” (p. 575).

The negative definition with an attempt to utilise real entities, i.e., antecedent activities such as a collision.

The negative definition is analytically applied to the evaluation of countermeasures.

The concept of “an accident” means the outcome of a collision resulting in damage. Collisions may thus happen without damage. These are not accidents. (See Shaoul 1975.)

“Risk-free” seems to be a primary concept meaning a state without the possibility that something unpleasant may happen. This belongs to the negative definition, i.e. absence of a harmful occurrence.

The author seems to deny that the non-accidental collisions are risk-free, meaning safe practices. She leaves the understanding of safety in the ultimate criterion and in the concept of “risk-free”.
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<th>Definition of Traffic Safety</th>
<th>Definition of Safety</th>
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<td>1977</td>
<td>Marek &amp; Sten</td>
<td>The purpose was to evaluate the contribution of driver education to traffic safety [reducing accidents]&quot; (p. 7).</td>
<td>The negative definition of traffic safety.</td>
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<td>1978</td>
<td>Shinar</td>
<td>The author pointed out that safety was measured through accident reduction and that there was no absolute definition of an accident. The terms “accident”, “collision” and “crash” were often used interchangeably. Shaoul’s [1976, see above] distinction was fine. The available data on collisions was from police reports, hence accidents.” (Pp. 100 – 102.)</td>
<td>The negative definition.</td>
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<td>1979</td>
<td>Häkkinen, S.</td>
<td>The author reviewed accident theories and models, systematically and critically, and extended the viewpoint in various directions, including traffic. The general and extensive definition of an accident was: “An accident is a sudden and unexpected event, not belonging to the planned and normal chain of actions of work, traffic, home, spare time, etc. This undesired event is caused by a defect or fault of [the] environment or technical devices, or by a non-adjustive act of man (variably caused). The results of this event may be death, injury, material damage, the occurrence of their symptoms or an interruption or delay in the normal progress of actions (system). This definition covers both common accidents, near accidents and critical incidents, service interruptions, etc” (p. 19).</td>
<td>The negative definition with an elaborate definition of an accident. An accident includes negative elements, e.g. deficiencies and non-adjustment. The definition covers the most harmful occurrences in traffic, at work, etc.</td>
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<td>1980</td>
<td>Mikkonen &amp; Keskinen</td>
<td>The authors concluded that the theory [then being held] had to be concentrated upon the description of normal traffic behaviour” (p. 11). The authors also referred to recognising risk and influencing accidents.</td>
<td>The authors base their theory on human potential and normal behaviour. The negative definition was present.</td>
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<td>1981</td>
<td>Forbes</td>
<td>“But over the years losses from crashes both in monetary value and loss of life and injury have been widely documented” (p. 2).</td>
<td>The negative definition.</td>
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<td>1982</td>
<td>Wolfe</td>
<td>“In road safety research it seems desirable to define a road traffic accident broadly to include any interaction between a non-fixed-track land vehicle and another vehicle, or a pedestrian, or a fixed object, or the ground, which causes any property damage or personal injury, whether it takes place on or along a public roadway or in a parking lot or driveway” (p. 337).</td>
<td>The negative definition.</td>
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<td>1986</td>
<td>Haight</td>
<td>“It is clear that there is an important relationship between the concept of risk (as understood in ordinary language) and accident (the focus of this journal)” (p. 359).</td>
<td>The negative definition produces refinement of the concept of risk.</td>
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<td>1986</td>
<td>Häkkinen, Lehtimäki, Saharinen</td>
<td>In their textbook on traffic psychology the authors describe safety in the form of the human performance potential and limits not only with lack of accidents. “Thus the newer origin [of traffic safety work] is the adaptation of traffic to the human performance potentials and limits” (p. 9). “The safety of traffic cannot be measured only by accidents. ... If nobody moves accidents do really not happen” (p. 10). “Every measure applied to traffic safety thus includes [in practice] some “theory” about the origin of accidents and their prevention” (p. 121).</td>
<td>Both the negative definition and a tendency to the positive one. No formulation of the positive definition.</td>
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<td>1986</td>
<td>OECD</td>
<td>“Although road accidents might never be eliminated, their incidence and severity can be greatly reduced” (p. 5).</td>
<td>The negative definition.</td>
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<td>1986</td>
<td>Summala</td>
<td>“A Finnish driver incurs a fatal accident, on the average, once in 40 million km which means about once in 1600 years” (p. 1).</td>
<td>The negative definition.</td>
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[See Häkkinen, S. 1966, 19.]
The authors deliberately accepted the negative definition. For example, they mentioned that at the peak of accident involvement some two or three years after people learn to drive, male drivers are involved in over four times the number of accidents commonly experienced by drivers in the age-range 35 to 45 and female drivers over twice that number. They referred to contributory factors in accidents, e.g. lack of roadcraft and misperception of traffic hazards.

"The ultimate goal of any intervention such as training must be the reduction of accidents. Whatever the rationale behind an intervention its success must be evaluated" (p. 145).

"The entire system of driver training is currently designated, run and monitored using surrogate behavioural measures [e.g. specific behavioural indices] whose causal relationship with accident frequency is unknown" (p. 146).

"It seems intuitively unreasonable, given the assumption that identical behaviours may not always result in an accident, to use the frequency of those behaviours which do have unfortunate consequences as the dependent variable. It is poor experimental design" (p. 147).

"Safe driving does not simply mean accident-free driving. Behaviour which could potentially cause accidents must also be considered" (p. 147).

The author examined the inconsistencies in the common usage of the word "accident" and "injury" among the health professionals and others. "Report of the Review Committee on New Zealand Statistics of Accidents Involving Injury failed to provide a definition of an "accident" and considered a number of injury data sets which included many 'non-accidental' injuries" (p. 1).

"Health professionals should discontinue using the term 'accident' and associated phrases, when referring to unintentional injury events" (abstract).

Discussion of the terms of the negative definition. It seems that the harmful incident called an accident in English also has problems in Finnish in connection with traffic. The Finnish term for an accident is "onnettomuus", meaning linguistically "unluckiness" and strongly suggesting incidents beyond human control.
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<td>1988</td>
<td>Trinca, Johnston <em>et al.</em></td>
<td>“By traffic safety we mean death and injury, not accidents involving only property damage since our perspective is that of public health” (p. 4).</td>
<td>The negative definition.</td>
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<td>1989</td>
<td>Elvik, Vaa &amp; Østvik</td>
<td>“Probably at least 25,000 people annually get injuries in accidents on the Norwegian public roads [and need] to be nursed in hospitals by doctors” (p. 3). “Traffic accidents result in big economic losses to the society” (p. 3).</td>
<td>The negative definition.</td>
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<td>1991</td>
<td>Ahtola, Asplund <em>et al.</em> (Eds.)</td>
<td>The authors considered both the healthy and sick person’s prerequisites for managing in traffic. The first chapter, “Traffic medicine tomorrow” began: “Experts estimate that 500,000 people annually die and 15 million are injured in road traffic throughout the world” (p. 9).</td>
<td>The negative definition.</td>
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<td>1991</td>
<td>Anteroinen, Katila <em>et al.</em></td>
<td>In their textbook on driver trainees the author defined a traffic accident as “A sudden and unexpected process which is unwanted and which does not belong to the normal traffic” (p. 23).</td>
<td>The negative definition.</td>
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<td>1991</td>
<td>Brown</td>
<td>“Death and disability resulting from road accidents continue to present society with a serious public health problem, in spite of the variety of measures taken by traffic authorities to improve transport safety” (p. 315).</td>
<td>The negative definition.</td>
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<td>1991</td>
<td>Evans</td>
<td>“Deaths, injuries, and property damage from traffic crashes – their origin and nature, and ways to prevent their occurrence and reduce their severity – form the subject of this book” (p. xiii).</td>
<td>The negative definition.</td>
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<td>1991</td>
<td>Lehtimäki</td>
<td>To outline training in traffic safety co-operation between various professional groups the author interviewed 33 professionals about the essence of traffic safety among other things. The traffic safety definition proved to be ambiguous and its public administration decentralised. The negative definition characterised the interviews (abstract).</td>
<td>The negative definition characterises the interviews.</td>
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<td>1991</td>
<td>Rothe</td>
<td>“Accidents, by definition, are unexpected, uncontrollable events” (p. 1).</td>
<td>Accidents as the basis of the negative definition.</td>
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<td>Year</td>
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<td>1991</td>
<td>Santalahti et al. (Eds.)</td>
<td>In considering the harm caused by motor vehicles to health, the authors began with the WHO definition. “Health is a state of physical, psychological and social welfare and simultaneously the resource of an individual and a society” (preface). Health is simply not the absence of an illness. They presented many ways to reduce the harmful influence of traffic.</td>
<td>Formally the positive definition but in fact the negative definition (“not simply the absence of an illness”). While the authors create and work with positive entities their focus is on avoiding harmful consequences.</td>
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<td>1992</td>
<td>Kajanto (Ed.)</td>
<td>The definition of Environmental Education was provisional. Traditional nature protection was making room for sustainable development and for living in harmony between people and nature” (p. 13).</td>
<td>A tendency to the positive definition, i.e. living in harmony rather than avoiding accidents.</td>
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<td>1994</td>
<td>Wilde</td>
<td>The title of this work is “Target risk. Dealing with the danger of death, disease and damage in everyday decisions.”</td>
<td>The negative definition.</td>
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<td>1995</td>
<td>Directorate General for Transport of the European Commission</td>
<td>Makes recommendations for “Traffic Education and Training of Young Drivers” and for preparation for obtaining a driving licence the Working Party pointed out that the learner driver must, among other things, be aware of his responsibility for life, health, the environment and property.</td>
<td>The safety aim definition. The term “responsibility” remains obscure. It probably means the protection of life, etc. The definition defines only the aims of safety.</td>
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<td>1995</td>
<td>Gregersen</td>
<td>The title is “Prevention of road accidents among young novice car drivers.” “Too many young drivers are killed or injured in road accidents all over the world and we have still not succeeded in reducing their overrisk and fully understanding the interaction between the processes behind their accident involvement” (abstract).</td>
<td>The negative definition.</td>
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<td>1995</td>
<td>Lehtimäki</td>
<td>Having interviewed 13 Road Administration professionals and 9 other professionals the author concluded that “the core of the professionals’ conception of traffic safety was ‘damagelessness’ [i. e. the state involving no damage or injury]” (abstract).</td>
<td>The negative definition. The core is ‘damagelessness’.</td>
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The Working Group appointed by the Ministry of Transport and Communication in Finland examined a co-training system based on traffic training given in driving schools, at home and in school. The Working Group stated that “Training and the forms of its realisation as well as the volume of teaching varies by country, sometimes to a great extent, but a distinctly better model on the basis of current studies and surveys when examined from the viewpoint of traffic safety cannot be found, at least not within follow-up periods of 1 – 2 years each ... Furthermore, other factors might be used as the basis of improvement for the driver training, e.g., ensuring the operating prerequisites of professional driver training and linking it to the training additional to the basic driver training” (abstract).

The team also noted that driver training is a part of our shared traffic safety culture.

The team can’t apply the negative criterion to the task. The traffic safety viewpoint has been superceded by preservation of professional driver training. This is legally questionable. While traffic safety may serve as a good argument for limitation of individual autonomy, private commercial activity normally must not violate one’s freedom.

Traffic safety thinking was implicitly based on the accident criterion.

"The zero fatality vision of the future road safety situation in Sweden states that nobody [zero] should be killed or disabled in road traffic accidents" (p. 152).

Summarising the introduction to the report "Effectiveness and [the] role of driver education and training in a graduated licensing system" the author began: “In summary, a stated objective of driver education/training is safety. It is, therefore, reasonable to expect that such programs will reduce the number of road crashes of young drivers” (p. 3).
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<td>1998</td>
<td>Groeger &amp; Rothengatter</td>
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<td>Giving an overview of the relevant psychological traffic topics, the authors concluded that “this overview has pinpointed a number of issues in the development of accident countermeasures where traffic psychology can contribute and indeed, has contributed” (p. 7).&lt;br&gt;The authors referred to a “forgetting factor” in retrospectively reported traffic accidents (p. 2).&lt;br&gt;The authors also referred to intentional or unintentional “driver error” as a major contributory factor in the accident process” (p. 6).</td>
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<td>1998</td>
<td>Englund, Gregersen et al.</td>
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<td>“It is all too obvious that we do not succeed in making this man – machine – environment system function without accidents” (p. 10).</td>
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<td>1998b</td>
<td>Hatakka</td>
<td></td>
<td>“This thesis has two main aims. The first aim is to gain more understanding of driver behaviour and especially of the factors, both normal and problematic, affecting this behaviour. It is important to know about drivers’ cognitions regardless of their connections with accidents, which means a careful analysis of the variation in drivers’ conceptions” (p. 13).&lt;br&gt;The terms “accident” and “risk” are among the author’s essential tools.</td>
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<tr>
<td>1998</td>
<td>Härkänen</td>
<td></td>
<td>Writing the history of Road Administration the author was concerned with safety and accidents. Finland motorised quickly in the 1960s. The roads were relatively good. Both the mean and variation of speed rose, as well as the need to overtake. “This progress resulted in an increased number of accidents” (p. 9).</td>
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Although the authors greatly concerned themselves with the positive entities, e.g. learning, social interaction, self-assessment, and training methods, their implicit purpose was to avoid damage; for instance, by recognising risk. “So it could be said, particularly of the young men who had accidents, that they resulted from ... their deficiencies [i.e. the driver did not recognise the risks of his or her own life-style or motives or he or she was not able to control them]” (p. 11).

