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### D 5.4

## Social and Cultural Factors

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#### Abstract:

The present methodological report introduces a prospective analysis scheme which is aimed at visualizing socio-cultural dimensions impacting the individual accident causation behavior.

On the background of different scientific concepts, coming from accidentological research as well as social sciences, the analysis scheme developed aims to enhance accident causation research sensitivity to socio-cultural impacts on accident production.

A “social spheres analysis scheme” is designed to permit the location of those accident causation variables which are situated at the outside of the individual.

This “social spheres analysis scheme” stands for a contribution to further comparative analysis in the European Community framework on road safety research. A mid/long term integration of a more systemic view on societal factors impacting road safety, can contribute to define predictors for upcoming prevention strategies in the framework of European road safety governance.

**Keyword list:** Social context, Environment, Cultural Differences, Social Role, Road Traffic Sociology, Habitus, Human Behaviour, Social Representation, Social Acceptability, Social Spheres Analysis Scheme, Social Identity Card

## Table of contents

<b>1</b>	<b><i>Executive Summary</i></b>	<b>4</b>
	TRACE project: TRAffic Accident Causation in Europe	4
	WP5 "Human Factors"	4
	"Social and cultural Human Factors": summary of TRACE report D5.4	5
<b>2</b>	<b><i>Introduction</i></b>	<b>6</b>
2.1	TRACE project: TRAffic Accident Causation in Europe	6
2.2	WP5 'Human Factors'	6
2.3	Interaction with other Work Packages inside the TRACE framework	8
<b>3</b>	<b><i>Accident causation in a Social Sciences perspective: individual beings in their social context</i></b>	<b>9</b>
<b>4</b>	<b><i>Academic accident causation research focusing on social context information</i></b>	<b>12</b>
4.1	Review of sociological and social psychological related literature	12
4.1.1	Why privileging sociological or social psychological related approaches?	12
4.1.2	Is there a specific field of Road Safety Sociology?	13
4.1.3	The influence of Socio-cultural variables - Durkheim as a precursor of modern accident causation analysis	14
4.1.4	The definition of "variables intervenantes" contributes to define Predictors for accident causation	14
4.1.5	Specific accident causation related publications	15
4.1.6	Membership to a specific ethnic group, cross cultural differences in driving behaviour and foreign drivers	15
4.1.7	Socio demographic factors, Risk profiles or risk groups; Age groups as risk groups (young drivers, old drivers),	16
4.1.8	Accidents under the influence of Alcohol ("drink driving")	18
4.1.9	Conclusions of the bibliographic overview, discussion and tie-in with the notion of "upstream factors"	20
4.1.10	Discussion and further proceedings	21
<b>5</b>	<b><i>Upstream factors for accident causation: an approach via the notion of social spheres</i></b>	<b>22</b>
5.1	The individual sphere	22
5.2	The social Environment: the road as a social space in the framework of accident causation analysis	23
5.3	The multilayer spheres of sociological dimensions	25
5.3.1	The formal norm (law)	27
5.3.2	Informal norms - usage, customs - conventions - subjective norm	28
5.3.3	Legal driving behaviour versus social driving behaviour	28
5.3.4	The societal value of risk taking	29

5.3.5	Cultural and ethnic dimensions; membership to an ethnic group or specific cultural group	30
5.3.6	Reference group, Peer group effects and subcultures	31
5.3.7	Socio demographic factors	32
5.3.8	Social Identity	34
<b>6</b>	<b><i>The “social spheres analysis scheme “</i></b>	<b>36</b>
6.1	The social and cultural upstream factors: overview	36
6.2	Application of the “social spheres analysis scheme” on accident causation analysis	37
6.2.1	Feasibility testing of the social spheres analysis scheme in the framework of existing in-depth accident investigation databases	37
<b>7</b>	<b><i>Conclusions and recommendations</i></b>	<b>43</b>
	<b><i>Bibliography</i></b>	<b>44</b>

# 1 Executive Summary

## TRACE project: TRaffic Accident Causation in Europe

In spite of countless amounts of research and development, road safety is still one of the main societal concerns today. It is not only a matter of concern for the European Commission and National Governments but also for the vehicle industry, insurance companies, driving schools, non-governmental organisations and more generally for every single road user. Car manufacturers have made strong efforts and have dramatically improved passive (and also active) safety of their vehicle for the past 15 years. However, current road safety research has shown that an asymptote is about to be reached on this aspect in most countries and many experts agree that preventive (prevention of accidents) and active safety (recovery of an emergency situation) should now, particularly, be brought forward.

The TRACE project has 2 major objectives:

The first one addresses the determination and the continuous up-dating of the etiology (i.e. analysis of the causes) of road accidents and injuries, and the definition of the real needs of the road users as they are deduced from accident and driver behaviour analyses.

The second one aims at identifying and assessing, among possible technology-based safety functions, the most promising solutions that can assist the driver or any other road users in a normal road situation or in an emergency situation.

So the purpose is first to bring a comprehensive and understandable definition of accident causation which goes further and deeper than the usual statements. It is also to provide the scientific community, the stakeholders, the suppliers, the vehicle industry and the other Integrated Safety program participants with a global overview of the road accident causation issues in Europe and promising solutions based on technology.

## WP5 "Human Factors"

In order to gain new knowledge on accident causation, several Methodological Work Packages (WP) have been defined in the structure of TRACE in order to give a support to the analyses conducted into the Operational Work Packages of the project.

As such, WP5 "Human Factors" has been defined to improve the multidisciplinary methodologies that allow the analysis of the role of "human factors" in road accident production. In brief, WP5 is oriented toward the diagnosis of the difficulties met by road users which lead them to an accident, toward the identification of the contexts in which they take place, and toward the definition of the origins of these difficulties whether they are human in nature otherwise.

The methods aim to standardise accident analysis in order to bring validated and comparable results from one study to the other, without loosing the scientific and academic background required for a comprehensive research work.

Four tasks compose this Work Package. The first three are oriented toward the elaboration of an operational model permitting a comprehensive analysis and classification of "human error" generating processes. The fourth one is devoted to a further and wider view on the influence of the social and societal context on accident occurrence.

### - Task 5.1 A model for human functional failure analysis

The objective of this task is to define and characterize the different types of human errors, violations and difficulties which are involved in the accident generating process. Such modelling work is based both on scientific literature dealing with human error analysis, and on truly in-depth accident data. The purpose is to build an operational grid for human functional failures, consistent with ergonomics concepts and specifically adapted to the driving task.

- Task 5.2 A comprehensive grid of factors and situations for human functional failure

Human failures are explained by factors characterizing the state of system, i.e. the defects of its components (human and other) and of their interactions. These factors are then considered as the explanatory elements of the road users' incapacity to adapt to the situation in hand. A grid of all the relevant elements contributing to human failures has been compiled, and differentiates those factors coming from the "human" part of the system, from those coming from the layout, the traffic interaction and the vehicle.

- Task 5.3 Typical failure-generating scenarios

The purpose of this third task is to combine the results from T5.1 and T5.2 in order to build a methodological frame allowing the aggregation of accident data under the form of generic accidental processes, viewed as an integration of the parameters characterizing the accident generation: which situation and context, which human failure, which explicative elements, which consequence, etc. They will allow putting forward the typical specificities of the difficulties encounters by different types of road users, in different types of situations.

- Task 5.4 Social and cultural aspects of human factors

The purpose of this task is more prospective. It is to analyze the socio-economic/socio-cultural dimension of human activity, its interaction with the driving system, to build a framework of analysis aimed at completing the accident analysis framework proposed in T5.3 by putting forward broader "upstream" factors of its production process.

**"Social and cultural Human Factors": summary of TRACE report D5.4**

The overall Work Package 5 of TRACE project focuses on methodologies for the analysis of the human factor in accident causation. The Task 5.4 of this WP was intended to enlarge the notion of human factors from individual centred approaches towards an integration of societal impacts on the accident causation process. To achieve this, the present report is oriented toward the following objectives:

- Present a systemic view on human factors in accident causation with a social sciences focus.
- Examine the individual being inside his social and cultural context, and so show the impacts of socio-cultural context variables on accident causation.
- Do a bibliographical analysis on selected literature which focuses on social sciences approaches with a benefit for accident causation research.
- Present several concepts aimed to be integrated in a complementary analysis tool, supposed to improve the "human factor" analysis in accident causation research.
- Create an analysis scheme that takes social context information into account and give suggestions for its practical application in further accident causation research.
- Finally, define Predictors regarding socio-cultural accident causation factors.

## 2 Introduction

TRACE project has the objective to promote a comprehensive view of accident causation in order to find the most promising solution able to help road users to perform their task securely.

In line with this objective, Work Package 5 is dedicated to a transversal work aimed at providing operational models and methodological support to the other Work Packages of TRACE, concerning 'human factors' aspects involved in road accidents.

The purpose of Task 5.3 is to combine the results from T5.1 devoted to human functional failures and T5.2 dedicated to the factors and situations of these failures, in order to build a methodological frame allowing the aggregation of accident data under the form of generic accidental processes.

As part of this task, the present report investigates in-depth accident data taking advantage of the methodological input of TRACE deliverables D5.1 (Van Elslande & Fouquet, 2007) and D5.2 (Naing, Bayer, Van Elslande, Fouquet, 2007) in order to build operational 'Typical Failure-Generating Scenarios' (TFGS) showing the inscription of human functional failures in the context of their production.

### 2.1 TRACE project: TRaffic Accident Causation in Europe

In spite of countless amounts of research and development, road safety is still one of the main societal concerns today. It is not only a matter of concern for the European Commission and National Governments but also for the vehicle industry, insurance companies, driving schools, non-governmental organisations and more generally for every single road user. Car manufacturers have made strong efforts and have dramatically improved passive (and also active) safety of their vehicle for the past 15 years. However, current road safety research has shown that an asymptote is about to be reached on this aspect in most countries and many experts agree that preventive (prevention of accidents) and active safety (recovery of an emergency situation) should now, particularly, be brought forward.

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The purpose of this third task is to combine the results from T5.1 and T5.2 in order to build a methodological frame allowing the aggregation of accident data under the form of generic accidental processes, viewed as an integration of the parameters characterizing the accident generation: which situation and context, which human failure, which explicative elements, which consequence, etc. They will allow putting forward the typical specificities of the difficulties encounters by different types of road users, in different types of situations.

- Task 5.4: Social and cultural aspects of human factors

The purpose of this task is prospective; its objective is to enlarge the view on the influence of the social and societal context on accident occurrence. Via an analysis of the socio-economic/socio-cultural dimensions of human activity and their interactions with the driving system, the present task aims to construct a framework of analysis which will complete the accident analysis framework proposed in Task 5.3.

On the background of individual-orientated "human error" approaches (as presented in TRACE deliverable D5.1), the objective of the present report is the integration of concepts which focus on social dimensions impacting individual action. These social dimensions are located outside the individual sphere and subject to analytical approaches which come from fields such as Sociology, Social Psychology or Ethnology.

The scientific approaches of those disciplines have in common, that their subject - the human being - is examined under a multidimensional perspective from the outside of the individual sphere. Consequently, the central interest of these approaches is not focussed on the individuals' singular behaviour, but merely places the interaction of several individuals inside a specific social and cultural context at the centre of their research, by establishing a systemic perspective.

"Soft" factors, such as culture, social status or membership to specific social groups, to give some examples, have an identifiable influence on individual behaviour. One way to understand road accidents is to approach it as something produced by individuals, interacting in a given social space - these individuals are not neutral, they are product of their specific history, in their specific cultural context and they are acting on behalf of their multiple social roles. Also, people are not neutral before

the accident happens; they live their lives and exist in their specific social network and diversified social contexts. Consequently, to dispose of some information regarding this “life” background and to have a framework for its interpretation should present an advantage in the analysis of the accidents production.

The integration of such socio-cultural variables in -for example- human error analysis increases the predictability of human interaction regarding accident causation.

The objective of the present work therefore lies in a proposal of analyzing techniques which is aimed at contributing to a systemic view on the “human factor” and give complementary input for a more complete vision on accident causation factors.

Starting with a short bibliographical overview, this report is mainly about defining some socio-cultural centred approaches to be potentially integrated in further accident causation analysis. The final outcome is an analysis scheme which will be illustrated with some practical examples.

### **2.3 Interaction with other Work Packages inside the TRACE framework**

The core task of Work Package 5 consists in presenting several methodological contributions on how to integrate and to analyze the “human factor” inside accident causation studies.

In this framework, the present Work package aims to give a methodological fundament for application in other TRACE Work packages, those dedicated to practical tasks, practicing these methodologies.

The final TRACE deliverable D5.4 presents a “social spheres scheme”, which is aimed at giving a visibility to the different upstream layers of socio-cultural influences that are located outside the individual sphere and which are supposed to potentially have a latent or manifest influence on the production of an accident.

This “social spheres analysis scheme” that is developed in the present report should have an added value for practical application. Besides the conceptual outline of the “social spheres scheme” as an analysis tool, a further objective of this report D5.4 consists - as a first step - in explaining its application within some typical accident causation scenarios.

In a second step - and this will be a specific task inside Work package 3 (task 3.2) - the further proceeding will consist in the test of the practical application of the analysis scheme, developed in the present task, on existing in-depth databases.

To do so, the tentative approach consists to identify the different socio-cultural variables in selected, existing databases. On the bases of the identified data, several case studies for application of the “social spheres analysis scheme” will be conducted and conclusions and recommendations regarding the feasibility of the “social spheres” approach will be given.

### 3 Accident causation in a Social Sciences perspective: individual beings in their social context

As pointed out in the introduction, the central interest of this report lies in identifying socio-cultural factors outside the individual sphere that may contribute to accident causation behaviour. Social context is one of the core subjects of Sociology, most of the concepts to be explained along this report are coming from this discipline. <sup>1</sup>

For the sociologist, human beings are always social beings, existing and interacting in a given, specific social context. The scientific interest lies in this understanding of human beings not only as individuals, but in their interaction with others under specific circumstances. The objective is to understand what motivates human behaviour inside society and how social human beings orientate their behaviour on the others' behaviour.

Causal analysis, functional analysis and the understanding of meaning: these are the main objects of sociological analysis – searching for the reasons and the contributing factors to an outcome or action. What function does specific social action fulfil, what is its contribution to the function of the whole? What is the sense, the meaning that humans do attribute to their actions, how do they construct the social representations that guide their decisions and actions, and what are the consequences their actions produce?

On another level, the sociological focus lies on is the study of social groups, their constitution, their specific social representations and their behaviour; the idea of a social group may focus on a core group of 2-3 persons or may be the study of rather complex organizations, societies, tribes or economic and political systems. The sociologist studies social categories such as gender, age, race, religion or ethnicity; the study of conflict of interest inside or between specific groups, or the issue of social inequality presents a major field of research. <sup>2</sup>

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<sup>1</sup> "Sociology, a word often used in quite diverse ways, shall mean here: a science which seeks interpretative understanding ("deutend verstehen") of social action, and thereby will causally explain its course and its effects. By "action" is meant human behavior linked to a subjective meaning ("Sinn") on the part of the actor or actors concerned; such behavior may be overt or occur inwardly – whether by positive action or by refraining from such action, or by acquiescence to some situation. Such behavior is "social" action where the meaning intended by actor or actors is related to the behavior of others, and conduct so oriented." (Definition by Max Weber in the translation of Keith Tribe; in: "The Max Weber Dictionary"; Swedberg, R.; Stanford, California, 2005; p.256)

<sup>2</sup> As to study "human behavior", which is central to both, Sociology and Psychology, the "Blackwell Dictionary of Sociology" proposes the following distinction:

"... Sociology might also be defined as the study of social behavior. However, since there is but a small range of human behavior that cannot be constructed as social to some degree, this definition confuses sociology with psychology, which is far more concerned with the individual's internal workings than with their social context and their connection to it. Although human behavior is central to sociological thinking, it is not what makes that thinking distinctly sociological. Central to any definition of the sociological point of view is the idea that the whole is greater than the sum of its parts, for the whole also includes the relations that bind the parts together, which generally cannot be derived from knowledge of the parts alone. It is of course true that social systems would not amount to much if there were no individual people, but it does not follow from this that social systems are therefore just a collection of individuals. Social systems are sets of arrangements in which individuals participate, much like a game that people play. (...) To borrow from the chemists, a molecule cannot be understood solely by studying the characteristic of each element that "participates" in it. Indeed, we know next to nothing about molecules unless we understand the bonds that connect them to one another, and these are not characteristics of any of the constituent parts. In the same way, psychological profiles of workers in a corporation will not be of much use in understanding what a corporation is and how it works. It is therefore a combined focus on social systems and their connection to individual people's lives that distinguishes sociology from other disciplines..." (Johnson, A.G.: « The Blackwell Dictionary of Sociology. A user's guide to sociological language.» ; Cambridge & Oxford, 1995 ; p.270 ;)

For helping to clarify the dimensions that are usually object to sociological and social psychological<sup>3</sup> analysis, the present report proposes a scheme that relies on the notion of *spheres*, including their limitations or integrations.

Due to the objective of supporting the systemic “human factor” centred approach on accident causation, the notion of these socio-cultural spheres aims to visualize the factors (or variables) that are situated outside the individual, but which are having an impact on his individual representations, decisions and behaviour.

The following scheme illustrates the distinctiveness and the complementarities of different approaches of “human factor” analysis:

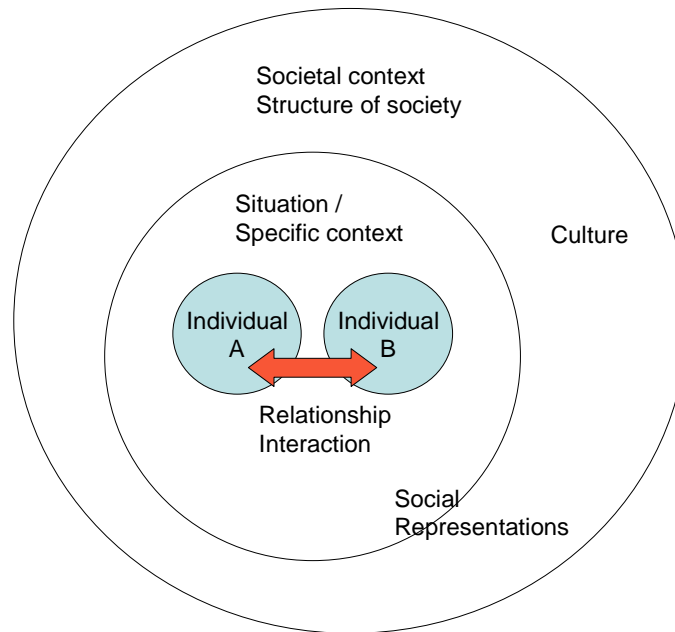


Figure 1. the individual inside its social context

The objective being to understand human behaviour in its specific societal context, the notion of “context” includes hereby not only the situation in which the individuals interact, but also the broader frame, or social environment, that contributes to produce this specific situation. Production factors, for example, are a given cultural background or dominant cultural patterns that create a common understanding of “how best to behave” under specific circumstances.

For example, you could consider that western society today is very much influenced by a cultural paradigm which values “quickness and effectiveness”, and encourages efficient “time management”. The social valorisation of “time saving”, preponderance of terms such as “real time” etc. may lead to cultivate a certain driving style, symbolizing to other people that you are in a hurry, you do not have time to waste, so you are socially adapted. Besides the “technical” aspect of being considered as “more efficient”, this behaviour has a highly symbolic content: your time is precious, which signifies to others that you are an important person. So your – supposed – social status which integrates your eagerness in “being efficient” is symbolically transposed by your driving style, you show that you are

<sup>3</sup> Sociology and Social Psychology are two disciplines that interact very closely; the focus of Social Psychology is more on social representations and the influence of social factors on the individual;

an important person who got no time to waste, you reclaim a distinctive social status – your way of driving is part of what sociology refers to as *habitus*<sup>4</sup>.

It is important to take into consideration that each individual is a product of the social influences he is integrating from his earliest stage of personal evolution, during the process of his socialization, specifically during childhood and as a young adult. The social environment which differs in several layers (or different spheres) is an integral part of the individual person, because it establishes a – variable – social context which functions as a "navigation system", helping the individual to find his way in the social world, to make his choices and to orientate his behaviour.

The idea of the multilayer system which is called here “social spheres” has a parallel with the notion of “environment” that is used in accident in depth analysis. The notion of the -social- environment presents the key dimension for our sociological “upstream factors” scheme; it will be explained and developed in a specific chapter of this report.

Sociology’s perspective understands the “social space” in the sense of a societal context that produces a specific environment, and the potential influences this environment may have on the individual. The Road is actually a social space *par excellence* – it is possibly one of the most social places in today life, a place where 24 hours a day individuals from the most diversified social backgrounds meet and have to interact together.

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<sup>4</sup>The concept of « habitus » is very much used in the sociology of P.Bourdieu (for example: Bourdieu, 1979) ; basically it means the way of behaving in the consciousness of a given social status, “social status translated in social action”. This concept will be explained in one of the next chapters.

## 4 Academic accident causation research focusing on social context information

### 4.1 Review of sociological and social psychological related literature

The following bibliographical overview is intended to give an insight on social sciences approaches that give information on social upstream factors, which are supposed to interact on the individual and so potentially contribute to accident causation.

With the final objective to define predictors for intervening socio-cultural factors in accident causation, the present overview centres on diverse research fields, that have in common an interest for analyzing variables in a – more or less- sociological perspective, meaning that their research focus lies on human factors outside the individual sphere.

The bibliographic sources selected do come partly from the field of accident or prevention studies, or are studies dealing with operational human errors in industrial production, system management or traffic. The selection is quite naturally limited on contributions that let appear a socio-cultural dimension or do use parts of sociological or social psychological concepts.

#### 4.1.1 *Why privileging sociological or social psychological related approaches?*

The central objective of the present report is to clarify the contribution of socio-cultural variables on the production of road accidents.

Information on socio-cultural dimensions in human interaction presents the “natural” focus of sociology as a scientific discipline; a search for specific sociologically driven concepts in accident causation research (or related fields) therefore appears as a legitimate focus for a bibliographical approach.

The first question to investigate was, on what degree sociological or social psychological driven concepts are already established in the framework of accident causation research. To do so, a short overview is given about the evolution and current situation of sociological research in the framework of accident causation analysis. In other terms: the academic existence of a “sociology of accident causation” (or “road safety sociology”) would be an indicator of a systemic integration of the socio-cultural factors inside the field of accident causation research.

Following is presented an overview on selected accident causation research, showing a relevant dimension of analyzing social and cultural factors, mostly on profiling “risk groups” (young drivers; drivers under the influence of alcohol). In addition, the bibliographical chapter contains a short excursion on Durkheim’s socio-epidemiological approach, which is interesting for the identification of social and cultural variables which are supposed to have an influence on accident production.

One conclusion of this bibliographic research – which is not to be considered as exhaustive – is that the research field of accident causation studies today shows neither specific evidence for sociologically relevant contributions, nor an important degree of integration of social sciences driven concepts, Psychology left apart. A limited number of sociological studies related to the theme of “road traffic” were identified; Accident causation research appears as a very “engineer” driven approach with a high formal degree, showing a culture of mathematical modelling. The integration of “human” factors appears limited and as generally determined by their potential of operability in epidemiological frameworks.

However, on some degree socio-cultural related approaches are visible, so what was analyzed and what is the information that can be integrated in the analysis scheme of the present report?

#### 4.1.2 *Is there a specific field of Road Safety Sociology?*

Is the discipline of Sociology academically established in the research field of accident causation? On a level of scientific approaches, sociological analysis do appear in the competency field of "Road Traffic Sociology" ("Verkehrssoziologie" in Germany), which is in fact more a Sociology on "Transport and Mobility", very close to the field of Urbanism. As pointed out by Rammler (Rammler, 2001), Sociology limited itself until the 1980's on some single and arbitrary chosen contributions regarding road safety and drivers behaviour. Contrary to the field of Psychology, wherein a field such as "Road Traffic Psychology" ("Verkehrspsychologie") has been clearly established since (as well as a science and as institution), Sociology does not appear as a science standing on his own, in relation to road traffic or road safety issues. There are no institutes or societies for "Road Traffic Sociology", neither are there existing "key"-references, relative to accident causation such as the framework of "human error" in Psychology, the latter having a relevant influence on accident causation studies today (see TRACE deliverable D 5.1).