Their argument included the examination of damage. The term “safety” was used undefined.

“Traffic injuries in the society constitute one of the biggest problems of national health” (p. 15).

This legal-sociological and ethnographic study concerned young drivers speeding in Southern Finland. The author considered their traffic behaviour in relation to situations involving driving round the block, racing each other illegally, and excessive speeding. The urge to speed is based on satisfaction. Those who desire to speed grow up under particular circumstances:

- Early orientation to cars
- Socio-economic difficulties
- One guardian (parent) missing or absent
- Disapproval of training.

A car provides many kinds of satisfaction, raising status, and racing, which are beyond the reach of the young person.

A car is a means of constructing relations and to resolving conflicts.

In principle the positive definition, but in fact the negative definition. While the authors originate and work with the positive entities, their focus is on avoiding harmful consequences.

The negative definition.

Positive safety thinking.

The author considers existing entities as related to traffic behaviour. The idea of damage is present but does not dominate the study.
<table>
<thead>
<tr>
<th>Year</th>
<th>Author(s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>Insurance Institute for Highway Safety &amp; Highway Loss Data Institute</td>
<td>Since sixteen-year-old drivers had higher risk rates than drivers of any other age, including older teenagers, the graduated licensing system targets only young people, not all novice drivers.</td>
</tr>
<tr>
<td>1999</td>
<td>Siegrist (ed.)</td>
<td>The authors considered “Driver training testing and licensing” commissioned by the EU, starting with public health and traffic accidents.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>They addressed the young novice driver’s safety in two ways: (1) “to reduce the factors that increase accident involvement” (dominating viewpoint), and (2) “to increase the influence of the factors that define safe drivers” (occasionally discussed). Once they had stated that there is still much research to be done in defining safe driving, they introduced the grid presented by Hatakka et al. (1997) [see also Mikkonen &amp; Keskinen 1980]. The grid shows four hierarchical levels of driver behaviour and three functions of the essential driver training curriculum. The authors reported that “The main aim of driver testing is the improvement of the preceding phase of training”, “The main objective of driving tests is concerned with road safety,” and “An additional – and probably even more important – function of the driving test is to influence the training and practice undertaken by learner drivers.”</td>
</tr>
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</table>
The authors reported that “there is a sense in which a test may be judged to be valid if it meets its objectives.” A driving test would thus have good ‘consequential’ validity if it influenced the amount and quality of training and the practice undertaken by learner drivers so as to achieve acceptable levels of safety and competence.

Since the authors again stress the connection between testing and training and practice, they conceive the driving test as a cause or motive for training and practising, which may produce safety. This is easily understood as an administrative measure and of only borderline validity.

The sense of validity in which a test meets its objectives resembles Kirk & Miller’s apparent validity (1986, 22).
Appendix 2

Driver training literature

Reports on the influence of the driver training and relevant literature surveys are summarised below. Translations from Finnish and Swedish were done by the researcher.

<table>
<thead>
<tr>
<th>Year</th>
<th>Reference</th>
<th>Points</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1958</td>
<td>Häkkinen, S.</td>
<td>Under the title “Some thoughts about driving school instruction” the author considers driving instruction from the principles of education and teaching methods, as well as psychology. He mentions that the prerequisites of driving learning were ideal. The driving instruction was explicit, demanding personal activity and hands-on involvement in the subject; it was given in phases, and in such a way that immediate repetition was an inherent part of the instruction method. The pupils’ vigilance and desire to learn were most often the best. Other branches of the instruction than driving only rarely produced similar results with as concise tuition. Fair driving skill was generally obtained in 10 - 15 hours of driving practice. While the objective of the pupil was success in licensing, road safety was the most important objective of the driving school instruction, which consisted of licensing and education including road safety and appropriate morals. Manoeuvring a car should have been separated from the establishment of driving habits in the instruction. The driving schools should have had appropriate fields at the beginning of tuition. The reduction of sudden breaks in manoeuvring, jerks, and tension in actual driving would then have been benefits.</td>
<td>The prerequisites of driving instruction are good in relation to manoeuvring a car. The brief instruction time militates against education in attitudes and morals.</td>
</tr>
</tbody>
</table>
Correct and incorrect attitudes dealt with morals in traffic. The driving instructor in the driving school was an absolute model for his or her pupil. Since he or she could be a good or bad influence, he or she had to recognise even the meanings of his or her minor expressions and gestures. The author stressed the brief tuition time when the instructor had also to teach attitudes and morals.

1960 Lauer
Based on three studies in Pennsylvania, Ohio and Iowa the author reported “It seems quite evident that training does help one to stay out of accidents and also to keep out of unnecessary violations” (p. 275). The accidents of trained drivers decreased as much as 50% compared with the untrained drivers. These early studies report surprisingly positive results. Unfortunately, the author does not mention the references to the Pennsylvania studies.

1971 Pelz & Schuman
The author concluded that “Young males aged 18 or 19 had substantially more crashes and received more tickets and warnings than did men either younger or older, and these differences remained after exposure was controlled by two methods which did not assume [the] linear effects of mileage” (p. 68). There seems to be a dangerous period in the life of young men.

1975 Shaoul, Jean
“It should be borne in mind that we have, as yet, no evidence at all that driver education has been successful in reducing the accident rate per mile ... Indeed, because of the nature of the criteria [sic.], namely accidents, it is probably impossible to mount ... an experiment that could show a positive and causal relationship between driver education and accidents” (p. 5). The author demonstrates an experimental problem of the accident criterion.

1984 Spolander et al.
The Swedish group analysed the problems of the young drivers and suggested various measures, which included a test of a model in which driving school and private training should have supported each other educationally [see Gregersen 1994]. The authors believed that it was possible to improve driver training. They presumed that school training produced safer drivers than private training. They also thought that private training involved educational and administrative problems. It seems that they do not consider private training as real driver training, but that it has to be incorporated into professional training.
ideally give this practice in routines to the trainees. (3) A problem dealt with the safety attitudes, i.e. the students’ comprehension of their own abilities and motivation in coping with their driving habits within their own limitations. (4) “Private driving practice should be integrated with driving school education. Private driving practice not only produces cheaper but often even more relaxed options to practice, having educational value” (p. 27 – 28). The authors did not question whether the private training should be restricted or not but how it should be conducted and be systematically incorporated into driver training. Private training particularly concerned the authors when they clarified the problems in Swedish driver training. It lacked a curriculum. There was no training permission. It was difficult to implement educational and methodological initiatives, which should have raised quality and thus the cost because the students might have selected private training. Since methodological and economic reasons prevented improvement of the individual prognosis of the drivers’ exam, it was not possible to raise its demands to favour driving school training, which the authors considered effective. Having stated the methodological difficulties in comparing between private and school training the authors reported that: “We do not thus know whether school training produces safer drivers than private training but logically it should be so” (p. 25). The authors implied that Sweden is an educational context relying on professional teachers. They asked why driver training is a deviation. They wanted to test whether professional driver training does not produce a better result than “that which can be arranged by the private persons who only exceptionally have general educational competence” (p. 26).
1985  Lund & Williams  The authors reviewed 14 controlled studies of the effects of the Defensive Driving Course. About a third of these studies were methodologically strong, showing the course had no consistent effect on crashes but a decrease of 10% in the frequency of traffic violations. Only among the flawed studies were there large, positive effects from the course. Thus the best available evidence does not support the hypothesis that the course decreases the likelihood of motor vehicle crashes.

1987  Brown et al.  Based on the literature survey, the authors concluded that “The only acceptable verdict on the benefits of compulsory [and professional] driver/rider training for road safety must therefore be, for the moment, ‘not proven’” (p. 142).

“However, sufficient empirical evidence has been adduced to establish that training could contribute more [than today] to road safety and accident rates would not necessarily be reduced simply by requiring all novice drivers, or even convicted traffic offenders, to undertake an existing course of professional driving instruction” (p. 145).

The authors also referred to the methodological difficulties in researching the topic of compulsory driver training.

“The general conclusion must be that the contribution of current driver training methods to road accident reduction is largely unknown, but almost certainly less than it could be” (p. 145).

1990  OECD  Very few studies can demonstrate convincingly that education and training reduce accident likelihood.

It is normal to find significant improvements in intermediary variables following education and training, but not in accidents [e.g. knowledge, attitude, and violations].

The Defensive Driving Course, a post-licence driver training program, did not affect crashes.

The majority of the studies included in the topic were flawed, incorporating methodological difficulties.

No benefit from professional instruction was demonstrated.

The authors identified compulsory training with professional and they omitted examination of lay training.

There are methodological difficulties in researching driver training.

There was not enough research into driver training.

There is a problem of verification of the causality between training and accidents. Training results in other kinds of behavioural change and improvement.

Good driving skills correspond to risk.
Behavioural changes are possible even though there are no effects on accidents.

A high level of driving skill is associated with high accident risk ["too much confidence in personal abilities"] (p. 79).

1991 Evans

Evans’s book considers driver education and training on the basis of previous research.

"Although there have been many studies of the influence of driver education on crash rates, none with acceptable methodology has shown that those who receive driver education have lower crash rates than those who do not."

"A possible reason why training and education do not lead to clear changes in safety is that so much of the skill and knowledge they aim to impart will be learned by trial and error, and by experience. Without instruction, drivers will learn how to negotiate corners, park, reverse, and perform all the repetitive tasks based on experimentation and feedback."

"The absence of proven safety benefits from driver education does not prove that training cannot increase safety, but merely that none of the methods so far applied has been demonstrated to be successful.

"The few weeks of driver education makes but a modest increment to this large pool of knowledge [received in the family automobile environment of motorised countries]." (Pp. 105 – 106.)

1991 Gregersen

Surveying the literature on driver training and its safety effects, the author considered the demand for compulsory training. He concluded that "it is not likely to be considered that traffic safety is improved by introducing compulsory driver training into the design training has today [in Sweden]. Presumably the conditions are the best with the system where those who want can avail themselves of the help of professional teachers while the others can choose drivers also learn effectively without instruction by trial and error and by experience.

The influence of family life is considerable compared with actual driver training.

The author trusts in the trainees’ capability to chose the driver training form.
Gregersen 1994  The author’s hypothesis was that “accident risk among young drivers, normally educated by private instructors, i.e. parents, will be reduced if complementary professional education and support are provided ... The results based on self-reported accident[s] show negative effects during the first year and positive effects of the changes during the second year after licensing. When the two years were added, no significant change was found” (abstract).

Wilde 1994  The author reasoned that “People chose one form of training or another, and it is conceivable that this choice was made on the basis of personal characteristics ... associated with accident involvement” (p. 88). Improved driver education did not necessarily help prevent accidents. Receiving a “superior” instruction can result in overconfidence and in underestimation of risk. (P. 88 –89.) Better driving skill is not associated with greater safety (p. 89 - 90). “Similarly, being at fault in an accident was not more common in drivers with less-than-average knowledge of the written driving test” (p. 90).

Directorate 1995  Working Party 2 recommended “Preparation for obtaining a driving licence should take the form of compulsory training by professional driving instructors, if possible.” It argued that they “are able to structure their driving lessons systematically, are in a better position to recognise learning progress and identify mistakes and also know how to integrate theoretical and practical instruction.” The Working Group also argued for lay instructors, however. It reported that they train less expensively, offer greater mileage, providing more experience than in professional training. The Working Group concluded that “However, weighing up these advantages and disadvantages, one would tend to favour professional training over lay training.” (p. 29.)

Complementary professional education was not found a significant influence during the rather brief period after licensing.