A structured overview regarding sociological research in relation to the framework of "road traffic" appears in Rammler (2001); the author proposes a number of categories on behalf of their specific contents, by numbering the main bibliographical references (ibid, pp16-21):

**Road traffic as a mirror of social conditions**, (mainly in: Claessens (1966), Tofote and Kuhm (Tofote, 1992); **The automotive system as a socio economical and political framework**; (in: Krämer-Badoni et al. (1971) and Lindner (1973)); **Analysis of the Transportation and Mobility Policy**; (in : Reichardt (1969); Windhoff-Héritier (1987). **Analysis of the modal split and the specific traffic modes** (in: Schivelbusch (1977); Sachs (1984); Radkau (1989); Wolf (1986)); **Sociology of technology regarding automotive traffic and its infrastructure** (in : Kob (1966); Sachs (1984) and Schmidt (1999)); **Sociology of Tourism and related traffic**; (in : Leugger (1966); Rochlitz (1993)); **Road accident and road safety sociology**; (in : Seipel (1992); Tofote (1992); Risser (1988)); **Sociology as an empiric tool for Infrastructure planning** (mainly : KONTIV ("Kontinuierliche Erhebung des Verkehrsverhaltens") Brög et al. (1988)); **Urban sociology related to road traffic** (Urban Planning and Research on automotive traffic as external effect); (in: Schade/Steierwald (1996); Hermann/Steierwald (1996, 1997); Brenner/Steierwald (1998));

Regarding topic "Road accident and road safety sociology", from interest in the given framework, the following – few - dimensions are appearing according to Rammler:

- feasibility approaches on driver typologies in relation to typical accident scenarios,
- socio demographic studies on "deviant driver"-profiles and
- Social representations and attitudes towards driving.

Rammler concludes on an evident lack of systematic, specific sociological research regarding the field of road traffic and road safety nowadays. According to his conclusions, Sociology as an academic discipline presents nowadays no driver for relevant contributions or suggestions for further road safety related research, research on the topics listed above are merely initiated outside the sociologists' academic community. Also, on upcoming fields for sociological research in the field of "Traffic-Sociology" or "Sociology of Mobility and Transport", Rammler (2001) seems to privilege the analysis of societal factors which are generating traffic, being a research field that describes the state of a society according to the situation of its mobility patterns and its transport policies (Claessens, 1966; dans : Rammler, 2001). This means to investigate what are decisions and societal processes, generating the way a society is producing its own specific mobility patterns and mobility priorities. Basically, this way of looking on social mobility (Sorokin, 1964) relates to the understanding of road traffic (being part of a greater mobility scheme) as a social phenomenon, according to its origins or motivations, its course and its consequences for society. Mobility is socially produced, it relates to the way that transportation is realized as well as to the societal context and its specific conditions. The product – specific mobility patterns – regenerates specific influences of the society's members according to their specific social status (or position in the social spheres). According to Rammler, each society (or more

specifically “community”) generates its most specific ways of mobility patterns regarding its specific mobility needs.

#### 4.1.3 *The influence of Socio-cultural variables - Durkheim as a precursor of modern accident causation analysis*

Sociology is a “pioneer” discipline regarding a very important approach, in a different framework, nevertheless very close and comparable to accident causation research and more specifically, to its epidemiological perspective. Emile Durkheim (1897) is rather well known for his study on “suicide”, wherein he analyzed sociological factors that contribute to the increase of suicides among different societies.<sup>5</sup> Based on statistics relating the prevalence of suicide in several European societies, Durkheim’s impetus was the difficulty he encountered to define the social fact<sup>6</sup> “suicide”.

On the first view, suicide appears as a rather individual phenomenon, but the causes for it are extremely variable from one individual’s particular social context to another, and so the dimension of context variability presented the lever for Durkheim’s analysis. By comparing suicide statistics from one country to another, Durkheim concludes that suicide varies according to social groups, and that establishes its genesis outside the individual sphere, outside of individual decision. By what we qualify today as multivariate analysis, Durkheim isolates a number of social factors such as “age”, “sex” or the socio professional status to measure the relevance of each. In addition, he introduces the “*variable intervenante*”, the factor not included in the statistics, but which he considers being highly relevant and on which one has to find measurable indicators<sup>7</sup>. By pointing out the relevance of the individual’s degree of social integration, Durkheim introduces one of his most famous notions, being “*anomie*”, which is since then defined as an absence of social integration or a product of social deregulation, having an impact on the function of a society as a system.

#### 4.1.4 *The definition of “variables intervenantes” contributes to define Predictors for accident causation*

What is Durkheim’s added value, especially in the framework of accident causation analysis in the present TRACE Work package dedicated to “Human Factors”? Like in Durkheim’s analysis, accident causation research is looking on a phenomenon usually regarded as an individual problem, or a problem between two individuals, being the individual driver, committing a functional error and so deregulating the system of which he is a part.

The individual decision is producing the outcome of the road traffic accident - but the crucial point here is that the individual decision is generated or at least co-produced by variables, coming from outside the individual sphere; for example, during education or by reception of communication messages, which produce a specific, latent attitude (or disposition) that in certain situations may “trigger” a specific decision with a behavioural outcome.

To better understand accidents production, it is necessary to identify such socio-cultural variables, which are acting from the outside on the individual’s actions, to describe them, and so define predictors that have a certain degree of probability to contribute to accident production.

The “social spheres” to be explained further in this report are actually very close to Durkheim’s “*variable intervenante*”, because they integrate multilayer-variables having an influence on the individual (or the individual sphere), and for which there is a need to define indicators that can be measured through existing data in accident statistics.

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<sup>5</sup> Emile Durkheim (1897) « Le suicide » ;

<sup>6</sup> Social fact is a translation of Durkheim’s « fait social » ;

<sup>7</sup> In Durkheim’s case, this variable was “*cohésion sociale*”, social cohesion, that Durkheim translates for example in indicators such as divorce-rates in a given society

#### 4.1.5 *Specific accident causation related publications*

What are topics, integrating “sociological or socio-cultural factors” which do appear in specific accident causation related publications? The following sociologically relevant topics are featured in accident causation literature:

- Cultural differences, ethnicity or membership to a specific culture as a risk factor
- Specific risk profiles or risk groups, in general related to socio demographic factors (gender, age)
- Accidents under the influence of alcohol (“drink driving”)

The following chapters will briefly introduce each topic in its specific research framework and then conclude on the relevant sociological dimensions to retain for the final objective, the construction of a “social spheres scheme”.

#### 4.1.6 *Membership to a specific ethnic group, cross cultural differences in driving behaviour and foreign drivers*

Regarding cultural differences, Zaidel (1992) explores the influence of the “social environment” on the individual driver. The key question is to evaluate the influence of the social environment on the driver, in the sense of “changing”, or affecting his individual behaviour. The crucial point in this contribution is about the “other drivers”, representing a source of information to the individual driver, which informs him about a certain conduct he should adopt in a given cultural framework, for example, the adaptation of specific “speed patterns”. In addition, Zaidel points out the importance of communication between drivers, based on “informal gestures and unregulated use of vehicle signals and lights” (Zaidel, 1992, p.587). Informal rules can potentially be in conflict with formal ones; also, there are different expectations and specificities between the different modes of transport.

The role of “race and ethnicity” is treated by Romano, Tippetts and Voas (2005); on the background of the specific analysis of fatal red light crashes, where the authors underline the little attention that the role of race and ethnicity has so far received in accident causation research. Even if they report not having found a nationwide (USA) study of the role of race/ethnicity, they refer to some studies that showed a prevalence of race/ethnicity behind fatal road accidents, in association with presence of alcohol, non-use of safety belts or speeding (Braver (2003); Campos-Outcalt et al. (2003); Harper et al. (2000); in: Romano et al. (2005), pp 453-454;). Specific attention is accorded to the prevalence of red light running among Hispanics in the US, they state that recently, the cooperation between the NCHS (National Centre for Health Statistics) and the NHTSA (National Highway Traffic Safety Administration) allow adding the variable race/ethnicity to the existing accident causation in-depth studies (FARS database). The main outcome of the study is that there seem to be a prevalence of the race/ethnicity criteria in combination with other factors, such as alcohol consumption or speeding. However, the race/ethnicity criterion through different ethnic groups is not prevalent by itself. The question of a specific cultural bias (membership) appears several times, but there is no clear conclusion; the authors suggest that a membership to an ethnic subgroup may possibly occur as a relevant factor. Among the findings of the study is a relatively large prevalence of Hispanic red light runners with no valid driving license at the time of the crash.

Ethnic, correlated with gender differences were the subject of a recent paper by Bergdahl (2007); under the hypothesis that men generally have a higher level of exposure towards road accident fatality and a greater tendency towards risky behaviour (alcohol and tobacco consumption), the dimension of ethnicity was hypothesized of being a complementary prevalent criteria for increasing road accident risk. In Bergdahl’s study, which compares male and female American (?) and American-Hispanic students in social sciences, the subjects were asked to self-report their attitude towards a choice of supposed risky driving situations; also, they self reported their attitudes regarding alcohol consumption and their subjective safety feeling for driving after alcohol consumption. The study’s results show a significant difference regarding the higher “safety feeling” for the male subjects, while no significant difference of the ethnic dimension appeared, so the author concludes on an important

influence of the gender dimension on the driving attitude. By correlating “gender” with “ethnicity”, the American-Hispanic subjects, male as well as female, showed a higher rate of requiring drinks for considering themselves “legally drunk” and consequently able to drive than the “American” subjects. This difference is interpreted as American-Hispanic having a higher risk of drink driving with a risk of collision and fatality, which the author relates to the overrepresentation of American-Hispanic male drivers in vehicle collisions, which would need further research. As a possible explanation for this higher disposition towards alcohol consumption among American-Hispanic people, the author relates to studies on the Mexican-American population wherein the strong family orientation and its social events (where alcohol consumption is supposed to be encouraged) are given as an explanation.

**Table 1. Membership to a specific ethnic group, cross-cultural differences in driving behaviour and foreign drivers: a résumé**

Topics	Factors we retain for the social spheres scheme
Influence from the social environment on the (foreign) driver	- Membership to a specific ethnic group and/or specific cultural group/subgroup
Ethnicity/race as a distinctive criteria regarding risky driving behaviour	- Cultural conventions
Cross-cultural differences in driving behaviour	- Driving in a foreign socio-cultural context
Accident risk of foreign drivers	- Gender attitudes towards risk taking
Ethnic/cultural dispositions	- Influences of gender attitudes correlated with ethnic/cultural background on risk behaviour
Gender differences	

#### **4.1.7 Socio demographic factors, Risk profiles or risk groups; Age groups as risk groups (young drivers, old drivers),**

Among the socio demographic factors that appear as relevant in accident causation studies, the variable “age” is listed prominently. Continuously, drivers under age 25 or over 65 years are overrepresented among the general population of accident drivers (Goldstein, 1962); a quick search in the “science direct”<sup>8</sup> databases for the last 10 years gives for the key word “older drivers” 181 articles, for the key word “young drivers” 203 articles. Inside the academic field of accidentology, these two age groups are commonly qualified as being the most exposed to accident risk.

Accident analysis relies most of the time on available, quantitative data, established through police accident reports. Qualitative data are searched for by multi disciplinary more or less “in-depth” studies with rather variable methodology. As a result, the established data is heterogeneous, and the specific study on the sociological characteristics of a given population bearing a specific accident risk is usually not done in this framework (for example, see Clarke, Ward, et. al., 2006). One consequence is, that specific accident risk populations, for example “young drivers”, are not analyzed on behalf of their sociological characteristics, but regarding their implication and exposure to typical accident scenarios in which they are significantly overrepresented. Therefore, the typology is not made on the characteristics of the population, but on the type of situation.

Esterle-Hedibel (1995), in allusion to Durkheim points out the dimension of anomie because of the diminution of social bonds and the transition to a specific “young peoples” risk culture in suburban areas. The reference group of the “gang” (“la bande” in French) is a determining factor for risk seeking behaviour and a transgression culture that is operated – among others – in the field of road traffic. The

<sup>8</sup><http://www.sciencedirect.com/>, search inside “Accident Analysis & Prevention”

notion of risk seeking is also relevant as a constructive element of the social identity of the young person; in this context, risk has a highly communicative function as a symbolic value.

The European project SARTRE did integrate the dimension of the social representations of the drivers, and so does not limit its approach on a description of behaviours. To do so, it tries to explain the motivations, the decision-makings that influence the young drivers as compared to the other motorists. SARTRE was a longitudinal study; six years passed between SARTRE 2 and SARTRE 3, which allows to evaluate the impact of the public policies, to measure the changes of the risk perceptions and the differences between sexes (e.g. SARTRE 3 shows that the women declare more risky conduits than six years before), as well as the modifications of society since SARTRE is a comparative prospect on a European scale, 23 countries being implied in the investigation. For that reason, another SARTRE contribution is its cultural approach on road safety, by trying to consider cultural aspects and the specific social context of each national identity (according to the hypothesis that national identity influences the behaviours of the drivers). For example, SARTRE shows that the young people in Croatia, in Poland, in Cyprus, in Greece and in Czech Republic take more risks when they overtake. Thus, there is a need for understanding the problems "Road risk/Young people" via the specificities of the populations. Also, there is an ambition in SARTRE to create a typology of the dangerous driver. Consequently, it gives a profile of the risky driver in an "ideal-type" approach, aiming at the prevention.

Regarding SARTRE, it strikes however that nothing differentiates the perceived levels of risky behaviours by the young drivers. In other words, young motorists are not asked on their perceived level of danger regarding their behaviour. However, if you consider the typologies of risk established by sociological approaches, in particular in the sociology of sport, one sees that there are different scales of risk perceptions and divergent aims required by young people. Moreover, the mode of socialization in which SARTRE includes the young persons confines the point of view until the beginning of the marital status. However, many sociology researches evoke peer groups as one of the fundamental elements of relational space and identity construction for young people (see Esterdele-Hedibel, 1997) who studied the impact of the group on the conducts and therefore its influence on the potentially deviant behaviour. The consideration of the "peer group" also makes it possible to introduce the meso-sociologic level to approach the phenomenon. Consequently, the question of identity is a problem of the "young culture": what does it mean to be a "young person" today, in different European countries with a diverse socio-cultural context? If several socio-demographic and factual variables (for example, type of vehicle) are admitted and useful, some data, in this report, inform us about a typology of young people. This typology would be useful before the establishment of a typology of the "young dangerous driver", especially as there are youths and not one youth (Bourdieu, 1984). In other words, it is important to wonder, among other questions, what is the social position that the institutions attribute to young people, and, on the opposite, which place young people according(?) to themselves (Vulbeau, 2002). This point could be completed by an anthropological dimension: driving is more than an aptitude based on knowledge and experiment - it is in fact a social act, governed by rules and thus, it is a confrontation of the rights and duties of the individuals on a presumably common, social space: the road. In this case, what does it mean that the young drivers, in their declarations, follow of too close the vehicle which proceeds or do not yield the right of way to the pedestrians than the other ages? (SARTRE 3) Why do they not cooperate with the other drivers?

Consequently, if SARTRE 3 tries to bring a sociological point of view which does not deal just with accidentology statistics, but includes qualitative data (driving related perceptions, declared behaviours), it does not make possible a complete comprehension of the problem.. It appears difficult to create a single model of risky behaviour inside such a heterogeneous population.

**Table 2. Socio demographic factors, Risk profiles or risk groups (young drivers, old drivers): a résumé**

Topics	Factors we retain for the sociological "upstream" scheme
Young drivers specific road accident risk Socio cultural membership Cultural differences	- membership to a specific age cohort as a risk factor - membership to a specific subgroup - peer group - Lifestyle

#### 4.1.8 Accidents under the influence of Alcohol ("drink driving")

In accident causation research, the dimension of drink driving appears as the sociologically most relevant. For example Biechler et. al. (1999) referring to Got, Faverjon et al. (1982, 1984, 1985) points out the relevance of the social profile of drivers that had an accident under the influence of alcohol. Especially the recidivist "drink driver" appears as a specific risk group to Biechler. For example, in a first typology approach (Biechler, pp.91) appears a profile of a mainly male, urban, active population that consumes alcohol while exercising his profession as a sales representative or executive manager, combining social status, a specific professional attitude regarding a "cult of speed and efficiency" and professional social behaviour that prescribes the consumption of alcohol during business negotiations. Another profile is the young, male driver from rural areas. Biechler underlines that these profiles, while coming from different social backgrounds, have in common that driving is a part of their life style, and this life style includes a daily consumption of beer, wine or other liquors. These profiles travel very much, often at night and during weekends; the motivation of driving is for business as well as for leisure activities.

The important point in Biechler's studies is the correlation of accident related risk factors (night driving, alcohol consumption, speed) with variables that defines these drivers as members of a social group, cultivating a specific lifestyle (executive, speed culture). A major conclusion of this study is that an analysis of the accident causation which only takes the immediate situation into consideration, without considering the "upstream" social context - which in fact gives the background information about the specific, social risk profile of the driver<sup>9</sup> - is simply incomplete, because key information about contributing socio-cultural factors are neglected.

**Table 3. Accidents under the influence of Alcohol ("drink driving"): a résumé**

Topics	Factors we retain for the sociological "upstream" scheme
Socio Demographic variables (gender, age) Socio cultural membership / peer group Life style	- Membership of a specific age cohort as a risk factor - Membership to a specific subgroup - Peer group - Lifestyle - Cultural influences

<sup>9</sup> « The behaviors are largely the result of social habits. Thus the place occupied by the decision making process in driving is generally overestimated... » (Biechler et al., 1999, pp. 107)

#### 4.1.8.1 *Integration of socio-cultural dimensions in the framework of "human error" analysis*

To complete the bibliographic overview with the focus on the integration of a social sciences point of view in accident causation analysis, there also is an important integration of the dimension of "human error" production to the present task. TRACE deliverable D5.1. and the general design of Work Package 5 put the notion of "human error" in the centre of the working group's cooperation process, regarding the factors of human error as accident causation contributors.

One of the leading questions for the present task was to understand the scientific reasoning of the notion of "human error"<sup>10</sup> and to develop an analysis framework where sociological analysis can cooperate with "human error analysis" in a coherent way (and a benefit for further accident causation analysis).

Without going into the depth of this notion (treated exhaustively in TRACE deliverable D5.1), the structure of "human error / failure analysis" is often schematized as the result of a "chain of events", and somewhat hierarchical structured dimensions (or factors) that produce an impact on the individual, leading to the production of an accident.

Reinach and Viale (2005), basing on Hobbs and Williamson (2003), underline the relationship between "downstream operator errors" and "upstream contributing factors" such as supervision, procedures or organizational influences. As in O'Hare's "wheel of misfortune" (O'Hare, 2000) model, Reinach & Viale propose a perspective that integrates on one side an "active part" of the operator, wherein active failures are produced on the individual level, in complement to "latent conditions upstream" (pp. 398), which are situated in the characteristics of an organization and so - potentially - create the conditions for the accidents production. Reinach & Viale's "human factors analysis and classification system" (HFACS) is applied on the context of the railroad industry (HFACS-RR), nevertheless, the structure of the model shows a high degree of compatibility with the context of road safety. In the sense of a systematic collection of human-factors related information, an investigation frame such as HFACS is supposed to have the following main benefits (pp.398).

- Provide a consistent and formal structure to accident/incident investigation data collection and analysis.
- Ensure the investigation is systematic and thorough by ensuring that all levels of the system are considered.
- Counteract heuristics and biases that investigators may bring to investigations.
- Enable comparisons of accident/incident contributing factors across industries that use HFACS to support their investigation and analyses. ..."

There are two points in particular to retain regarding HFACS:

- The insistence of the notion of "latent factors" stressed by Reason (1990) on an upstream level and
- The "systematic investigation of all levels of the system".

"Latent factors" appeals to the sociologists understanding of individuals' characteristics, developed during the course of their lives (a main part during socialization in child and teenage years), and which presents an incorporated socio-cultural capital that gives social identity and orientation of individual's actions.

The "systematic investigation of all levels..." in social sciences perspective means to question systematically if the upstream levels, outside the individual sphere, could be possibly involved in the accident causation process.

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<sup>10</sup> See for example: Kouabenan, 1999; O'Hare, 2000; or Reason, 1997;

#### 4.1.9 Conclusions of the bibliographic overview, discussion and tie-in with the notion of “upstream factors”

The bibliographical overview shows a number of points regarding today’s integration of sociological or social psychological investigation in accident causation research:

- Sociology appears not as an academically established discipline inside the field of accident causation research. However, a number of sociologically relevant dimensions appear in this research field.
- These dimensions are generally referred to as “driver characteristics”, being supposed to generate an impact on the production of the accident.
- The type of situation reveals the (over-)representation of a given population, but the analysis of the causation factors is limited to a sort of “first degree” investigation in which only the immediate, pre-accident situation factors and the accident production factors are taken into account. The following graphic (cf. Graph 2) shows the current analysis scheme as it reflects itself in today’s accident investigation:

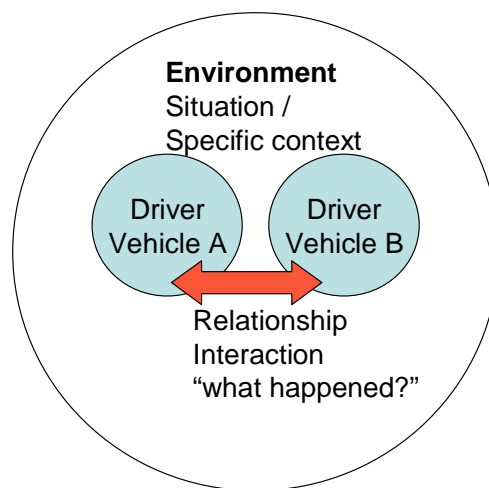


Figure 2. Accident investigation analysis scheme

- From a sociological perspective, this analysis frame as it applies today in accident causation analysis appears as being limited, for the main reason that it excludes the influence of society produced factors on the individual, as well as it ignores an “evolutionary” timeframe in the sense of “what has gone before”. People are not exclusively defined by the type of situation they are evolving in (a traffic accident can be one possible outcome of a situation), but subject to multiple social, economical and cultural factors on a longitudinal time scale as well.
- However, it also must be retained that there are indications in the revised literature that the multiplication of “upstream factors”, such as for example “alcohol consumption attitudes” correlate with “membership to a specific ethnic group” and, even further upstream, there appears a relationship to “family culture” (as supposed in Bergdahl (2007)). Such questioning about the impact of multiple socio-cultural criteria on risk disposition and accident causation is an indicator for a growing sensitivity regarding a need of larger interpretation models in accident causation research.
- “Human error” orientated, systemic approaches such as HFACS give an interesting possibility for an integration of “upstream levels” that consider societal influences on accident causation.

As a conclusion of the literature overview, the listed socio-cultural dimensions will be integrated and further developed in an explanatory analysis scheme in the next part of the present report.

#### *4.1.10 Discussion and further proceedings*

Will a more profound consideration of sociological and social psychological aspects improve the understanding of the accident causation process? Sociologists always have the feeling that in general, the analysis of situations, involving human interaction would profit from the integration of sociology's perspective, one of the reason for this is that sociology defines itself as the scientific approach where the systemic view is inherent.

On the other hand, the field of accident causation research is a very engineer driven field, the main interest lies on the analysis of what happened in a specific situation, if there was a failure of technology or the human and, consequently, could be improved (or re-engineered) to avoid the same problem in the future. To stretch it even more, one could precise that the sociological frame is a systemic and longitudinal one, the accidentologic frame an immediate one ("types of situation"). In a feasibility approach of testing potential benefit of sociological analysis, this rather opposite way of considering a problem should be taken into consideration pragmatically.

The point taken in the present report therefore, is not to create a parallel model on "how to do accident causation research the sociologist's way", but merely concentrates on specific dimensions that are already present in accidentology, to enlarge them and propose an integrative, systemic analysis scheme for future accident causation research.

## 5 Upstream factors for accident causation: an approach via the notion of social spheres

From the bibliographic review, a number of sociologically relevant factors were retained which will be integrated in a broader analysis frame, that will further be referred to as “social spheres analysis scheme” (or “the social spheres”). In addition, the chapter will introduce some sociological and social psychological concepts that appear helpful for the construction of the “social spheres” and help to clarify the upstream factors and their impact on the sphere of the individual. The “social spheres” scheme will be introduced and defined according to its different layers. The chapter will close with some examples aiming to illustrate the use of the social spheres scheme as a complementary analysis tool.