Driving skill is not as important as the way it is used. Improving skill may be harmful if overconfidence is also increased.

The arguments did not explicitly include the safety criterion. The argument for compulsory training by professional driving instructors is unconvincing. The arguments emphasise the demands of driving school, not the circumstances at home. For instance, professional instructors must structure the driving lessons systematically to do their job in a very restricted time. In Finland they normally have 12½ hours to give a trainee
Working Group also recommended that “Good driving instruction requires qualified driving instructors. They should have the following skills: instruction methods, highway code, motor mechanics, driving dynamics, environmental awareness and driving psychology.” It argued for the assignment of driving instruction to professional instructors, avoiding the major disadvantages resulting from instruction by untrained people. These were, in particular, “lack of teaching skill, lack of the diagnostic competence to recognise [appropriate] learning progress of undesirable learning processes quickly, and take corrective action if necessary, against the danger that bad habits, which are difficult to correct later, are practised in the initial phases.” (p. 31.)

Liikenne-­ministeriö (Ministry of Transport and Communications in Finland)

See appendix 1.

The team also noted that “driver training is obviously a part of our common traffic safety culture (p. 10).”

driving practice before autonomous driving. In parenting, driver training is a phase of family interaction not strictly limited in time. When the trainee and his family is convinced of the trainee’s skills, he reports himself for the exam. The Working Group seems to rate professional training with the demands of the driving schools. The lack of teaching skills cannot be stated so unconditionally. For instance, before training a young person to drive, the parent has taught him or her in the family about 18 years and this interaction will normally continue in driving licensing and after. Quick diagnostic competence is certainly needed in the brief training period of the driving schools but not necessarily in the slower parenting. Even the danger of bad habits cannot so absolutely be stated as only a disadvantage for untrained people; cf. a teacher becoming set in his ways.

The preservation of professional driver training is preferred to traffic safety, raised the legal question of whether such protection justifies limitation of individual autonomy. The team wants additional limitation of permission training, a driving test for trainers.
1996 Hatakka et al. In their conference paper titled “Professional and Private Driver Training in Finland. - Evaluation of Results” the authors found no clear signs of difference in the number of accidents between drivers from driving schools and private training. They found some evidence for fewer violations among drivers with private training due to their educational level. They concluded that the driver populations were selected and that schools had more problematic students than laymen. They concluded that “the role of professional training is also to maintain the general level and to take care of the most problematic candidates” (p. 248).

1997 Gregersen The Swedish National Road and Transport Research Institute performed an evaluation of lowering the age limit for practising driving to 16 years. The main idea was to enable the learner drivers to practice more and thus to increase their experience behind the wheel before they were allowed to drive alone. The lowered age limit required one or more qualified supervisors, normally the father. Among other findings, the author noted that the amount of private driving tuition had increased 2.5 – 3 times while the amount of driving school training was unchanged, but took place more towards the end of the training period. The parents of the 16-year olds also had university education to a slightly greater extent than the other parents.

1998 Groeger & Rothengatter In providing an overview of relevant traffic psychological topics, the authors also dealt with driver training. It should provide the basis for safe and efficient traffic participation. This was not the case, because many particular psychological principles, e.g. systematic feedback and error correction, were not taken into account. They commented that education and training have been the focus of attention, for instance, because novice road users were disproportionally at risk.

No clear signs of difference in the number of accidents between drivers from driving schools and private training.
Privately instructed drivers commit fewer violations than professionally instructed.
Strong selection between the driver populations.
The authors recommend an administrative measure.
The system of the lowered age limit allows families the potential to train their children more fully.
It easy to imagine that driver training is utilised in the normal transportation of families giving trainees motives and a real life context.
Coherent research into driver training is needed as well as appropriate implementation of results.
1998a Hatakka

Under the title of his article “Driving school or private training” in the anthology “Psychology in driver training” the author compared these methods in several respects, i.e. success in the driving exam, damage, offences, education and attitude to traffic. The conclusion was that the training groups were selected. The private trainees were more generally educated than the school trainees. It was the good education that resulted in the favourable outcomes in violation and risk-taking. Even the family system seemed to affect the selection as well as the function of private training. The finding that the drivers trained in driving schools drove more than the privately-trained drivers was due to education.

“This possible intermediate influence on training [the influence of private training on the trainer] has not been studied at all as far as I know” (p. 101). The author also considered some administrative points like “A more liberal system to get a permission of training ... could lead to a growth of the black [uncontrolled] economy and to an uncontrolled professional traffic training” (p. 101).

1998b Keskinen

The author wrote that “If the driver training system has deliberately to be improved the number of exclusively privately trained drivers would not be very large. The design of its aims and its methods would then become difficult. The development of the driver exam would remain the only method of controlling training” (p. 237).

1998 Vaaranen

See appendix 1.

1999 Groeger & Brady

The authors, describing driver trainees’ acquisition of driving skills and success in their state driving examination, reported at the end of the abstract that “Practice with non-professional instructors, i.e. with friends and family, appears The driver training methods per se do not seem to have an influence but the general education of the trainees did. The trainees in the different methods are selected. The author was concerned about administrative points needing in fact more comprehensive discussion on such matters as the relation between control and traffic safety.

The driver training methods per se do not seem to have an influence but the general education of the trainees did. The trainees in the different methods are selected. The author was concerned about administrative points needing in fact more comprehensive discussion on such matters as the relation between control and traffic safety.

The author seems to be concerned with the authoritative control of aims and methods. He does not argue why private training would be impossible to develop. Is there not a possibility of relying both on people’s volunteer ability to develop driver training and licensing drivers? Vaaranen’s positive thinking and findings are conducive to driver training.

All trainees got both professional and private tuition in varying amounts. In the experimental design they were classified according to the
a more important determinant of successful acquisition than professional training, although both are essential to meeting licensing requirements." Professional instruction per se did not increase a trainee's likelihood of passing their first driving test.

Intelligence predicted the trainee's initial skill level.

The quality and make-up of the driving experience evidently affected the trainee's learning rate.

Those who learned most rapidly were those who had lower initial levels of skill.

Professional instruction per se did not increase a trainee’s likelihood of passing their first driving test.

Intelligence predicted the trainee’s initial skill level.

The quality and make-up of the driving experience evidently affected the trainee’s learning rate.

Those who learned most rapidly were those who had lower initial levels of skill.

The claim "... although both (professional and non-professional tuition) are essential to meeting licensing requirements" seems to be a known fact without explicit correspondence with their conclusions.

The authors’ ultimate criterion is simply the state driving exam. They avoid the problems of the accident criterion.

The graduated licensing system has been developed in jurisdictions which allow low minimum entry ages of driving trainees, even as low as 14 years. While this driver education system targets the abilities of young people, it supports their maturation, alleviating negative impacts such as inexperience.

While the graduated licensing system is educational, it is also an administrative means for the legislator to protect citizens on the roads. The states seem to enact their licensing systems independently.

Parents’ resources are essentially involved in
have just some of them. Many states have augmented their graduated systems with additional features including driver education innovations, seat belt use provisions, and penalty systems in which violations result in license suspension or extension of the holding period" (p. 1).

“Parents strongly favour graduated licensing. A 1996 Insurance Institute for Highway Safety survey of parents of 15 year-olds in Florida who were about to enter a graduated licensing system found 95 percent of the parents supported a minimum period of supervised driving. Ninety percent favoured night driving restrictions, 60 percent favoured restricting teen passengers during the first few months of driving, and 74 percent of the parents favoured a graduated licensing system that includes all of these components. When these same parents were interviewed three years later, after their children had gone through Florida’s graduated system, support for the restrictions was even stronger” (p. 2).

Also in 1996, parents of teenagers surveyed in Connecticut, Delaware, New Jersey, and New York said they strongly support graduated licensing requirements. Although many parents want their children to get licenses early so they no longer have to be taken to school, work, or social activities, the same parents worry about the risks their children will be taking as young drivers (p. 2 – 3).

“A graduated system requires a young driver to hold his or her permit for a minimum of six months. During this time a parent needs to familiarize the new driver with literally dozens of driving scenarios -- for example rural, urban,
suburban, freeways, rush hour, night-time, dusk, and rain. The time required of
the parent or guardian is less daunting when viewed over the entire six
months. For example, 50 hours over 6 months equals just 8.3 hours per month,
or a little more than 2 hours per week” (p. 3).

1999 Katila et al. The authors evaluated the long-term effects of the Finnish driver training
reform of 1990 on accidents. The driver training was reformed according to
their ideas, including cognitive and hierarchial theories of driving behaviour as
well as theories of constructive learning of driving behaviour.
Among male drivers, particularly older than 21 years, the decrease in accidents
was considerable. Among the older female drivers there was no decrease. The
difference between the sexes seemed to result from the increase in confidence
in one’s own skills in driving in slippery road conditions.

1999 Keskinen et al. The authors, The Traffic Research Group at the University of Turku, reported
Finnish driver training based on the two-phase driver education system
adopted in 1990. A candidate takes the driving exam after the first phase to
obtain a probationary Driving Licence valid for two years without any special
limitation. “The second phase” of training consists of an analytical part, a
practising part and feedback. No exam follows this phase but feedback is given
to the trainee.
The points of the theoretical approach of the Finnish curriculum are cognitive,
hierarchial theories of driving behaviour, and theories of constructive learning.
The highest level of goals and skills of living include driving safety. The
problem for young males is control of their personal motives and themselves.
Finnish accidents have shown positive trends according to the authors’
analysis. “The second phase” seemed to be effective. The authors also
reported that “the construction of the two-phase driver education provides an
The findings stress psychological factors like
certainty.

The authors report Finnish professional driver
training largely neglecting parenting training.
Since the intermediate phase between the first
and “the second” phases has its educational and
legal meaning, the Finnish curriculum actually
has three phases. Since the intermediate phase
is not included in driving schools, it seems to be
neglected.

A remark on a detail: The authors reported: “The
second phase can be carried out only in a
driving school.” While the qualified traffic
instructors are permitted to train drivers in the
continuing driver training, i.e. the second phase,
an individual applicant with approved
The authors had to analyse the effect of driver training systems on behaviour, their potential, and their limits from existing literature, and make conclusions. They described and assessed several measures. They introduced the grid presented by Hatakka et al. (1997) (see also Mikkonen & Keskinen 1980), which shows four hierarchical levels of driver behaviour and three functions of the essential driver training curriculum. The authors recommended a modified combination of the graduated licensing system framework and an education, and training programme with subject matter specified by the dimensions of the grid. They also stressed constructive principles in learning.

The authors concluded that the training systems which have shown safety-increasing effects are those which have not only increased the amount of formal education and training, but introduced other components, such as graduated licensing, increased experience through lay instruction or risk-awareness training.

Since lowering the age limit of practising in a car to 16 years may encourage young drivers to choose mainly a private car, the authors warned that the number of accidents may increase. They noted the role conflict in driver instruction, since driving schools depend on the fact that people need driving licences. They should be educated to refrain from driving unless absolutely necessary.

The authors thought that social equality problems could not be significantly improved by systems based mainly on private instruction, because selection effects may cause problems.

The authors supply the missing definition of safe driving with appropriate functions in driver training.

While licensing systems are autonomously elaborated in various states and territories of North America, one uniform system seems to be a goal in the European Union (see Insurance Institute for Highway Safety & Highway Loss Data Institute 1999 above.) The benefit from lay instruction has been established although there is little or no research into this.

The authors do not conceive private instruction as liable to motivate unnecessary driving.

Since authors do not explain how private instruction and selection of a training form violates civil rights, the social equality problem seems to be no difficulty at all.
2000 Gregersen et al. The authors tested two hypotheses in relation to the lowered Swedish age limit from 17½ to 16 years for car-driving practice: (1) “Those who utilised the new age limit will have lower accident involvement as novice drivers compared to young drivers who did not utilise the prolonged practise period before or after the change” (p. 27). (2) “Accident involvement among the youngest, novice drivers in general would be reduced as an effect of the reform” (27 – 28).

“The purpose of lowering the age limit was to give the learner drivers an opportunity to acquire more experience as drivers before being allowed to drive on their own” (p. 25).

Their methods comprised two experimental designs and checks for three compounding factors, and gathering population register and questionnaire data.

The results supported both hypotheses. “[The reform] has had a general accident risk reducing effect on novice drivers [of] approximately 15% [accidents per km driven]” (p. 34). The reduction of the accident risk in the group who utilised the new age limit was approximately 40%, whereas those who did not utilise the prolonged training period did not benefit at all (p. 34).

While the authors based their work on the approach of Rasmussen (1984), their viewpoint was solely the experience of a learner driver.