As exposed in the precedent chapter, the HFACS and its idea of a hierarchical structure of potentially influent upstream factors was a source of inspiration, the notion of “upstream” being rather illustrative (the term of “upstream” will further be employed to indicate specific dynamics in some cases). However, to designate the scheme here to be introduced as “social spheres analysis scheme” has the following reasons:

The idea of the *sphere* is to be surrounding, without involving necessarily a notion of hierarchy. Social beings are living in a social environment, and this environment is layered in several spheres of political, social or cultural dimensions, influencing themselves mutually. The “social spheres” scheme invites to consider a broader definition of “environment” as it is usually applied in accident causation analysis.

Another idea of a “social spheres” scheme is the dynamics of all the parts towards each other, which presents a central dimension in sociology (Weber, 1922). Also, “weberian” as well is the fact that social individuals tend to attribute a sense to their own actions and to the actions of the other, which creates a highly dynamic framework of mutual orientation.

The following paragraphs will now develop one by one the different layers of the “social spheres analysis scheme”, beginning with the individual sphere.

### 5.1 The individual sphere

The individual sphere contains the social individual as a “product” of sociological influences. The “single” individual is not necessarily the main subject of sociology and social psychology; merely these disciplines try to understand what are types, or categories, of individuals according to their specific ways of behaving and interacting in groups or within society. Therefore, the individual sphere in the present framework is defined as a possible product or assembler of sociological, ethnological and social psychological categories.

For example, the individual person integrates a number of demographic variables; he is a man or a woman in a certain age with a specific educational background. He has specific experiences regarding driving, he has a specific social status that involves maybe a specific driving style and he could be a member of an informal social group with distinctive behaviour patterns that may have a distinctive part in the production of the accident.<sup>11</sup>

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<sup>11</sup> NB: the presented scheme and its sociological reasoning aims not to replace other existing analysis frameworks and tools, it is merely to see as complementary. In addition, the idea that the social individual is a product of surrounding social spheres of influence does not pretend to the monopoly of human factor analysis.

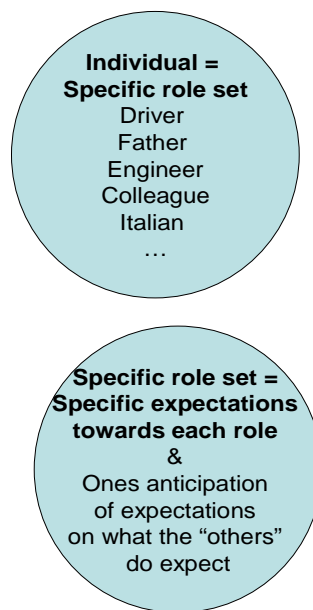


Figure 3. Examples for individual role settings

The different sociological categories that intervene and contribute in the sociological and social psychology's perspective to create the individual are explained in the following paragraphs.

## 5.2 The social Environment: the road as a social space in the framework of accident causation analysis

The notion of environment and its relevance for the sociological prospective has already been mentioned in chapter 2. By imploring the systemic dimension of the accident causation process, Ferrandez<sup>12</sup> defines environment as the "design of the road infrastructure, its conditions and its environment". The dimension of "environment" is central to accident causation analysis: everything that happens outside of the car and the driver happens there - as an analytic category it appears very complex and therefore lacks precision. Is the notion of environment limited to the "natural" conditions (landscape or urban environment, meteorological conditions), or does it include the traffic situation (traffic jam, flow, high-speed competition) by considering the "other"? And which "other", being the fact that there are several types of participants of the road, such as pedestrians, Two wheelers (powered or not), public transport or other cars.

The accident causation analysis encountered today in accidentology (and in what constitutes the "spine" of the current TRACE project) defines the core of the discipline as being a systemic approach that takes into account

- The driver
- The vehicle
- The infrastructure in its environment

What does not appear clearly in this definition, is the question if "environment" is limited to an 'immediate' environment, so that the definition could also be the "situation" or the "specific context" wherein the accident was produced?

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<sup>12</sup> Ferrandez, 1995; p.17

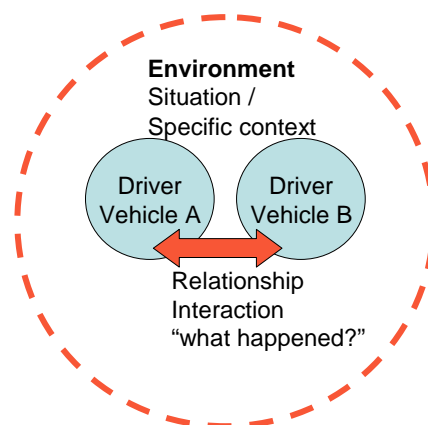


Figure 4. Focus on the notion of “environment”

By limiting the “field” of analysis to such an understanding of environment, the specific situation and its outcome could be understood, but for further analysis a number of factors are lacking – factors that are present in the production of the accident, which are prior to its production. An individual driver is not “neutral” when he causes or is implied in a road accident, he carries a lot of “social luggage” with him; these “social luggage” constitute in fact that the “latent factors”<sup>13</sup>, possibly to manifest in an accident causation situation. The driver is a product of a – unlimited – number of social factors that constitutes his individual person and consequently orientates his behaviour and interactions with the others.

The road as an environment, where the interaction between social individuals happens, is a highly dynamic place; due to the objective of the present report, the definition of “environment” should be reviewed in the sense of enlarging it.

A possibility would be to distinguish between a direct, immediate environment which would correspond to the existing approach in accident causation analysis, and a wider environment which could be defined as “the social space”.

The “social space” (or social context) includes the specific socio-cultural connotations that each actor involved has, regarding the environment he drives in, according to specific expectations he has towards the socially constructed environment and assuming what expectations the other actors / drivers / participants of the road have towards him. Inside this social space, the actions are direct, it is where the outcome of the situation (the accident) actually is produced. The social space presents a complement to the “human error” model as presented in task 5.1, as a complementary analysis frame, the social space is the dimension where socio-cultural dispositions manifest in specific decisions and so in action.

The definition of “environment” for the social spheres scheme consequently should enclose:

- The understanding of the road as a place of social interaction according to formal, codified rules, informal rules and conventions
- The other drivers
- The other participants of the road
- The social space or social context: what are social expectations towards a specific environment

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<sup>13</sup> see HFACS

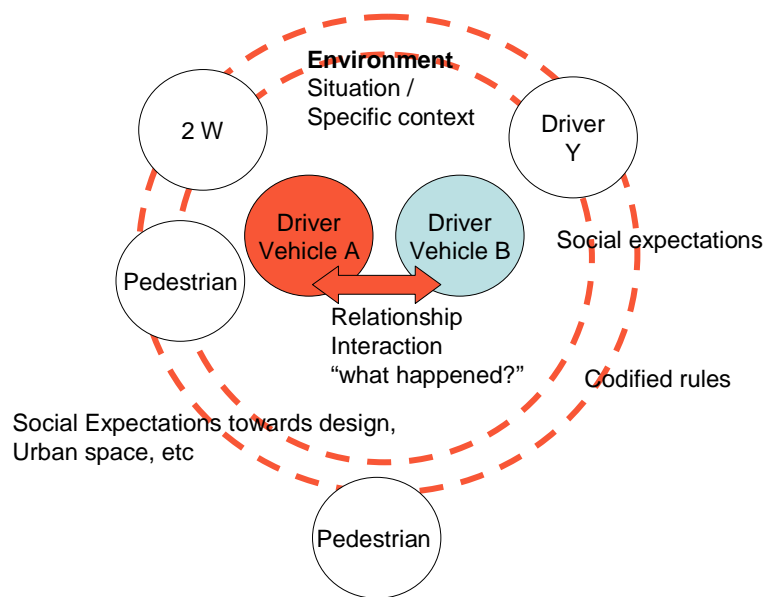


Figure 5. A broader understanding of environment

### 5.3 The multilayer spheres of sociological dimensions

The influences of the “social environment” at the site of the accident now must be clarified regarding their direct, situation related impact on the accident production or their more latent dispositions, lying in socio-cultural or ethnological dimensions which are a product of individual evolution of the acting persons.

The objective of the social spheres is to distinguish between

- the “human error” space, where direct interaction between the involved individuals produces an accident outcome, and
- the “upstream layers” where the latent dispositions, which are socio-culturally produced and which create “fundaments”, increasing the individual or collective risk for an accident outcome.

The “social spheres scheme” objective is to propose a virtual map, which helps to locate and to connect the socio-cultural dimensions that are influencing the individual behaviour and so co-generate – going through the “human error”- the accident as an outcome of a specific situation.

The “upstream” levels of sociological dimensions integrate a number of dimensions that influence the individual level. The different dimensions are relevant regarding their potential impact on the individual sphere. In the following chapters, each dimension is defined on behalf of its formal content and characteristics, as well as its potential impact(s) on individual representations, decisions and resulting behaviour.

The upstream factors that compose together the “social spheres scheme” are not a homogeneous construct; there are different levels of upstream factors that have to be distinguished according to their mutual impact. In the “social spheres” scheme, three multidimensional social spheres will be distinguished interacting with each other. From the outer sphere to the individual sphere, there appear:

1. **The Normative sphere (prescription and social structure) integrates:**
  - a. A formal structural level that integrates the dimensions of the law (the legal background), the normative system.
  - b. An informal level that integrates customs and conventions;
  - c. A level of culture, or the “cultural bias”.
  
2. **The Reference Sphere (direct social interference) corresponds to:**
  - a. A level that integrates dimensions of social conditions and / or social status that contribute to the social identity of the individual driver; the notion of habitus.
  - b. A level that we want to qualify as “membership” to a distinctive culture or subculture,
  - c. Membership to an ethnic group, cultural backgrounds or age cohorts.
  - d. Socio demographic factors (gender, profession, etc.)
  
3. **The Context sphere (social situation, social space) integrates the specific social context of the accident causation situation, as well as further dimensions related to the implicated individuals**
  - a. Social expectations towards the presumed role of the “others”
  - b. Social expectations towards oneself (“expectations of expectations”)
  - c. Trip related information (urban structure, trip characteristics, etc)
  
4. **The individual sphere, home of the “human error”** – here the upstream layers potentially impact on the individual decision making process and the behavioural outcome.

It is not necessarily important to situate each variable on an exact position inside sphere one to three. The main interest of the scheme is to illustrate the dynamics of social and cultural factors, and the influence they potentially have on the individuals producing the accident.

This multilayer system of “upstream factors” integrates partly the question of the “cultural bias” or the question of the existence (and prevalence) of a specific “Road Safety Culture”<sup>14</sup> and its influence on an individual driving style. This notion of “road safety culture” is of interest when there is a conflict of divergent cultures that may contribute to the production of an accident.

An important point of the earlier explained “dynamics” of the social spheres is that the above numbered upstream factors not only influence the accident causation individually, but also may act in combination and produce an effect by their multiplication.

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<sup>14</sup> See Duclos, 2006 « Culture Auto »

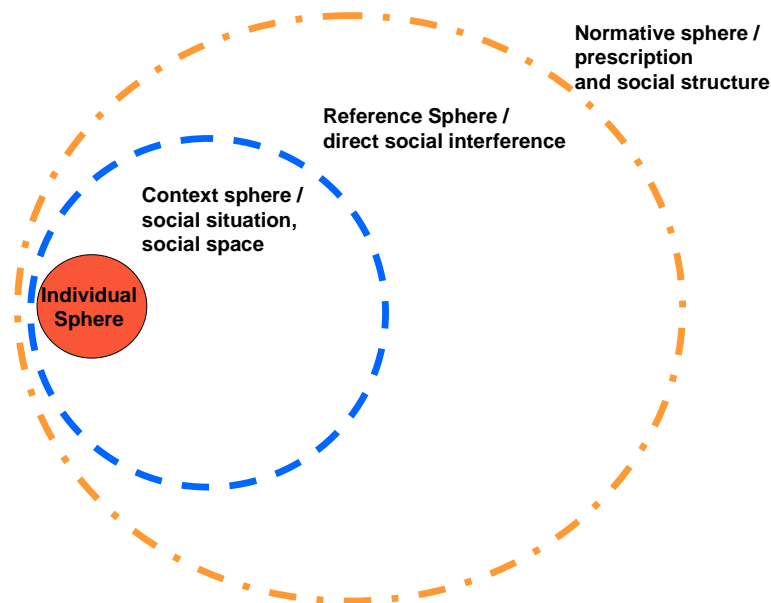


Figure 6. The different layers of the social spheres

According to the now established logic of these “social spheres”, the different socio-cultural variables will be introduced one by one and a definition given; all variables will be integrated in the final scheme and some examples added. The first sphere to be detailed is the normative structure of society, according to formal and conventional norms:

### 5.3.1 *The formal norm (law)*

“...in everyday usage, a norm is a standard that is considered by most people to be usual practice in a statistical sense (...) In sociology, however, a norm is a cultural rule that associates people’s behaviour or appearance with rewards or punishments (SANCTIONS). As such, norms create social consequences that have the effect of regulating appearance and behaviour. The consequences are artificial in that they do not naturally result from the action itself. (...) As RULES, norms make a connection between acts on the one hand and social sanctions on the other.”

**The norms establish the connection between the act and the consequences societies apply on the action.**

The law gives a normative frame for the individuals conduct in a society and it specifies the sanctions that are applied in case of deviant behaviour. According to Weber (Weber, in: Swedberg (2005), pp140-141) , “an order will be called ...law if it is externally guaranteed by the probability that physical or psychological coercion will be applied by a staff of people in order to bring about compliance or avenge violation...” Therefore, the aspect of an institution or an agent, which actually guarantees the respect of the law, because he has the means to sanction the offenders, is essential.

In a comparative perspective, one has to consider that each society in the limits of its definition as a nation has distinctive laws that are not necessarily the same in another national context.

The road traffic environment presents a specific social space with a high number of formal / legal specifications that assemble, for example, in the “Highway code” in Great Britain, the “Code de la route” in France or the “Strassenverkehrsordnung” in Germany.

Examples for the formal norm in the framework of road traffic are typically the speed limit or the pedestrian (“zebra”-) crossing, the duty to fasten the seat belt or to use Child restraint systems (CRS),

or to respect the prohibition of alcohol consumption when driving a motor vehicle. In case of non-respect of these formal, codified rules, the agent employed with the task of law enforcement, typically the road police forces are supposed to intervene and to sanction trespass. The regularity of the intervention or the sanction creates stable social expectations, for example, that there is no exception from the rule and that in case of control, the police officer always sanctions according to a catalogue of adequate sanctions.

### 5.3.2 *Informal norms - usage, customs - conventions - subjective norm*

Formal norms main characteristic is the stability of the norm or the rule, and the stability of the sanction in case of its non-respect, which implies also the existence of an agent for enforcement.

In the contrary, customs are empirical uniformities, common usages, based upon long standing and practice; "...if an orientation toward social action occurs regularly, it will be called "usage" insofar as the probability of its existence within a group is based on nothing but actual practice...adherence to what has as such become customary is a ... strong component of all conduct and, consequently, of all social action..." (Weber, in: Swedberg (2005); pp. 57-58).

Custom differs from convention in that it does not imply a legal sanction. A social functioning of informal norms implies the knowledge of their existence.

**Customs, conventions and usage contribute to influence the social representations of the individual in the frame of the subjective norm - the individual orientates his actions on criteria of social desirability, the expectations he expects from his social environment.**

The informal norms can sometimes be in conflict with the formal norms and so create a dynamic that exercise an influence on the individual's decisions and behaviour. For example: in a traffic situation regarding the respect of a speed limit in a rural area, the formal norm regulates a speed limit of 80 km/h on a rural motorway. The informal norm for the drivers using this part of the motorway (which may be perfectly straight and commonly judged as being not dangerous), consists in ignoring the legal speed limit and to drive at least with an average speed of 130 km/h . Possibly, most of the road users are people living nearby, they use this motorway every day, and so commonly "create" the local custom of not respecting the official speed limit. A driver who now is decided to respect the speed limit, (maybe because he is a law abiding person, or because he does not know the motorway, or he just was flashed by a speed camera half an hour earlier) may be confronted with other drivers, more sensitive to the informal usage, and this most probably will result in what you can qualify as "social pressure" (for example, the others will sanction him by activating the horn or by driving too close).

### 5.3.3 *Legal driving behaviour versus social driving behaviour*

The conflict that is generated between the formal law and the informal usage could be regarded in another analysis frame. As already stated above, the road is a social space where social interaction takes place in given cultural frameworks. Social interaction is generating specific cultural patterns in each dimension of human interaction. Usually, there are a number of possibilities that each of us have to interact with our humans fellows (??), and these ways of interacting are very much depending of our capacity of interpretation of the others behaviour towards ourselves. The means we have to interpret the others behaviour or habits is mainly based on first hand experiences with him: we see how he or she is dressed, we can look in his eyes, we hear if he speaks loud, we can ask him an information and make him understand that we did not get the information.

The context of road traffic behaviour is much more complex; on the one hand, we rely on the formal (legal) frame that is supposed to guide our traffic behaviour. Given the social character of human interaction, human road traffic behaviour integrates not only this formal dimension, but is merely the product of a social negotiation process wherein the legal framework presents one factor among many others.

The following table schematizes the distinctive dimensions on typical topics which characterize basic human interaction as well as social road traffic behaviour.

	<b>Social Interaction</b>	<b>Formal (highway code) Road traffic behaviour</b>	<b>Social road traffic behaviour</b>
<b>Speed</b>	< 5 Km/h	= 30 / 50 / 90 /130 Km/h	> 30 / 50 / 90 /130 Km/h
<b>Motivation</b>	Choice , hazard	From A to B	From A to B the fastest way possible, opportunity
<b>Situational context, having an influence on behaviour</b>	The other(s), norms & values; rewards & sanctions	Rules, sanctions	The others, rewards & sanctions, negotiate the rule
<b>Expectations / counter expectations</b>	Norms & values, customs	Respecting the formal norm	“relative” respect of the formal nom, customs, negotiation, law of the strongest, opportunity ...
<b>Signals, Language that guide the behaviour</b>	Facial expression, language, corporal language, habitus	Infrastructure design, traffic signs, traffic lights ...	Infrastructure design, traffic signs, traffic lights ...  Specific (cultural context) language, bumper, informal signs ...
<b>Visual contact</b>	always	Few	Few
<b>Anticipation</b>	Difficult	Yes (purpose!)	Very Difficult
...			

### 5.3.4 *The societal value of risk taking*

In the framework of his sociological and cultural sciences anchored approach on “Risk”, Adams (1995) introduces the concept of a basic social behaviour-typology regarding social strategies towards risk. Inside this concept, the distinctive “ideal types” (Weber, 1922) are the “homo prudens” (the cautious individual with a certain risk avoidance strategy) and, on the opposite, the “homo aleatorius” (the gambling man). According to this dichotomy, Adams establishes a number of postulates, which sets “risk behaviour” in perspective to quasi-economic reasoning of opportunity costs. According to this opportunity cost orientation regarding risk taking, the guiding logic for the individual consists in evaluating expected losses or rewards. The expected outcome is related to the social structure and its norms and values; the fact of taking a risk, even against established social norms may result in a social reward (high social standing, admiration from peers, etc.).

In detail, Adams Postulates are:

- Everybody has a propensity to take risks.
- The propensity varies from one indicator to another.
- The propensity is influenced by the potential rewards for the risk-taker.
- Perceptions of risk are influenced by experience of accident losses.

- Individual risk taking decisions represent a balancing act in which perceptions of risk are weighted against propensity to take risk.
- Accident losses are a consequence of taking risks; the more risks an individual takes, the greater, on average, will be both the rewards and losses he/she occurs. We live in a society in which « risk taking » is valued (finance, cultural representations of « action », etc.)

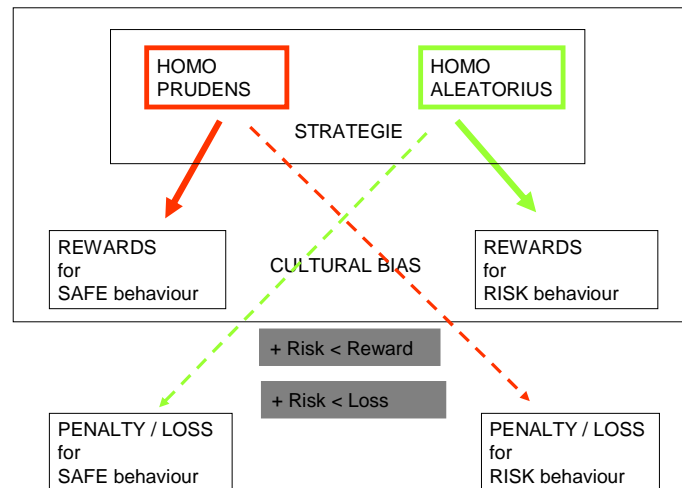


Figure 7. The risk scheme according to Adams (1995)

For the field of accident causation research, the above concept appears interesting, because it anchors individual risk behaviour in a larger social frame wherein the attitudes to risk, are not fix, but negotiable according to the valorisation of the reference group. For example, drink driving combined with a clandestine speed racing contest, after visiting a countryside located disco at the age of 18 years, can be a perfectly accepted and valued behaviour (for example, regarding its “trespassing” aspect) by the peer group of friends who have more or less the same age.

### 5.3.5 Cultural and ethnic dimensions; membership to an ethnic group or specific cultural group

The bibliographical review put forward several notions regarding “culture” and “ethnicity” having an impact on road accident risk.

- membership to a specific ethnic group and/or specific cultural group/subgroup
- cultural conventions
- driving in a foreign socio-cultural context
- gender attitudes towards risk taking
- influences of gender attitudes correlated with ethnic/cultural background on risk behaviour

The concept of ethnicity is a fundamental category of a society’s organization, which defines their members as individuals sharing a common historical origin and biological inheritance. Weber (1922) gives the highly regarded definition of ethnic groups as “human groups (other than kinship groups) which cherish a belief in their common origins of such a kind that it provides a basis for the creation of a community...” (Weber, in Kuper & Kuper, 2004, pp 317-319). It is important to distinguish the

notion of ethnicity from other concepts like “race” or “nation”: in sociology, the concept of “race” is considered as problematic and appears not as a concept. The “nation” is, according to Weber, a political concept, for example an ethnic group creating a political structure or an independent state.

The notion of “culture” is complex and evolved over the last two centuries according to different schools of thinking and scientific disciplines as Anthropology, Ethnology, and Sociology. All of these scientific approaches aim to understand the meaning of human action in a given (cultural) context. Culture is socially (culturally) constructed and is “not natural”.

“**Culture**”<sup>15</sup> generally refers to patterns of human activity and the symbolic structures that give such activity significance. Different definitions of “culture” reflect different theoretical bases for understanding, or criteria for evaluating, human activity.

Most general, the term *culture* denotes the whole product of an individual, group or society of intelligent beings. It includes technology, art, science, as well as moral systems and characteristic behaviours and habits of the selected intelligent entities. In particular, it has specific more detailed meanings in different domains of human activities....”<sup>16</sup>

For the social sphere scheme, one should retain that “culture” is a sum of specific references that guide human action and social representations. In this sense, culture is very much related to the dimensions of values and norms, which exist for every society, but with sometimes significant differences among them (literally “what a society, a culture is valorising, what is important”); for example, the role of the family in the sense that the family acts as a strong prescriptor of behaviour, creates social expectations towards their members and so creates behavioural patterns.

This cultural dimension interacts closely with the next variable, being the “reference group”, or “peer group”, and its power as a prescriptor of expected (and accepted) behaviour.

### 5.3.6 Reference group, Peer group effects and subcultures

The notion of the “peer group” or reference group appears relevant regarding the framework of road safety and accident causation analysis. The “Encyclopaedic Dictionary of Sociology” (Sharma; 1992) gives the following definition (pp.637):

1. A primary group, (...), a close, an intimate group, composed of members who have roughly equal status. Children’s playgroups are peer groups and are important to children in forming models for identification because they are relatively free from adult definitions and adult authority...
2. A group of individuals of equal status. (...) children and adolescents, who experience a very different influence on their socialization by interacting in groups of their own age, as compared to the hierarchical family experience.
3. (...) adolescent peer groups tend to have: (1) a high degree of social solidarity; (2) hierarchical organization; (3) a code which rejects, or contrasts with, adult values and experience...”