The research supported the Swedish administration.

The approach was quantitative and drivers were treated collectively. Methodological difficulties such as data being collected from different sources restricted the number of available analysis methods.

While the authors left the function of the supervisor in the driving experience of the learner driver open, they warned of the concern of “proponents of formal traffic education”: “Unless in an education situation proper, bad habits can be acquired quickly.” However, the authors assumed “that the total effect of experience is good for safety.” – Although they calculated that “the accident involvement was approximately 35 times higher during the first 2 years after licensing than during the 2 years of practising”, they did not consider the influence of the supervisor and the interaction between him and the learner driver.
Appendix 3

Expert opinions

The analysis produced a summary with two viewpoints, each containing main categories and subcategories:

A. The course of a driver’s career
   1. Experience before official driver training
   2. Motives for driver training
   3. Driver training manoeuvring
      3.1. Manoeuvring, direction of driver training and selecting drivers
   3.2. General process of training and learning
   3.3. Driving school
   3.4. Permission training
   3.5. Combination of driver training types
   3.6. Comparison of driver training types
   3.7. Parenting
   3.8. Miscellaneous
   4. Driving exam and driving licence
      4.1. Criterion of success in the exam
         4.1.1. Observation and manoeuvring skill
         4.1.2. “Traffic eye” in the exam
      4.2. Miscellaneous
   5. Intermediate phase
   6. Second phase
   7. Initial phase of autonomous driving
      7.1. Young drivers
      7.2. Miscellaneous
   8. Being accustomed to driving
      8.1. Traffic culture
         8.1.1. Family and group driving
         8.1.2. The culture of being right
      8.2. The reality of driving skill
         8.2.1. Development of driving skill
         8.2.2. The restrictiveness of driving skill
      8.3. Traffic enforcement, consequences and sanctions
         8.3.1. Enforcement and reprimand
         8.3.2. Conflicts, crashes and other hazards
         8.3.3. Sanctions
   9. Diminution of driving ability
   10. Abandonment of driving

B. Driver’s non-chronological values
   1. Danger
      1.1. The definition of danger and its manifestation
      1.2. Understanding or outlining of danger
      1.3. Preparation for danger and avoiding it
      1.4. Risk-taking, risky behaviour and callousness in the face of danger
      1.5. Typical dangerous situations
   1.6. Exaggerated danger
   2. Traffic safety
      2.1. Definition
      2.2. Promotion
         2.2.1. Education
         2.2.2. Action as a road user
         2.2.3. Technical devices
   3. The necessity for an automobile
      3.1. The importance of a car for a man
      3.2. Giving up driving
         3.2.1. Abandonment of a private car
         3.2.2. Public traffic
   4. Beliefs, attitudes, opinions, personal interpretations
      4.1. Beliefs, attitudes, opinions in traditional education and training
      4.2. Beliefs, attitudes, opinions in enforcement
      4.3. Beliefs, attitudes, opinions in endangering traffic and in accidents
      4.4. Personal interpretations of the traffic regulations
   5. Culpability and compensation for damage
   6. Gender and traffic
      6.1. Gender in education
      6.2. Driving skill by gender
      6.3. Gender and safety
### Appendix 4

The masters’ proficiency and kind of interview

<table>
<thead>
<tr>
<th>Master</th>
<th>Proficiency</th>
<th>Kind of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Senior fireman; rescues lives, health and property, e.g., from burning houses, the sea and road accidents, drives big fire-engines, trucks, cars.</td>
<td>In the preliminary phase of the interview, no common themes</td>
</tr>
<tr>
<td>M2</td>
<td>Policeman, instructor, taxi, truck and bus driver; protects people and property, drives highway patrol vehicles and trains police candidates.</td>
<td>In the preliminary phase of the interview, no common themes</td>
</tr>
<tr>
<td>M3</td>
<td>Professor emeritus specialised in work and road safety; long trips by car; one of the authors.</td>
<td>In the preliminary phase of the interview, no common themes</td>
</tr>
<tr>
<td>M4</td>
<td>Driving examiner, motor vehicle engineer; met numerous candidates in the theory and driving tests, drives trucks and cars; assisted the researcher in acquiring data on driving exam.</td>
<td>Complete interview with all of the common themes</td>
</tr>
<tr>
<td>M5</td>
<td>Motor vehicle engineer; previously examined vehicles, long employed by an educational organisation, drives various vehicles.</td>
<td>Two themes “Model cars” (8) and “My background” (0)</td>
</tr>
<tr>
<td>M6</td>
<td>Engineer, traffic planner for 30 years, drives cars.</td>
<td>Two themes “Comment on photo” (7) and “My background” (0)</td>
</tr>
<tr>
<td>M7</td>
<td>Master builder, traffic planner; employed 34 years by an educational organisation, drives cars; formerly a colleague of researcher</td>
<td>Two themes “Comment on photo” (7) and “My background” (0)</td>
</tr>
</tbody>
</table>
Appendix 5

Interview questions and protocol

The translated interview protocol with comments was as follows. The theme title number is in parenthesis. The key question represented on the cards is underlined. The complementary questions are shown but not the situational probes:

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Immediately before the interview** | - The interviewee was welcomed. Some small talk sometimes occurred.  
- The interviewee saw the plaster casts, the scale measure and the tape recorder on the table.  
- During interviewing some juice and a pastry were available. |

**The subjects being discussed**

(1) Me as a road user

1. **How do I get around in traffic?**
   1.1. Which are your most typical reasons and needs to travel?
   1.2. Select the plaster cast corresponding to your most usual road user type.

1.3. By what other means have you travelled?

1.4. How safe a pedestrian are you?
   1.4.1. Put the cast on the appropriate point of the scale.
   1.4.2. What makes you safe?
   1.4.3. What is not safe in you? What do you lack?

(2) I as a driver

2. **How confident a driver am I now?**

2.1. Put the cast on the appropriate point of the scale.
2.1.1. What makes you confident?
2.1.2. Is there something unconfident in you? Do you lack something?

2.2. How confident a driver were you just after licensing?
2.2.1. Put the cast on the appropriate point of the scale.

2.2.2. What has happened to you since licensing?

2.3. How a confident driver were you when you started your driver training?
2.3.1. Put the cast on the appropriate point of the scale.

2.3.2. What had happened to you before your driver training?
2.3.3. What happened to you in the driving school / the permission training?

2.4. How confident or a proficient driver do you think you will become?
2.4.1. Put the cast on the appropriate point of the scale.

2.4.2. What kind of a driver are you going to be at your best?

2.5. Do you have any ideal drivers?
2.5.1. Who is your ideal? What is he or she like?

(3) My opinions of the types of driver training
3. How good do I rate the driver training I received?

3.1. Put the cast on the appropriate point of the scale.

3.2. What was good about it?
3.3. ... and what was bad?

3.4. Why did you select this type of driver training?
3.5. Did you consider the other type of training?
3.6. How good do you rate the type of driver training you did not receive?
3.6.1. Put the cast on the appropriate point of the scale.

3.6.2. What is good about it?
3.6.3. ... and what is bad?

• Both aspects.
• The outcome of driver training and other prior education.
• The scale question introduced the sub-theme.
• Functional answer
• Checking of the impact of the autonomous driving.
• Checking the interviewee’s level at the beginning of driver training. (This question was based on experience as a passenger, a cyclist and on actual driving before the legal driver training.)
• The scale question introduced the sub-theme.
• Functional answer
• Checking the interviewee’s skills and ability before driver training.
• Checking the interviewee’s learning and change while driver training. Information on the driver training types.
• Completing the interviewee’s account of his or her career as a driver.
• The scale question introduced the sub-theme.
• Functional answer
• Checking the interviewee’s view of the future.
• Checking what kind of ideals the interviewee had.
• Projective question.
• Finishing theme 2
• Comparison between the driver training types.
• Concerned driving school or permission training, dependent on the case.
• Checking the type the interviewee received.
• The scale question introduced the sub-theme.
• Functional answer
• Checking the characteristics of the training received. General concepts “good” and “bad” just for stimulation.
• Checking the reasons for the selection and consideration.

• Checking the type the interviewee did not receive.
• The scale question introduced the sub-theme.
• Functional answer
• Checking the characteristics of the training not received. General concepts “good” and “bad” just for stimulation.
3.7. What is the difference between the types of training?
3.8. How would you develop driver training?

(4) My opinion of the road rules

4. How well do I abide by the traffic rules?
4.1. Put the cast on the appropriate point of the scale.
4.2. Why do you need the rules?
4.3. Do the rules guarantee your safety?
4.4. How?
4.5. Are there unnecessary road signs?
4.6. The set road signs: what are the most and least important road signs?
4.7. How well do you know the purpose of the traffic rules?
4.8. Put the cast on the appropriate point of the scale.

(5) How do I observe my safety in traffic?
5.1. Is your safety completely in your own hands?
5.2. Put the cast on the appropriate point of the scale.
5.3. What is in your own hands?
5.4. ... and what is not?
5.5. What do you do to ensure your safety on the road?
5.6. What kind of incidents have you encountered?
5.7. How well your safety is maintained by traffic co-operation?
5.7.1. Put the cast on the appropriate point of the scale.
5.7.2. How do you account for the possible difference between your personal and cooperative protection (or its lack)?
5.8. Does some part of your safety remain not ensured?
5.8.1. What causes this? What happens then?
5.8.2. Does chance or fate effect your safety? (bad luck, nature or any factor

- Checking where the matter had not been explicit.
- An attempt to draw views from the newly licensed driver.
- Supporting the interviewee’s expertise.
- Checking the essential point for traffic safety.
- Taking the rules as such hindered the interviewee from identifying the rules with safety uncritically.
- Checking the interviewee’s potential legal compliance.
- The scale question introduced the sub-theme.
- Functional answer
- Checking the interviewee’s comprehension of the traffic rules and social interaction in traffic.
- A projective variant to ask about the interviewee’s comprehension of legal and social matters.
- Controlling theme 4

- The scale question introduced the sub-theme.
- Functional answer
- Checking the core issue of traffic safety.
- “Danger & safety”
- Checking traffic safety with the common terms associated with it and in its two aspects. The preliminary work resulted in avoiding the direct term “safety” because it could faze the interviewee.
- Checking the potential of the interviewee to protect himself or herself.
- The scale question introduced the sub-theme.
- Functional answer
- Checking the interviewee’s details in both aspects.
- Checking where the matter had not been explicit.
- Checking what kind of examples the interviewee had noted.
- Checking the potential of the traffic culture to safeguard the interviewee.
- The scale question introduced the sub-theme.
- Functional answer
- A check that the comparison had been made.
- Checking the interviewee’s overall safety status
- Attempting to pinpoint the safety deficit.
- A direct question to assess the possible cause of safety deficit.
independent of human will)

5.9. What would have happened if your safety some day was completely in your hands?

(6) My experience as a passenger

6.1. Do I feel apprehension at someone else’s driving?

6.2. Do I feel comfortable about the driving of others?

6.1.1. What can happen in these circumstances? Why? In what kind of driving? How do you respond?

6.2.1. What is such driving like? Why? Had you any influence on the incident?

6.3. What kinds of passenger have you had? Describe them.

(7) My comments on the photo of a traffic incident.

(8) My comments on the model cars.

The presumption of the theme was that the interviewee had won car in a lottery.

8.1. The choice of the prize on the basis of two miniature cars. The alternatives were the sports car or Citroën CV4 (Diane).

8.2. The lottery condition was the difference between the prices of the cars is paid in cash. What was the choice then?

(9) Remaining important topics

(Mitä muuta minulta pitäisi kysyä?)

- A conjectural question allowing a basis in fantasy. Checking free solutions of the safety problem.
- Finishing theme 5.
- Checking the interviewee’s notions of other drivers.
- The interviewee’s identification deviated from the active to passive road user. The circulative point of view protected the interviewee’s identity and let him or her speak freely. He or she could consider other drivers “objectively”. (Tomm 1993.)
- Checking the apprehension about the drivers, i.e. the negative aspect.

- Asking details

- Checking comfort with other drivers, i.e. the positive aspect.
- Asking details

- Checking the feedback the interviewee got from his or her passengers.
- Opportunity to report success in driving.
- A free discussion.
- Projective opportunity for the interviewee to produce his or her notions of the crossing situation. The situation deviated explicitly from the Finnish practice.
- Projective opportunity to the interviewee to produce his or her notions of the two model cars and their comparison.
- A fascinating topic to many young drivers.
- An imaginary basis resulted in comparison and freedom to express oneself.
- The fancy sports car and the plain Citroën CV4 car.