The appurtenance to a peer group or to a subculture is a complementary factor to ethnical group membership or specifically to being part of the age cluster of “young drivers” (usually age 18 – 25). The notion is important because it can explain what determines risk and/or deviant behaviour at the origin of accident causation. According to the definition, the peer group can establish its proper frame of rules, which result in stimulating behaviour at the opposite of the formal law. The notion of (sub-) culture, very close to the peer group, without its limitation to an age cluster<sup>17</sup>, summarizes a number

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<sup>15</sup> From the [Latin](#) *cultura* stemming from *colere*, meaning “to cultivate”),

<sup>16</sup> <http://en.wikipedia.org/wiki/Culture>

<sup>17</sup> for example, motorcycle gangs as the «Hells Angels» or similar organizations present “subcultures”, establishing a proper code of conduct and a sometimes specific relationship to the formal law and its executives...the appurtenance to a specific age cluster is hereby not necessarily a criteria of membership.

of specific references that present behavioural guidelines to the group. In some situations, the non-respect of these informal guidelines can lead to sanctions by the group towards the “deviant” member.

In the framework of subculture and peer group effects, the notion of “risk culture” is particularly interesting, in the sense that the group may cultivate a number of risky behaviour patterns that are considered as elementary dimensions of the group’s identity. To gain membership (or to maintain it), the members of the group are supposed to act accordingly, for example by participating on inner city races or clandestine speed competitions.

Even by not going this far, simply the peer group’s convention that a Friday night’s disco trip can only be enjoyed after at least 10 beers may create a cultural frame in which the individual member has to throw in the balance if he wants to follow the formal rule (“don’t drink and drive”), or the social control of his fellow peers, who suggest that there really is no problem “because you are in control...”. The formal law possibly being symbolic of everything what motivates him preferring his peers, and the group creating social pressure could give a complementary explanation to the epidemiologic phenomenon of young drivers’ higher exposure to road accidents.

The peer group is maybe a good example of a more complex variable, in the sense of Durkheim’s “*variable intervenante*”, because it is multidimensional and regroups several notions that have their own, specific dynamics such as “age groups”, “relation to the rule”, “subculture”, “social control” or “social pressure”.

The most important dimension of peer group or reference group impact on individual decisions and so behaviour, is the power as a prescriptor that the reference group may exercise on individuals and so eventually create conflicts between the following of the formal norm (for example the highway code, which prohibits drink driving) and the demands of the reference group (the family encouraging drinking on family events where everybody came by car...).

### 5.3.7 Socio demographic factors

Socio demographic factors are already taken into consideration in the traditional accident in-depth analysis. They commonly serve to identify the individual characteristics of the persons involved in road accidents. The epidemiological analysis establishes if in specific accident scenarios, specific age groups or gender, are overrepresented.

According to the “social spheres” analysis scheme, socio-demographic factors are part of the individual sphere. Specifically age and gender are elemental dimensions of the individual and can be understood as “objective” dimensions.

However, the sociological and social psychological perspective situates age and gender in a larger framework; from its viewpoint, both variables are the result of social construction and social definition (“Zuschreibungsprozesse”).

From this position, socio demographic factors should be completed with the objective to enlarge the background information on the individuals implicated in an accident.

The variables “education”, “professional situation” and “habitat” (all to be defined in the following paragraphs) appear not to be taken into consideration on a regular basis in in-depth accident analysis, but appear very useful for complementary background information, because they complete the accident drivers’ social profiles.

#### 5.3.7.1 Age

1. The age in number of years of an individual, or the appurtenance to an age cluster or age group (for example: young drivers = 18-25, senior drivers = 55+, etc).
2. Age determines – more or less - the physical state of the individual.
3. Society determines a number of expectations towards the individual according to his age, for example, regarding his professional activity. The actual western society considers persons over 45

already as “seniors” and difficult to employ. On the opposite, traditional societies, for example in African countries or Japanese society values age in a “principle of seniority”, in the sense that a higher age, being a senior implicates a certain amount of life experience and wisdom.

The example of the “senior driver” or the “young driver” refers to an upstream sphere that determines the actions of members to a given group. The young drivers specific behaviour may be determined by his cultural reference group (see “peers”). The senior driver may distinguish his driving style by the adaptation of specific driving strategies; for example, according to his social status as a non-active person he can choose to go on a trip without regard of the daytime, or choose to drive only during the day.

The appurtenance to an age group is not only determined by the physical age, but by a number of societal definitions and expectations that influence the action of the age group’s members.

### 5.3.7.2 Gender

As “age groups”, the fact of being a man or a woman is not only an objective quality. Outside the biologic quality of a person, the variable gender is always constructed in a social context and extremely dependent of the macro-context of the workforces redistribution and the industrialist paradigm. In most of the European societies, women are considered to be primary preoccupied with the household and the education of the children. Employment rates, wages and decision making positions in management for women are variable over the countries, but still women are –globally speaking- less professionally active, earn less and are underrepresented in management as compared to men.

Regarding road accident risk, especially younger women appear less exposed than young men (for example, GB/ABI; 2006) – or to paraphrase it differently: being a young male (driver) can be considerate as a risk factor. The reasons for this difference appear partly in children’s Education and Socialization, for example the transfer of gender-specific role models with their specific set of social expectations what should be the way of being a young girl in distinction to a young boy (for example: Faulstich-Wieland, et.al., 1995; Lassnigg & Paseka, 1997). The expectation towards young boys being self-affirmation, courage and risk taking (“boys don’t cry...”), and, eventually, the reproduction of the role sets inside the family (as well as representations generated by media) contributes to recreate and to amplify risky behaviour, that is in fact socially encouraged and rewarded. The young girl at the opposite appears still very much integrated in a “mother and housekeeper” role set, the self-affirmation via dangerous games and competition (especially not with the boys) is not broadly distributed in European families, neither is public education.<sup>18, 19</sup>

Relative to accident causation, the role of gender is central to the idea of an analysis via “upstream factors”, because the upstream levels produce the content of gender specific role sets and their resulting risk behaviour.

### 5.3.7.3 Education/ level of education

(The gender related issues of education are already explained in 4.3.5.)

Education means the level of education, referring to a formal criterion being the highest level obtained in one’s studies (for example, “master degree”, “college degree”, “baccalaureate”, etc.)

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<sup>18</sup> A look in French or German schoolbooks and other education material through all kind of disciplines still shows Madame Dupont doing all the cleaning and cooking, while Monsieur Dupont drives the car and goes to the office, her daughter Anne is helping Mother Dupont with the bakery and son Jean-Pierre goes with his friends doing the inline-skating...

<sup>19</sup> see for example: Enders-Dragässer,U.; Fuchs,C.: Interaktionen der Geschlechter. Sexismusstrukturen in der Schule. Weinheim - München 1989; or: Hoffmann, Berno: Das sozialisierte Geschlecht. Zur Theorie der Geschlechtersozialisation. Opladen 1997;

In the context of accident causation research, the investigation of the variable “Education” aims to take into consideration different educational backgrounds of accident drivers.

#### 5.3.7.4 Professional situation

The variable “professional situation” refers to the actual professional occupation, as well to the issue of being active or not being active / being without work. This variable may complete the information regarding the social status of the driver.

#### 5.3.7.5 Habitat

With the variable “Habitat”, the idea is to integrate two dimensions: first, where do the implicated persons actually live, are the urban or suburban residents or living on the countryside. Second, in consideration of the site of the accident, is the geographic place of living part of the trip (did the accident occur during the typical trip “work / home”, or was it an exceptional journey).

Another hypothetical interest of the variable habitat could be the correlation with the living / residential conditions of the individual and on what is his “mobility budget” (how much time someone spends in his daily work / life / leisure-related trips).

### 5.3.8 Social Identity

In the Social Identity Theory<sup>20</sup>, an individual has not a “unique” personal self, but integrates several “selves” according to his different memberships in social groups and their related role sets. According to the social context, the individual behaves on several levels, depending for example if he is in a professional, public or familiar context. An individual has multiple “social identities”, meaning his self-concept in relation to his perceived or internalized membership of social groups. The social identity is distinctive from the notion of “personal identity”, which refers to self-knowledge that derives from the individual’s uniqueness (what makes his personality).

The theoretical framework of Social Identity involves the categorization in in-group and out-group, the general effect being, that the in-group (actually of whom the individual considers being member) is higher valued than the out-group.

#### 5.3.8.1 Social status and Social Structures

The “social status” is connected to the notion of social class and social stratification. It refers to the – relative – social position of an individual in a society. The social status is determined by social definition, it is a product of society and its social structures. Social structures mean “a sum of units that are in relation, and this relation is regular and not due to hazard”<sup>21</sup>. The term “Social Structures” describes social conditions, that are perceived as being objective and that are generated by social interaction; specifically, social structures are not altered during the social interaction, but generally persist due to specific stabilizing elements, such as social sanctions, norms and values, traditions and institutions. According to Galtung (1984), social structure may result in “structural violence” when social structure “create influences or impact on individuals, with the consequences that their actual, somatic and intellectual possibilities of self-fulfilment are realized on an inferior level, as compared to their potential fulfilment”<sup>22</sup>.

#### 5.3.8.2 Social role

The definition of a social role is “a set of connected behaviours, rights and obligations” according to specific social situations. The social role foresees a set of expected behaviour according to the social

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<sup>20</sup> see for example: Tajfel, H.; Turner, J. C. :“The social identity theory of inter-group behavior”. In S. Worchel and L. W. Austin (eds.), *Psychology of Intergroup Relations*. Chicago, 1986; Turner, J. C. :“Towards a cognitive redefinition of the social group”. In H. Tajfel (ed.), *Social Identity and Intergroup Relations*. Cambridge, 1982;

<sup>21</sup> free translation, after Barth (1987), pp108-109 ;

<sup>22</sup> free translation after Galtung (1982), pp12-13 ;

status and the social positions of the actors. An individual has several social roles, for example, his professional role (being an engineer in a international company), being a parent (father / mother of two children) and part of a private football association. Each of these roles has a different set of specific expectations towards the individual, and these expectations have not necessarily to do with the expectations regarding the other role sets (being a confirmed football player is not necessarily creating a benefit in the conception process of an electric traction system). Social role and their expectations participate to create social structures, and serve to render social interaction predictable.

### 5.3.8.3 *Lifestyles*

Lifestyle, on the one hand, is a way of living that is based on an individual's choice, which is adapted to the individual's personal characteristics and his personality, his social interactions, as well as socio economic and environmental factors. At the other hand, the adaptation of an individual lifestyle is very much dependent on the cultural capital (Bourdieu, 1979) of a person, which determines via cultural dispositions, acquired during one's socialization process, the potential access to a specific social status and so the possibly, to choose his individual lifestyle. From a constructivist point of view, the notion of lifestyles is established in straight reference to the concept of "habitus".

### 5.3.8.4 *Habitus*

The concept of Habitus is central to the sociology of P.Bourdieu (Bourdieu, 1979) and his attempt to develop sociology of human practice "that avoids both individualistic voluntarism and structuralist determinism..." (Jenkins, in: Kuper & Kuper, 2004, pp 439-440). "The habitus is made up of classificatory schemes and practical dispositions, the two being intimately implicated on each other. (...) these schemes and dispositions, particularly the basic practical taxonomies in which classification and disposition (...) coincide, are transposable from one social domain to another, as the logic of practice characteristic of a group or culture (...) Embodiment is fundamental to the habitus (...) For Bourdieu, the body, via the habitus, is a mnemonic device within and on which the foundations of culture are inscribed..." In Bourdieu's understanding, the expression of the body, the behaviour, and the clothing style or consumption activities translates the incorporated socialization and the cultural capital of the individual, which does not mean that this is entirely the result of a cognitive process. Habitus is an important dimension of social identity, it contributes to determine the place of an individual, and to create "distinction" (Bourdieu, 1979).

In the framework of accident causation analysis, the notion of "habitus" makes sense regarding individual or collective driving styles, in the sense that they translate a number of incorporated socio cultural dimensions in the behaviour of individuals. As explained above, these "-styles" are neither entirely conscious, nor totally unconscious.

## 6 The “social spheres analysis scheme “

After defining the different variables which in their sum, constitute the upstream levels of social and cultural factors, this paragraph summarizes in a table the variables according to each level, and presents the idea of the social spheres scheme in a graphic form.

### 6.1 The social and cultural upstream factors: overview

The following table (cf. Figure 8) classifies the different socio-cultural variables according to each layer of the “social spheres”. Figure 9 shows the final social spheres analysis scheme completed by the social and cultural variables.