- Making the alternatives economically equal in order to discuss safety properties and other points.
- “What else should the interviewer ask me?”
- “What do you think about the interview?”
- Opportunity for the interviewee to end the interview if he or she thought that something had been missed or that something should be stressed.
- Also feedback on the interview methods.
(a) **My personal information**
(Millainen on taustani?)
Age, occupation, family, general life situation, cars in use

After the interview

- Checking some personal information and finding possible deviating cases.
- The interviewee announced his or her correct or pen name for the report.
- The interviewee's promise to check his or her summary was obtained.
- The interviewee got a plaster cast as a souvenir and chocolate as a prize and was asked to check his or her summary later.
- Some small-talk might ensue.
- When necessary the interviewee was assisted to find his or her route to where he or she was going. Some interviewees were given a lift to where they wanted to go.
Appendix 6

Decisions concerning summarising

Acceptance of interview verbatim

When the interview was concise, explicit, and in standard Finnish there was no need to summarise it.

Editing and checking were often done in the process of summarising. The principles were:

Comprehensibility

The researcher summarised only the expressions he understood. In cases of incomprehensibility the researcher questioned the interviewee until this clarified the matter. The summary was then reused, subject to additions and deletations by the interviewee. The researcher also had to understand any irrelevant expressions in order to reject them from the actual analysis.

The types of questions asked concerned.

Ellipses
The interviewee did not mention a matter or it could not be heard on the tape. One or more suggestions were offered in the interviewer’s questions.

Illogical expression
The interviewee might use a colloquial concept which was illogical in standard Finnish. A “place” could mean a “situation” for example.

Explication of a logical matter
The interviewee could fail to mention an important matter. For instance, the crucial part of a sentence might be missing. An example:

The interviewee: “If I am tired on the road I try to be very careful.”
The interviewer: “Do you walk, ride or drive then?”

Correction of confusion
The interviewee could become disconcerted while speaking. A logical expression was suggested. An example:

The interviewer: “How do you go to your bungalow?”
The interviewee: “I ride.”
The interviewer: “You mean you drive?”
The interviewee: “Yes.”

Probing
If the researcher simply did not understand the remark, he asked a more precise question.

Coherence

The ideas which had been interrupted were rejoined. The actual succession of the comments was generally maintained. Sometimes it was necessary to re-assemble parts of a whole which appeared in different parts of the interview.
The responsibility of the “I”

The preliminary work revealed that the young interviewees were prone to hide themselves behind some expert. They tried to speak impersonally, affecting some formal authority they did not actually have. This phenomenon, not interesting in the actual research, could have resulted in obscuring the genuine conceiver. In these cases the summaries were written in the “I” form corresponding to the interviewees’ own person. This was to ensure that what emerged was the interviewees’ conceptions not those of experts, the common opinion, etc. The interviewees often replaced the “I” with the “you”, “we”, passive expressions, the third person without the pronoun and the cases when they avoided the “I”, not referring to a particular person. Recognising these cases was easy as well as the cases when the interviewees were really speaking about another expert. In all such cases the interviewee accepted the researcher’s correction while negotiating the summaries.

The researcher also eliminated the interviewer from the summaries. The text was completely the “I’s” or the subject’s account of his or her thoughts.

This technique made it easy for the interviewee to check the summaries and his or her thoughts. It was also easy for the researcher to adopt the interviewee’s thoughts.

The protection of the “I”

It could have been embarrassing for the interviewee to read his or her colloquialisms. The summarised text in standard Finnish however lacked impact, which might also have detracted from the checking of the summary.

Reference to traffic

The interviewees generally used the words “here” and “there” referring to traffic. Instead of these the phrase “on the road” was put in the summary. An example:

“You must be careful there.” → “You must be careful on the road.”

Standard Finnish

The colloquial language was transformed into standard Finnish in the process of checking the concepts. Colloquial tags, unnecessary stress, repetition, breaking, and other features hindering comprehensibility were corrected.

A broader concept was generally put into a paragraph and a concise one in a sentence. The sentences were complete, i.e. with the predicates, subjects, and other necessary parts. The informative function of predicates was particularly utilised.

Words

The interviewee’s words were used if they were explicit and in standard Finnish.

Topics

The general topics based on the interview themes were used. The main topic contained the interviewee’s first name, for instance “Juha’s traffic safety”. The quantitative answers to the scale questions were generally written in the sentence starting the section in order to find them easily later.
Open enumeration

While enumerating a list of things the interviewee often left out the set of indefinably open instances ("... and other things like these."). When it was clear that the openness was insignificant the enumeration was summarised as closed. In the other cases the expression was written clearly as a list of examples. The category of the examples could often be defined verbatim ("watching, hearing, feeling, and other functions of the senses"). Usually this resulted in a question to the interviewee.

Implicit expression

An implicit expression resulted in a probing question, particularly if the matter was of interest to the actual research. The components of the concepts were clearly linked in the text, even though tautologically.
Appendix 7

Negotiating the summaries

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Appendix 8

Contacts with an interviewee needed for acceptance of the summary

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## Appendix 9

### Sample

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<td>21.01.97</td>
</tr>
<tr>
<td>M5 Matti</td>
<td>02.10.97</td>
<td>2890</td>
<td>27.01.99</td>
</tr>
<tr>
<td>M6 Hannu</td>
<td>03.10.97</td>
<td>2754</td>
<td>29.01.99</td>
</tr>
<tr>
<td>M7 Heino</td>
<td>04.10.97</td>
<td>2390</td>
<td>09.02.99</td>
</tr>
</tbody>
</table>

**Total**  55964  12115

Aiming at the C-category licence

Swedish

Senior fireman

Policeman

Professor emeritus

Driving examiner

Motor vehicle engineer

Engineer, traffic planning

Master builder, traffic planner
<table>
<thead>
<tr>
<th>Code</th>
<th>Group</th>
<th>Interview words</th>
<th>Summary words</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>P,S</td>
<td>Males</td>
<td>202982</td>
<td>53076</td>
<td>26</td>
</tr>
<tr>
<td>PL,SL</td>
<td>Females</td>
<td>45239</td>
<td>14053</td>
<td>31</td>
</tr>
<tr>
<td>M</td>
<td>Master drivers</td>
<td>55964</td>
<td>12115</td>
<td>22</td>
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<td>Total</td>
<td></td>
<td>304185</td>
<td>79244</td>
<td>26</td>
</tr>
</tbody>
</table>
Appendix 10

The 9-value scale conception ratings

<table>
<thead>
<tr>
<th>Interviewee pair</th>
<th>The most typical road user group</th>
<th>Scale questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>As safe pedestrian</td>
<td>As secure motorist</td>
</tr>
<tr>
<td></td>
<td>Before training</td>
<td>When licensing</td>
</tr>
<tr>
<td>S</td>
<td>P</td>
<td>S</td>
</tr>
<tr>
<td>1</td>
<td>Ped.</td>
<td>Mot.</td>
</tr>
<tr>
<td>2</td>
<td>Mot.</td>
<td>Ped.</td>
</tr>
<tr>
<td>3</td>
<td>Pass.</td>
<td>Ped.</td>
</tr>
<tr>
<td>4</td>
<td>Bic./Pass.</td>
<td>Pass.</td>
</tr>
<tr>
<td>5</td>
<td>Mot.</td>
<td>Ped.</td>
</tr>
<tr>
<td>6</td>
<td>Mot.</td>
<td>Mot.</td>
</tr>
<tr>
<td>7</td>
<td>Bic.</td>
<td>Ped.</td>
</tr>
<tr>
<td>8</td>
<td>Pass.</td>
<td>Mot.</td>
</tr>
<tr>
<td>9</td>
<td>Mot./Ped.</td>
<td>Ped.</td>
</tr>
<tr>
<td>10</td>
<td>Ped.</td>
<td>Pass.</td>
</tr>
<tr>
<td>11</td>
<td>Ped.</td>
<td>Ped.</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Md</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mode</td>
<td>Mot./Ped.</td>
<td>Ped.</td>
</tr>
</tbody>
</table>

S = School interviewee
P = Permission interviewee
Appendix 11

The indexing progress

The chronology, detailed method, and preliminary results of indexing were:

<table>
<thead>
<tr>
<th>Note</th>
<th>Theme or subtheme</th>
<th>Method</th>
<th>Preliminary results and observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>2.5 Ideal driver</td>
<td>The nodes were developed while indexing the text units. Order of indexing followed the interviewee codes (p. 50).</td>
<td>* The fathers, other relatives and peers were the young male drivers’ important human relations.</td>
</tr>
<tr>
<td>02</td>
<td>3.1.4 Choosing a type of driver training</td>
<td>The nodes were developed when indexing the text units. Order of indexing was from the codes of the interviewees.</td>
<td>* The young male drivers and their families felt free to choose training. * The father is often the paramount authority. * The peers were also important.</td>
</tr>
<tr>
<td></td>
<td>3.1.5 Considering the other type of driver training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>5.3.2 Chance</td>
<td>When re-reading the interview texts the researcher made notes of relevant points. He developed the index system from these. Order of indexing was from the codes of the interviewees.</td>
<td>* The young men’s values had seemingly developed at home, at school and with peers. The short training did not obviously influence their values. * The permission interviewees emphasised traits of complete safety while the school interviewees emphasised its lack.</td>
</tr>
<tr>
<td>04</td>
<td>6.1 Alarming driving habits</td>
<td>Having got indexing practice the researcher continued with whole themes. The nodes were developed while indexing the text units. Order of indexing was from the codes of the interviewees.</td>
<td>Speed was stressed as a factor causing alarm. The interviewees might be alarmed if their drivers did not abide by the rules and if they understood the incidents caused by this.</td>
</tr>
</tbody>
</table>
6.1 Alarming deficiencies in the drivers' performance (observation, manoeuvring)

- The deficiencies caused some apprehension.
- The peers showed deficiencies.
- The father and the family members usually had no deficiencies.

6.1 Alarm over harmful incidents

- The interviewees imagined many harmful incidents.
- The school interviewees spoke about alarm more often than did the permission interviewees.

6.1 Nature of the alarming driving

- Some connection between the traits of the driver and the alarm existed.
- Speed was alarming.
- Beside the family of the young male drivers their peers affected them.

6.1 Responses to alarming driving

- The interviewees had responded to alarming driving in many ways. The responses were subjective, e.g. vigilance, or interactive, e.g. commenting.
- The spoken communication of peers could be a traffic education resource.

6.1 Passengers' general and miscellaneous conceptions of alarm

- Knowledge and alarm had an inverse relation.
- The father was a positive driver.

6.2 Passengers' awareness of comfortable driving.

- Experience and awareness of the driver affected feeling of comfort.
- Relaxed drivers were the father, sister, taxi-drivers and peers.

6.2 Relaxed driving habits

- The school interviewees specified relaxed driving more than the permission interviewees did. The former regarded moderate speeding as good driving.

6.2 Lack of relaxation

- The importance of close human relations was confirmed. The father and peers drove in a relaxed manner.
- The school interviewees stressed the lack of relaxing drivers more than the permission drivers.
6.2 Passengers’ general and miscellaneous conceptions of relaxation

* The interviewees thought they were relaxed but they could not say how.

6.2 Relaxed driver

* The father and the peers were seen as relaxed drivers.
* The father was a model of a relaxed driver, particularly to the school interviewees.
* It was easy to relax if the passenger thought positively of the driver.

* The importance of close human relations to the young male drivers, particularly their fathers, was stressed as indexing progressed. The fathers and the peers seemed to be the backbone of driver training.

6.2 Relaxed driving: circumstances and vehicles

* The interviewees reported only a few conceptions.

6.2 Passenger’s influence on relaxed driving.

* The interviewees did not generally affect the driver’s driving ease.
* The interviewees refrained from interference in the driver’s performance.

6.3 The passengers’ conceptions of the interviewees as drivers

* The passengers were mainly positive about the interviewees as drivers but without particularising.
* Family members assessed the permission interviewees.
* Peers rated the school interviewees.

* It proved to be too early and time-consuming to construct phenomenographic categories in indexing. It was better simply to index well and also improve familiarity with the data. The phenomenographic categories do not result directly from the nodes. They also need further consideration.
* Interview questions like “What is good” and “What is bad” stimulated the interviewees to speak a lot but the dichotomy implied by the questions was too crude to be worth indexing as such, more detailed nodes being required.

As driver

(Growth sub-themes: Before driver training, During driver training, Licensing, At this moment, In the future)

* The theme consisted of many nuances.
* Most node types extended over at least four of the five growth sub-themes.
* The subtree was rather horizontal.
* The node titles were either static, e.g. “Vehicles”, or dynamic, e.g. “I improve”.

The procedure was fixed, indexing and checking. The order of the documents in each procedure was randomised.
Opinions of driver training (except Selecting a type of driver training, Considering the other type of driver training)
The procedures were re-read twice, outlining the index-list, indexing twice, re-reading again and checking. The order of the documents was randomised.

Opinions on road rules
The procedures were re-read, outlining and testing the index-list, indexing and checking. The order of the documents was randomised.

Danger and safety (except "Chance" and "Complete safety")
The procedures were re-read, outlining the index-list, indexing and checking. The order of the documents was randomised.

Comments about the photo
The procedures were re-read, outlining and testing the index-list, indexing and checking. The order of the documents was randomised.

Comments about the model cars
The procedures were re-read, outlining and testing the index-list, indexing and checking. The order of the documents was randomised.

Supplementary comments
The procedures were re-read, outlining and testing the index-list, indexing and checking. The order of the documents was randomised.

Indexing resulted in five parental nodes, i.e. scale measures, premises, education, consequences and evaluation.
Conceptions of real entities, e.g. vehicle and road, were indexed only at one parental node though they had nuances to several, for instance, a vehicle as a premise and a teaching aid. The nuances were considered in the analysis.
The personality was thought to mean more than driver training does.
Pre-training was assessed as being crucial.
A cluster including “traffic safety”, “necessity of the rules” “order”, “reliance on others” and “avoiding harmful incidents” began to emerge.
The main divide was between the epistemic and ontic conceptions, the former being conceptions of abstractions, the latter conceptions of performance.
The general nodes of confidence, driving habits, following rules, interaction, avoiding damage and prerequisites corresponded with danger and safety.
The index-list was based on the questions like: “What is in the photo?” “What does it mean?” and “How should it be?”
The school interviewees thought the situation in the photo was safer and the permission interviewees more dangerous.
The interviewees were mainly interested in the monetary value of the cars.
Only a few interviewees thought about safety.
The interviewees provided rather little information.
Their assessment of the research was positive, even markedly so.
The interviewees’ background

The data sources were the on-line summaries, the off-line field protocol, and driving exam cards. They were re-read, the index-list was outlined, they were indexed and the indexing was checked. The order of the documents was randomised.

* The male interviewees were normally 18 years old.
* The interview was normally conducted during the month after licensing.
* 10 male interviewees accepted the summary as such.
* 12 male interviewees changed the summary in some way.

As a road user

The procedures were re-read, outlining and testing the index-list, indexing and checking. The order of the documents was randomised.

* The young men’s notional behaviour in traffic was related to family, school, peers, and hobbies.
* They were usually pedestrians or car drivers.
* The performance as pedestrian was seemingly based on perception, while safety was concentrated on pedestrian crossings and using traffic lights.
* They often mentioned being in a hurry while walking.

All indexing

* All indexing was checked in randomised order.
* There were about 700 nodes in total.
* The list of nodes is in appendix 12.
Appendix 12.

Indexes and nodes

Q.S.R. NUD.IST Power version, revision 3.0.4d GUI.
Licensee: a.


(1) /Road user
( 1 1) /Road user/Need to travel
( 1 1 1) /Road user/Need to travel/Amusement
( 1 1 2) /Road user/Need to travel/Peers
( 1 1 3) /Road user/Need to travel/Hobby
( 1 1 4) /Road user/Need to travel/Family transport
( 1 1 5) /Road user/Need to travel/School
( 1 1 6) /Road user/Need to travel/Just possibility
( 1 1 7) /Road user/Need to travel/Public transport
( 1 1 8) /Road user/Need to travel/Work
( 1 1 9) /Road user/Need to travel/Health
( 1 1 10) /Road user/Need to travel/Annoyance
( 1 1 11) /Road user/Need to travel/Town
( 2) /Road user/Type of road user
( 2 1) /Road user/Type of road user/Pedestrian
( 2 2) /Road user/Type of road user/Cyclist
( 2 3) /Road user/Type of road user/Motorcyclist
( 2 4) /Road user/Type of road user/Motorist
( 2 5) /Road user/Type of road user/Passenger
( 2 6) /Road user/Type of road user/Unused types
( 2 7) /Road user/Type of road user/Types not actual any more
( 3) /Road user/Variety of road use
( 3 1) /Road user/Variety of road use/Length of trip
( 4) /Road user/Pedestrian safety performance
( 4 1) /Road user/Pedestrian safety performance/Measure
( 4 1 4) /Road user/Pedestrian safety performance/Measure/four
( 4 1 5) /Road user/Pedestrian safety performance/Measure/five
( 4 1 6) /Road user/Pedestrian safety performance/Measure/six
( 4 1 7) /Road user/Pedestrian safety performance/Measure/seven
( 4 1 8) /Road user/Pedestrian safety performance/Measure/eight
( 4 1 9) /Road user/Pedestrian safety performance/Measure/nine
( 4 2) /Road user/Pedestrian safety performance/Prerequisites of performance
( 4 2 1) /Road user/Pedestrian safety performance/Prerequisites of performance/Senses
( 4 2 2) /Road user/Pedestrian safety performance/Prerequisites of performance/Vehicle
( 4 2 3) /Road user/Pedestrian safety performance/Prerequisites of performance/Shoes
( 4 2 4) /Road user/Pedestrian safety performance/Prerequisites of performance/Environment
( 4 2 5) /Road user/Pedestrian safety performance/Prerequisites of performance/Circumstances
( 4 2 6) /Road user/Pedestrian safety performance/Prerequisites of performance/Mobility
( 4 3) /Road user/Pedestrian safety performance/Mode of performance
( 4 3 1) /Road user/Pedestrian safety performance/Mode of performance/Opinions on safety and danger
( 4 3 2) /Road user/Pedestrian safety performance/Mode of performance/Learning
( 4 3 3) /Road user/Pedestrian safety performance/Mode of performance/Imperfection
( 4 3 4) /Road user/Pedestrian safety performance/Mode of performance/Traffic rules
( 4 3 4 1) /Road user/Pedestrian safety performance/Mode of performance/Traffic rules/Obeying
( 4 3 4 2) /Road user/Pedestrian safety performance/Mode of performance/Traffic rules/Disobeying
( 4 3 4 3) /Road user/Pedestrian safety performance/Mode of performance/Traffic rules/Surrendering
( 4 3 4 4) /Road user/Pedestrian safety performance/Mode of performance/Traffic rules/Keeping rights
( 4 3 5) /Road user/Pedestrian safety performance/Mode of performance/Common sense
( 4 3 6) /Road user/Pedestrian safety performance/Mode of performance/Foreseeability
( 4 3 7) /Road user/Pedestrian safety performance/Mode of performance/Carefulness - carelessness
( 4 3 8) /Road user/Pedestrian safety performance/Mode of performance/Patience
( 4 3 9) /Road user/Pedestrian safety performance/Mode of performance/Absent-mindedness
( 4 3 10) /Road user/Pedestrian safety performance/Mode of performance/Courtesy
( 4 3 11) /Road user/Pedestrian safety performance/Mode of performance/Calmness
( 4 3 12) /Road user/Pedestrian safety performance/Mode of performance/Risk-taking
( 4 3 13) /Road user/Pedestrian safety performance/Mode of performance/Tourism
( 4 3 14) /Road user/Pedestrian safety performance/Mode of performance/Driver training
( 4 3 15) /Road user/Pedestrian safety performance/Mode of performance/Reliance
( 4 3 16) /Road user/Pedestrian safety performance/Mode of performance/Harmful occurrence
( 4 4) /Road user/Pedestrian safety performance/Actual performance
( 4 4 1) /Road user/Pedestrian safety performance/Actual performance/Observing
( 4 4 2) /Road user/Pedestrian safety performance/Actual performance/Being visible
( 4 4 3) /Road user/Pedestrian safety performance/Actual performance/Traffic lights
( 4 4 4) /Road user/Pedestrian safety performance/Actual performance/Crossing
( 4 4 5) /Road user/Pedestrian safety performance/Actual performance/Co-operation
( 4 4 6) /Road user/Pedestrian safety performance/Actual performance/Hurrying
(3 3 4 5) /Training form/Education/Practising/Circumstances
(3 3 5) /Training form/Education/Teaching aids
(3 3 6) /Training form/Education/Test in training
(3 4) /Training form/Consequences
(3 4 1) /Training form/Consequences/Adoption
(3 4 2) /Training form/Consequences/Habit of driving
(3 4 3) /Training form/Consequences/Feeling
(3 4 4) /Training form/Consequences/Confusion
(3 4 5) /Training form/Consequences/Personal conflict
(3 4 6) /Training form/Consequences/Exam
(3 4 7) /Training form/Consequences/Extra training
(3 4 8) /Training form/Consequences/Harmful occurrence
(3 5) /Training form/Evaluation
(3 5 1) /Training form/Evaluation/Comparison
(3 5 2) /Training form/Evaluation/Self-assessments
(3 5 3) /Training form/Evaluation/Assessment of training
(3 5 4) /Training form/Evaluation/Imperfection
(3 5 5) /Training form/Evaluation/Competence of trainer
(3 5 7) /Training form/Evaluation/Evaluative driving
(3 6) /Training form/School
(3 6 1) /Training form/School/Selection S
(3 6 1 1) /Training form/School/Selection S/Professionalism
(3 6 1 2) /Training form/School/Selection S/Own school
(3 6 1 3) /Training form/School/Selection S/Friends
(3 6 2) /Training form/School/Consideration P
(3 6 2 1) /Training form/School/Consideration P/Human relations
(3 6 2 2) /Training form/School/Consideration P/Economic matters
(3 6 2 3) /Training form/School/Consideration P/Option on permission
(3 6 2 3 1) /Training form/School/Consideration P/Option on permission/No legal option
(3 6 2 3 2) /Training form/School/Consideration P/Option on permission/No practical option
(3 6 2 3 3) /Training form/School/Consideration P/Option on permission/Real option
(3 7) /Training form/Permission
(3 7 1) /Training form/Permission/Selection P
(3 7 1 1) /Training form/Permission/Selection P/Feasibility
(3 7 1 3) /Training form/Permission/Selection P/Human relations
(3 7 2) /Training form/Permission/Consideration S
(3 7 2 1) /Training form/Permission/Consideration S/Problems in school
(3 7 2 2) /Training form/Permission/Consideration S/Driving school facilities
(3 8) /Training form/Difference
(3 9) /Training form/Development
(4) /Rules
(4 1) /Rules/Measure
(4 1 1) /Rules/Measure/one
(4 1 2) /Rules/Measure/two
(4 1 3) /Rules/Measure/three
(4 1 4) /Rules/Measure/four
(4 1 5) /Rules/Measure/five
(4 1 6) /Rules/Measure/six
(4 1 7) /Rules/Measure/seven
(4 1 8) /Rules/Measure/eight
(4 1 9) /Rules/Measure/nine
(4 2) /Rules/Following rules
(4 2 1) /Rules/Following rules/Violations
(4 2 1 1) /Rules/Following rules/Violations/Velocity (violations)
(4 2 1 2) /Rules/Following rules/Violations/Rest of violations
(4 2 2) /Rules/Following rules/Relative obedience
(4 2 3) /Rules/Following rules/Imperfection
(4 2 4) /Rules/Following rules/Pretence
(4 2 5) /Rules/Following rules/Risk-taking
(4 2 6) /Rules/Following rules/Safe acts
(4 2 7) /Rules/Following rules/Confusion
(4 2 8) /Rules/Following rules/Uncertainty
(4 2 9) /Rules/Following rules/Keeping licence
(4 3) /Rules/Need for rules
(4 3 1) /Rules/Need for rules/Safety
(4 3 2) /Rules/Need for rules/Avoiding damage
(4 3 3) /Rules/Need for rules/Order
(4 3 4) /Rules/Need for rules/Confidence
(4 3 5) /Rules/Need for rules/Needless rules
(4 4) /Rules/Significance of signs
(4 4 1) /Rules/Significance of signs/Danger warning signs
(4 4 2) /Rules/Significance of signs/Regulating priority
(4 4 3) /Rules/Significance of signs/Prohibitory or restrictive signs
(4 4 4) /Rules/Significance of signs/Mandatory signs
(4 4 5) /Rules/Significance of signs/Special regulation signs
Passenger/Fear

Objects of fear

Reasons for alarming event

Deficiency in performance

Driving habits

Rules

Unfastened seat belts

Testing passengers

Unfastered seat belts

Deficiency in performance

Slipperiness

Driving habits

Driving habits

Property loss

Driving habits

Driving habits

Property loss

Driving habits

Property loss

Driving habits

Property loss

Driving habits

Not controlling
difficulty

Blocking

Copying a good driver

Instrument

Rules

Unfastened seat belts

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.

Recklessness

Testing passengers

Recklessness

Overtaking vehicle and situations.
(6 1 3 2 3) /Passenger/Fear/Responses/Objective responses/Helping driver
(6 1 3 3) /Passenger/Fear/Responses/Effect of response
(6 2) /Passenger/Relaxation
(6 2 1) /Passenger/Relaxation/Objects of relaxing driving
(6 2 1 1) /Passenger/Relaxation/Objects of relaxing driving/Consciousness
(6 2 1 1 15) /Passenger/Relaxation/Objects of relaxing driving/Consciousness/Feeling of mastering a vehicle
(6 2 1 2) /Passenger/Relaxation/Objects of relaxing driving/Driving habits
(6 2 1 2 1) /Passenger/Relaxation/Objects of relaxing driving/Driving habits/O.K. with driving
(6 2 1 2 3) /Passenger/Relaxation/Objects of relaxing driving/Driving habits/Considerate driving
(6 2 1 2 4) /Passenger/Relaxation/Objects of relaxing driving/Driving habits/Secure driving
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(6 2 1 2 7) /Passenger/Relaxation/Objects of relaxing driving/Driving habits/Driving habits/Normal driving
(6 2 1 2 10) /Passenger/Relaxation/Objects of relaxing driving/Driving habits/Good driving
(6 2 1 11) /Passenger/Relaxation/Objects of relaxing driving/Driving habits/Regular driving
(6 2 1 12) /Passenger/Relaxation/Objects of relaxing driving/Driving habits/Fluent driving
(6 2 1 3) /Passenger/Relaxation/Objects of relaxing driving/Absence of alarming entities
(6 2 1 3 2) /Passenger/Relaxation/Objects of relaxing driving/Absence of alarming entities/Lack of tension
(6 2 1 3 4) /Passenger/Relaxation/Objects of relaxing driving/Absence of alarming entities/Non-reckless driving
(6 2 1 3 6) /Passenger/Relaxation/Objects of relaxing driving/Absence of alarming entities/Lack of playing
(6 2 1 4) /Passenger/Relaxation/Objects of relaxing driving/Relaxing occurrence
(6 2 1 4 2) /Passenger/Relaxation/Objects of relaxing driving/Relaxing occurrence/Sleeping
(6 2 1 4 3) /Passenger/Relaxation/Objects of relaxing driving/Relaxing occurrence/Reading
(6 2 1 4 4) /Passenger/Relaxation/Objects of relaxing driving/Relaxing occurrence/Listening
(6 2 1 4 5) /Passenger/Relaxation/Objects of relaxing driving/Relaxing occurrence/Sitting
(6 2 1 4 6) /Passenger/Relaxation/Objects of relaxing driving/Relaxing occurrence/Chatting
(6 2 2) /Passenger/Relaxation/Kind of relaxing driving
(6 2 2 1) /Passenger/Relaxation/Kind of relaxing driving/Driver
(6 2 2 1 1) /Passenger/Relaxation/Kind of relaxing driving/Driver/Known driver
(6 2 2 1 1 4) /Passenger/Relaxation/Kind of relaxing driving/Driver/Known driver/Peer drives
(6 2 2 1 1 5) /Passenger/Relaxation/Kind of relaxing driving/Driver/Known driver/Family drives
(6 2 2 1 1 5 1) /Passenger/Relaxation/Kind of relaxing driving/Driver/Known driver/Family drives/Father drives
(6 2 2 1 1 5 2) /Passenger/Relaxation/Kind of relaxing driving/Driver/Known driver/Family drives/Sister drivers
(6 2 2 1 1 5 3) /Passenger/Relaxation/Kind of relaxing driving/Driver/Known driver/Family drives/Uncle drives
(6 2 2 1 1 12) /Passenger/Relaxation/Kind of relaxing driving/Driver/Unknown driver
(6 2 2 1 1 12 1) /Passenger/Relaxation/Kind of relaxing driving/Driver/Unknown driver/Girl drives
(6 2 2 1 1 2) /Passenger/Relaxation/Kind of relaxing driving/Driver/Unknown driver/Occupational driver
(6 2 2 1 1 2 9) /Passenger/Relaxation/Kind of relaxing driving/Driver/Unknown driver/Occupational driver/Bus drivers
(6 2 2 1 1 2 9 16) /Passenger/Relaxation/Kind of relaxing driving/Driver/Unknown driver/Occupational driver/Truck driver
(6 2 2 1 1 2 9 23) /Passenger/Relaxation/Kind of relaxing driving/Driver/Unknown driver/Occupational driver/Truck driver
(6 2 2 1 3) /Passenger/Relaxation/Kind of relaxing driving/Driver/"Licence"
(6 2 2 1 3 7) /Passenger/Relaxation/Kind of relaxing driving/Driver/"Licence"/"New licence"
(6 2 2 1 3 8) /Passenger/Relaxation/Kind of relaxing driving/Driver/"Licence"/"Old licence"
(6 2 2 1 3 9 3) /Passenger/Relaxation/Kind of relaxing driving/Driver/"Licence"/"Older licence"/Much driving
(6 2 2 1 2 14) /Passenger/Relaxation/Kind of relaxing driving/Driver/Personality of driver
(6 2 2 6) /Passenger/Relaxation/Kind of relaxing driving/Circumstances
(6 2 2 12) /Passenger/Relaxation/Kind of relaxing driving/Highway
(6 2 2 18) /Passenger/Relaxation/Kind of relaxing driving/Vehicle
(6 2 3) /Passenger/Relaxation/Responses
(6 2 3 1) /Passenger/Relaxation/Responses/No effect
(6 2 3 3) /Passenger/Relaxation/Responses/Objective effects
(6 2 3 4) /Passenger/Relaxation/Responses/Reliance
(6 2 3 4 13) /Passenger/Relaxation/Responses/Reliance/Driving style
(6 2 3 5) /Passenger/Relaxation/Responses/Observing traffic
(6 2 3 6) /Passenger/Relaxation/Responses/Belts
(6 3) /Passenger/Own passengers
(6 3 1) /Passenger/Own passengers/Reliance
(6 3 2) /Passenger/Own passengers/No negative feedback
(6 3 3) /Passenger/Own passengers/Satisfied
(6 3 4) /Passenger/Own passengers/Success
(6 3 5) /Passenger/Own passengers/Fear
(6 3 6) /Passenger/Own passengers/Comparison
(6 3 7) /Passenger/Own passengers/Adaptation
(6 3 9) /Passenger/Own passengers/Influence
(6 3 10) /Passenger/Own passengers/Adaptation
(6 3 11) /Passenger/Own passengers/No nervousness
(6 3 12) /Passenger/Own passengers/Passengers
(7) /Photo
(7 1) /Photo/Action
(7 1 1) /Photo/Action/Habit of action
(7 1 2) /Photo/Action/Traffic arrangement
(7 2) /Photo/Assessment of situation
(7 2 1) /Photo/Assessment of situation/Order
Appendix 13.

Frequencies of complete safety

<table>
<thead>
<tr>
<th>Complete safety</th>
<th>Conceivers (in primary categories)</th>
<th>Cases (text units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young males</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>0.1. I change.</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>0.2. I am alone in traffic.</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>0.3. The actions of people change.</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>0.4. People obey rules.</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>0.5. The system changes.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>0.6. Circumstances change.</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>0.7. Vehicles change.</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>13</td>
</tr>
</tbody>
</table>

All interviewees
Appendix 14.

The frequencies of the argument conceptions of safety

<table>
<thead>
<tr>
<th>Categories of description</th>
<th>Conceivers (in primary categories)</th>
<th>Cases (text units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young males</td>
<td>S P Total</td>
<td></td>
</tr>
<tr>
<td>1.2. No safety ever</td>
<td>3 1 4</td>
<td>S 01:61, 05:57, 06:63; P 09:75</td>
</tr>
<tr>
<td>1.3. Chance and traffic</td>
<td>2 5 7</td>
<td>S 05:57, 07:60; P 01:54, 01:57, 02:62, 02:68, 03:46, 03:51, 04:47, 06:55</td>
</tr>
<tr>
<td>1.4. Imagination</td>
<td>2 1 3</td>
<td>S 04:86, 08:56; P 02:47, 02:59, 02:68</td>
</tr>
<tr>
<td>1.4.1. I am alone on the roads.</td>
<td>2 2 4</td>
<td>S02:65, 04:70; P 07:72, 08:95</td>
</tr>
<tr>
<td>1.5. Knowledge of safety</td>
<td>2 4 6</td>
<td>S 04:96, 04:101, 05:57; P 01:54, 03:47, 08:91, 10:64, 10:73</td>
</tr>
<tr>
<td>1.5.1. Lacking safety knowledge</td>
<td>3 2 5</td>
<td>S 04:95, 04:101, 09:89, 10:68; P 04:61, 09:79</td>
</tr>
<tr>
<td>1.5.2. Acquiring safety knowledge</td>
<td>3 6 9</td>
<td>S 02:80, 02:80, 04:11, 04:85, 04:95, 04:96, 04:101, 06:71; P 02:62, 03:47, 04:7, 04:47, 04:61, 07:72, 09:78, 09:79, 09:83, 10:69</td>
</tr>
<tr>
<td>1.5.3. Applying safety knowledge</td>
<td>5 2 7</td>
<td>S 02:79, 06:54, 06:54, 07:60, 10:74, 10:50, 11:82; P 01:57, 10:56</td>
</tr>
<tr>
<td>1.6. The need for road rules (elicited)</td>
<td>3 5 8</td>
<td>S 01:53, 10:49, 11:68; P 02:47, 04:46, 06:53, 06:63, 08:84, 09:65</td>
</tr>
<tr>
<td>1.6.1. Safety as the need for or the purpose of the rules</td>
<td>3 3 6</td>
<td>S 01:53, 10:49, 11:68; P 02:47, 03:37, 06:53</td>
</tr>
<tr>
<td>1.6.2. Courtesy, order and fluency as need for the rules</td>
<td>5 3 8</td>
<td>S 02:93, 04:95, 06:71, 06:72, 09:89, 10:61; P 01:57, 02:68, 07:93</td>
</tr>
<tr>
<td>Total</td>
<td>35 39 74</td>
<td>All interviewees but P11</td>
</tr>
</tbody>
</table>
Appendix 15.

The frequencies of the performance conceptions of safety

<table>
<thead>
<tr>
<th>Categories of description</th>
<th>Conceivers (in primary categories)</th>
<th>Cases (text units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young males</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>2.1. General human safety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.1. Number of road users</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>S 02:79, 04:85, 08:61;</td>
<td>P 01:50, 02:62, 02:65, 04:48, 11:65</td>
</tr>
<tr>
<td>2.1.2. Co-operation and interaction</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>S 06:71, 09:85, 09:88, 10:61</td>
<td>P 02:68, 03:46, 09:83, 10:69</td>
</tr>
<tr>
<td>2.1.3. Confidence in traffic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.3.1 Others obey the rules or do not.</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>2.1.3.2. The rules guarantee safety. (elicited)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>S 03:62, 05:67, 01:37, 05:43, 11:48</td>
<td>P 01:37, 11:71</td>
</tr>
<tr>
<td>2.1.3.3. The rules do not guarantee safety. (elicited)</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>S 01:53, 01:68, 02:85, 04:89, 04:70, 05:43, 06:54, 07:60, 08:46, 10:50;</td>
<td>P 03:37, 04:48, 05:55, 07:72, 08:76, 09:66, 10:56</td>
</tr>
<tr>
<td>2.2. My safety habits as a driver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.1. My general safety mode</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>S 02:80, 07:78, 09:85, 09:88;</td>
<td>P 03:47, 05:53, 08:95, 10:68, 10:69</td>
</tr>
<tr>
<td>2.2.2. My specific safety strategies</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>S 02:83, 04:85, 08:59, 08:61, 10:68;</td>
<td>P 01:54, 02:62, 08:86, 08:89, 09:78, 09:79</td>
</tr>
<tr>
<td>2.2.3. Drunk driving</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>S 11:82;</td>
<td>P 02:62</td>
</tr>
<tr>
<td>2.2.4. Me and the traffic rules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.4.1. I obey the rules.</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>S 02:79, 02:87, 07:78 11:82;</td>
<td>P 02:62, 03:47, 04:63, 09:78</td>
</tr>
<tr>
<td>2.2.4.2. I disobey the rules.</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>S 06:54, 07:60;</td>
<td>P 02:62, 04:48, 07:72</td>
</tr>
<tr>
<td>2.2.4.3. I waive my rights.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>S 02:85;</td>
<td>P 08:76, 09:11, 09:83</td>
</tr>
<tr>
<td>2.3. My safety as a pedestrian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3.1. My general self-assessment as a pedestrian</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>S 04:11;</td>
<td>P 04:7, 05:8, 08:16, 09:11</td>
</tr>
<tr>
<td>2.3.2. My pedestrian safety from driving experience</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>S 02:6, 07:10;</td>
<td>P 04:7</td>
</tr>
<tr>
<td>2.3.3. I cross roads as a pedestrian.</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>S 02:6, 03:10, 04:11, 04:11, 04:11;</td>
<td>P 04:7, 05:8, 09:11, 09:12, 09:13</td>
</tr>
<tr>
<td>2.3.4. I perceive traffic as a pedestrian.</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>S 02:6, 02:7, 03:10</td>
<td></td>
</tr>
<tr>
<td>2.3.5. My physical condition as a pedestrian</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>S 02:7, 03:10</td>
<td></td>
</tr>
<tr>
<td>2.3.6. I obey the rules as a pedestrian.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>S 03:10</td>
<td></td>
</tr>
<tr>
<td>2.4. Roads, weather, and safety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.1. The road, its parts and state, including traffic lights</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>S 02:79, 02:87, 02:87, 03:62, 04:95, 04:111, 06:63, 08:56, 10:74, 10:74;</td>
<td>P 01:57, 03:51, 09:79, 09:83</td>
</tr>
<tr>
<td>2.4.2. Road signs</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>S 01:56, 11:71;</td>
<td>P 06:59, 08:80</td>
</tr>
<tr>
<td>2.4.3. Routes</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>S 04:96, 06:81, 10:68</td>
<td></td>
</tr>
<tr>
<td>2.4.4. Weather</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>P 01:50, 03:51</td>
<td></td>
</tr>
<tr>
<td>2.5. The car and safety (elicited)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5.1. Car maintenance</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>S 02:93;</td>
<td>P 02:64</td>
</tr>
<tr>
<td>2.5.2. Car safety features</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>S 01:53, 01:84, 02:116, 02:116; 07:108;</td>
<td>P 02:64, 04:90, 06:88</td>
</tr>
<tr>
<td>2.5.3. Imaginary driving safety habits</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>S 01:84, 01:85, 04:177, 05:67, 06:90, 07:108, 08:79, 08:81, 11:114;</td>
<td>P 04:88, 09:105, 11:83</td>
</tr>
<tr>
<td>2.5.4. Liking for car and safety</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
|                           | S 05:67, 05:67, 10:96;
<table>
<thead>
<tr>
<th>Section</th>
<th>N</th>
<th>Y</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5.5. The attractions of the cars</td>
<td>2</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>2.5.6. General safety properties of the car</td>
<td>7</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>2.5.7. No safety difference between the model cars</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>2.6. Unexpected traffic</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2.6.1. Unpredictable incidents in traffic</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.6.2. Animals are unsafe for road users.</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>90</td>
<td>85</td>
<td>175</td>
</tr>
</tbody>
</table>

All interviewees
Appendix 16.

Frequencies of *chance* as an argument conception among male interviewees

<table>
<thead>
<tr>
<th>1. Argument safety category (Young males)</th>
<th>Conceivers (in primary categories)</th>
<th>Cases (text unit addresses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3. <em>Chance</em> and traffic</td>
<td>S 5, P 7</td>
<td>S 05:57, 07:30; P 01:54, 01:57, 02:62, 02:68, 03:46, 03:51, 04:47, 06:55</td>
</tr>
<tr>
<td>Total</td>
<td>2 5 7</td>
<td>Two S’s and five P’s</td>
</tr>
</tbody>
</table>
Appendix 17.

Male chance frequencies “independent of human will”

<table>
<thead>
<tr>
<th>3.Joint category “chance independent of human will” (Young males) (Elicited)</th>
<th>Conceivers (in primary categories)</th>
<th>Cases (text unit addresses)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>3.1. Negative categories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.1. Rather a negative category</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.1.2. Ambivalently negative category</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3.2. Positive categories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2.2. Human factor</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>- Artefacts</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>- Human behaviour</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3.2.3. Chance and danger “Traffic is dangerous.”</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>22</td>
</tr>
</tbody>
</table>
### Appendix 18.

**Female chance frequencies “independent of human will”**

<table>
<thead>
<tr>
<th>3. Joint category “chance independent of human will” (Young females) (Elicited)</th>
<th>Conceivers S</th>
<th>P</th>
<th>Total</th>
<th>Cases (text unit addresses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3. Human shortcomings in traffic 3.3.1. Traffic always involves the possibility of a harmful incident.</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>PL1:107; PL1:108; PL1:109; PL2:97; PL3:59; SL1:64, SL2:69</td>
</tr>
<tr>
<td>3.3.2. Traffic involves chance.</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>PL1:107; PL2:97; PL3:59; SL1:64, SL2:69</td>
</tr>
<tr>
<td>3.5. Examples of chance 3.5.1. Attack of illness</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>PL1:108; SL1:64</td>
</tr>
<tr>
<td>3.5.2. Animals as chance</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>PL3:56; SL1:64</td>
</tr>
<tr>
<td>3.5.3. Slippery roads as chance</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>PL1:107; SL1:64, SL2:69</td>
</tr>
<tr>
<td>3.5.4. Human factors as chance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>PL1:107; PL2:97; SL2:69</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>13</td>
<td>24</td>
<td>Every interview included in examination</td>
</tr>
</tbody>
</table>
Appendix 19.

Overall young male *chance* frequencies

<table>
<thead>
<tr>
<th>4. Overall categories of <em>chance</em> (Young males) (Spontaneous)</th>
<th>Conceivers (in primary categories)</th>
<th>Cases (text unit addresses)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>4.1. Education and <em>chance</em></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4.2. Social adequacy and <em>chance</em></td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4.3. <em>Chance</em> and insurmountable obstacles</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>4.4. The notional dynamic of <em>chance</em> and its avoidance</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
| Total                                                        | 7 | 12| 19                   | Twelve interviewees  
Five S’s (S01, 02, 04, 08, 09); Seven P’s (P01, 02, 03, 04, 05, 06, 10) |
Appendix 20.

Overall young female *chance* frequencies

<table>
<thead>
<tr>
<th>4. Overall categories of chance (Young females)</th>
<th>Conceivers</th>
<th>Cases (text unit addresses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Spontaneous)</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>4.5. Human shortcomings in traffic</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4.5.1. Traffic always involves the possibility of a harmful incident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5.2. Traffic involves <em>chance</em></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4.6. <em>Chance</em> and countermeasures</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.7. Examples of <em>chance</em></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4.7.1. Slippery roads as <em>chance</em></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.7.2. Human factors as <em>chance</em></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>10</td>
</tr>
</tbody>
</table>

Every interview included in analysis
Appendix 21.

Overall chance frequencies among master-driver interviewees

<table>
<thead>
<tr>
<th>Overall chance frequencies among master-driver interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Overall categories of chance (Masters) (Spontaneous)</td>
</tr>
<tr>
<td>Conceivers</td>
</tr>
<tr>
<td>Cases (text unit addresses)</td>
</tr>
<tr>
<td>4.8. Human shortcomings in traffic</td>
</tr>
<tr>
<td>4.8.1. Traffic always involves the possibility of a harmful incident</td>
</tr>
<tr>
<td>Conceivers</td>
</tr>
<tr>
<td>Cases (text unit addresses)</td>
</tr>
<tr>
<td>4.8.2. Traffic involves chance</td>
</tr>
<tr>
<td>4.9. Chance and countermeasures</td>
</tr>
<tr>
<td>4.9.1. Chance and the lower nervous system in countermeasures</td>
</tr>
<tr>
<td>4.9.2. Common sense in countermeasures</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conceivers</th>
<th>Cases (text unit addresses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.8. Human shortcomings in traffic</td>
<td></td>
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<tr>
<td>4.8.2. Traffic involves chance</td>
<td></td>
</tr>
<tr>
<td>4.9.1. Chance and the lower nervous system in countermeasures</td>
<td></td>
</tr>
<tr>
<td>4 M1:44, M2:13, M3:39, M4:22</td>
<td></td>
</tr>
<tr>
<td>4.9.2. Common sense in countermeasures</td>
<td></td>
</tr>
<tr>
<td>1 M2:13, M2:27</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>12 text units of M1, M2, M3 and M4</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 22.

### Reliability techniques

<table>
<thead>
<tr>
<th>Research phase</th>
<th>Improvement of reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>The preliminary work</td>
<td>* Explication of the difficulties of the research problem.</td>
</tr>
<tr>
<td>* Literature surveys</td>
<td>* Outline of the research tasks.</td>
</tr>
<tr>
<td>* Analysis of the legal system</td>
<td>* Design of the methodological approach.</td>
</tr>
<tr>
<td>* Analysis of the performance in the driving exam</td>
<td>* The basis of different kinds of data</td>
</tr>
<tr>
<td>* Analysis of expert opinion of a driver’s career</td>
<td>* Acquisition of a good perspective.</td>
</tr>
<tr>
<td>Method</td>
<td>* The qualitative approach was conducive to research into safety and driver training.</td>
</tr>
<tr>
<td>* Modified phenomenographic data acquisition and analysis subsumed into systematic analysis</td>
<td>* The conceptions were appropriate to revealing human mental resources.</td>
</tr>
<tr>
<td>* Data acquisition covered more than the problem area (Performance in traffic vs. traffic safety and driver training)</td>
<td>* Two complementary qualitative approaches, systematic analysis and phenomenography, were applied.</td>
</tr>
<tr>
<td>* Phenomenography was extremely appropriate to the analysis of concepts and interviews.</td>
<td>* Systematic analysis outlined and controlled.</td>
</tr>
<tr>
<td>Data acquisition</td>
<td>* The influence of the interview interaction was recognised.</td>
</tr>
<tr>
<td>* Modified phenomenographic data acquisition applying principles of brief therapy</td>
<td>* The concepts of traffic safety and driver training could emerge free of overly narrow boundaries.</td>
</tr>
<tr>
<td>* Data acquisition covered more than the problem area (Performance in traffic vs. traffic safety and driver training)</td>
<td></td>
</tr>
<tr>
<td>Interviewing</td>
<td>* The sample was considerable, including the subsamples for comparison.</td>
</tr>
<tr>
<td>* The interviewees were genuine cases.</td>
<td></td>
</tr>
<tr>
<td>Researcher-interviewer</td>
<td>* The author is proficient in traffic safety and education.</td>
</tr>
<tr>
<td>* He has completed a professional writing course, and is an experienced writer and reviewer.</td>
<td>* He stressed familiarisation with the research tasks and data throughout the research.</td>
</tr>
<tr>
<td>* The long research period was conducive to creativity.</td>
<td></td>
</tr>
<tr>
<td>Interview themes</td>
<td>* The themes entailed a naturally structured discussion.</td>
</tr>
<tr>
<td>* The themes included the interest of the research and enabled free responses from the interviewees.</td>
<td>* The interviewees’ status changed between pedestrian, driver, passenger, road user, and citizen.</td>
</tr>
<tr>
<td>Questions</td>
<td>* Different kinds of question were used, e.g. functional and projective, to inspire and enable responses. Shay young people were particularly encouraged.</td>
</tr>
<tr>
<td>* There were parallel but different kinds of question, e.g. the scale questions, to improve understanding and fidelity.</td>
<td>* Traffic safety conceptions in particular could be brought out by the interview theme 5, after a particular conjectural question, and more generally.</td>
</tr>
<tr>
<td>Summarising the interviews</td>
<td>* Summarising the interviews improved understanding; for instance, by familiarisation, precision, checking by the interviewee, and making the continued analysis easier.</td>
</tr>
<tr>
<td>Indexing the interviews</td>
<td>* The qualitative data software enabled extensive and precise preparation for analysis of the conceptions.</td>
</tr>
<tr>
<td>* The 22 core interviews were completely indexed to achieve familiarisation with the variation in the evidence and to make preliminary findings.</td>
<td>* The principles of phenomenography were observed.</td>
</tr>
<tr>
<td>Analysing</td>
<td>* Systematic analysis particularly helped to control phenomenography, to find incongruities, i.e. the conceptional restriction to “the outer world”, and the chance conceptions.</td>
</tr>
</tbody>
</table>