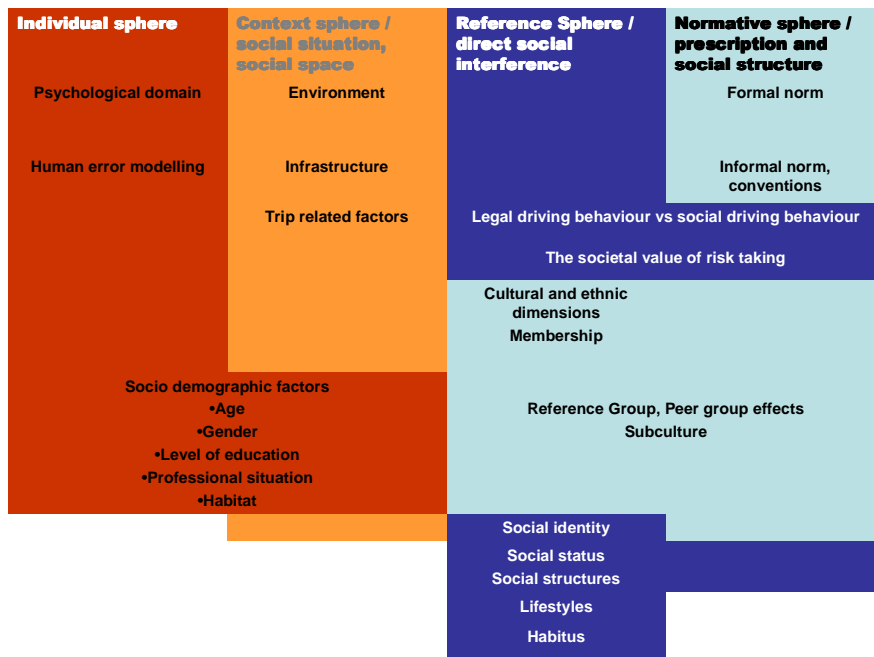


Figure 8. Classification of the socio-cultural variables according to each upstream dimension

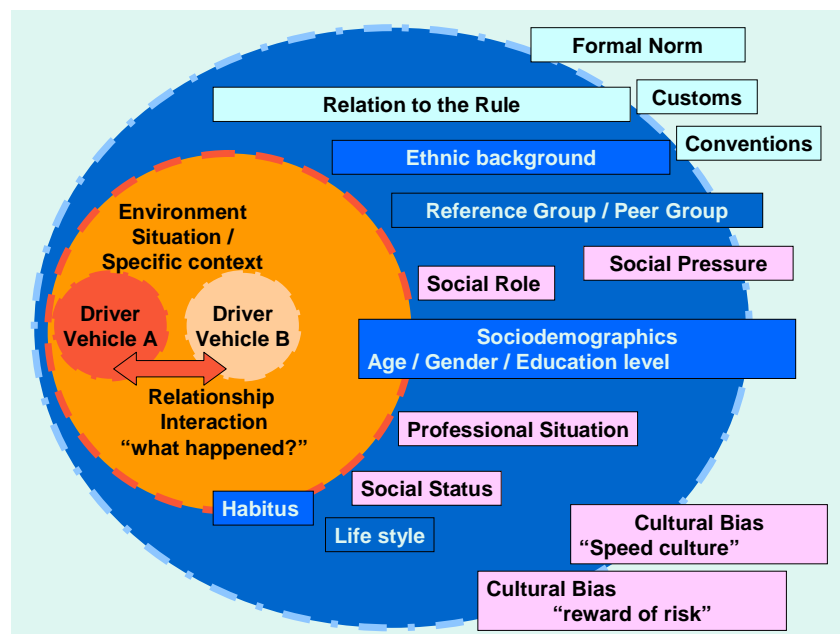


Figure 9. Dynamics of the social and cultural variables which constitute the “social spheres”

## 6.2 Application of the “social spheres analysis scheme” on accident causation analysis

After the introduction of the “social spheres analysis scheme”, now what is the benefit of this analysis tool? How to use the “social spheres” scheme as an analysis grid inside accident causation analysis? This paragraph’s objective is about the practical application of the “social spheres” scheme; the following description will be constructed examples<sup>23</sup>, issued from experiences with accident in depth studies in the framework of LAB and CEESAR’s accidentological research.

To demonstrate the practical application of the analysis scheme, two usages will be demonstrated:

1. the use of the “social spheres” scheme as a tool for location of the human accident causation factor,
2. the construction of a social identity card for establishing social profiles on accident drivers.

The benefit of the “social spheres analysis scheme” is projected essentially in identifying predictors regarding socio-cultural impacts on human behaviour, and so for example bases for prevention strategies.

Regarding the pure research aspect, the “social spheres” present an investigation tool for usage in the framework of the EDInterview. In further generations of in-depth studies, the multi-dimensional variables from the “spheres” can be formalized for statistical analysis.

### 6.2.1 Feasibility testing of the social spheres analysis scheme in the framework of existing in-depth accident investigation databases

#### 6.2.1.1 The “social spheres analysis scheme” as a tool for location of the human accident causation factor

The aim of the present section is to propose a sociological perspective on the human factor in accident causation. The proposed analysis scheme takes into consideration latent social and cultural factors outside the individual sphere, supposed to have a potential impact on a number of accident causation scenarios.

The logic of the “social spheres” is to give access to potential accident causation factors which are situated outside the individual sphere, where the “human error” is analyzed and so render visible upstream factors that can have an impact on the accident causation process. There are some examples where the human accident causation factor is located outside the individual sphere, that there are latent socio-cultural factors manifesting at an accident outcome.

As exposed in the precedent chapters, these latent socio-cultural factors correspond mostly to the structure of Durkheim’s “*variable intervenante*”, it is a mix or coincidence of several of these latent variables that act together and so produce the accident.

The “social spheres” can help to locate such variables and so orientate the analysis and further research.

For example an accident as an outcome of “drink driving”, in combination of influences from a reference group from a specific cultural context: the main cause for the accident happened is situated outside the individual sphere, even if the individual “caused” the accident as a consequence of a decision and behavioural process. The determining factors for the accident outcome were already prepared way ahead in specific socio-cultural settings that let the individual decide to consume alcohol together with his family during a family event<sup>24</sup>, it was a social event, where everybody behave the same and alcohol consumption and driving somewhat was socially cautioned.

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<sup>23</sup> A practical application on real case studies and the existing databases EDA and GIDAS will be subject of task 3.2 in the framework of Work package 3.

<sup>24</sup> cf. Bergdahl, 2007 in the bibliographic chapter

The accident causation factors consequently are located in the formal and the reference sphere, it is there where the further research or prevention strategies should intervene.

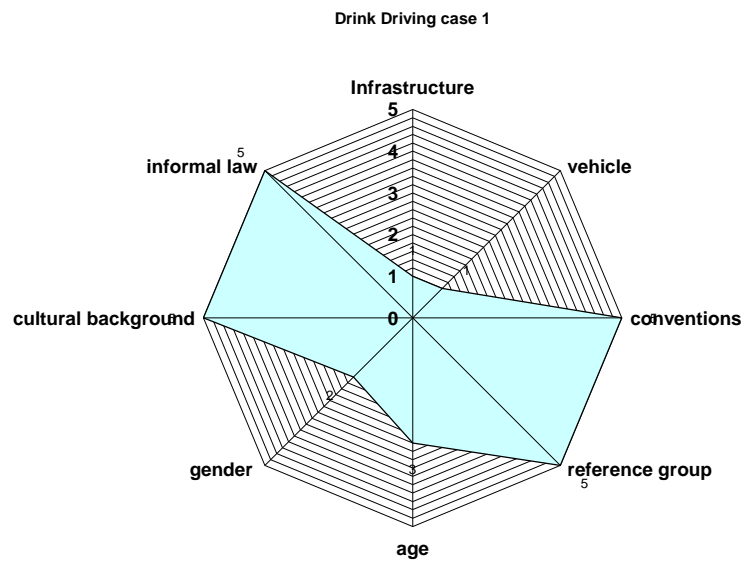


Figure 10. One example of location for « drink driving » according to the social spheres analysis framework

Another example, also regarding “drink driving” as an accident causation factor would be the following: male driver, 43 years, sales manager who drives - neglecting the speed limit - after a business lunch with alcohol consumption and has an accident; what are the accident causation factors? From the perspective of the “social spheres” scheme, the accident causation factors are situated in the reference sphere, the person responds to socially expected behaviour, due to his social position and professional role, which implies a specific habitus regarding socio-professional situations and possibly his driving style (dynamic) as well. To predict the potential outcome, the analysis should focus on the social frame and the social conventions before the person takes the wheel, the “human error” he will commit is only the trigger.

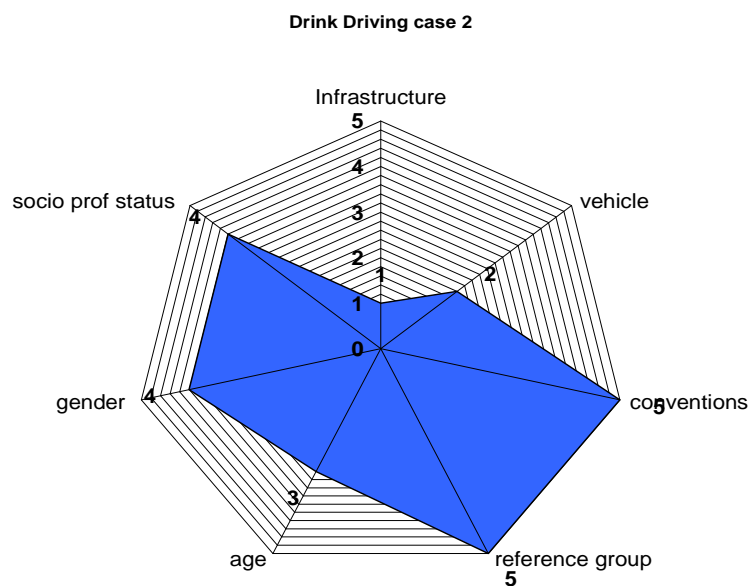


Figure 11. A second example for the location of “drink driving” inside the social spheres

Another constructed, but nevertheless probable case could be the following: a foreign driver (German driver's permit holder), drives for the first time in the suburbs of Paris. He has an accident, neglecting the priority of another driver while trying to orientate in a high speed environment (everybody is driving faster than the indicated legal speed limit, slower driving is sanctioned with horn or verbal insults). Where are the accident causation factors situated? The "social spheres" scheme would locate factors inside the formal sphere, as a "clash", a "violation" of social expectations inside a given legal and cultural frame, where a foreign driver has different expectations regarding the social and legal environment and than the resident drivers.

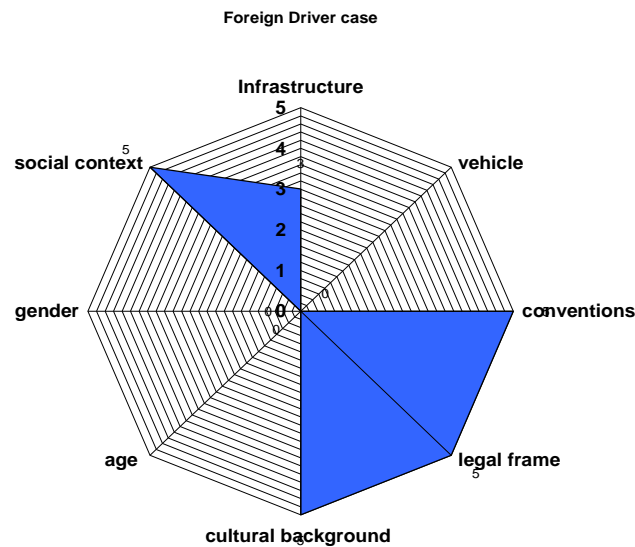


Figure 12. An illustration for the location of the issue of the "foreign driver" inside the social spheres

A further application of the "social spheres" scheme is the social profiling of drivers which are implicated in an accident. The idea hereby is not to define risk groups in the sense of stereotyping or stigmatizing individuals regarding their specific personal background, but merely collect relevant background information on what is the socio-cultural context of some accident scenarios.

The social identity card could be a tool that can help to define, via a "negative approach" (meaning, what is actually lacking in today's in-depth analysis on accident causation), what would be relevant background information to collect for a wider understanding of the accident causation process.

Typically, the social identity card would be part of the EDA interview, and so integrate the socio-cultural background information in the interview process. The "design examples" for the social identity card are supposed to be first examples aimed to clarify its concept - the card is supposed to evolve and to improve according to the usage during upcoming testing and further research.

### 6.2.1.2 Proposal for a social identity card and its application

The objective of the social identity card is about systematically collecting driver information that contributes to establish hypothesis on potential influences of social and cultural factors. The identity card is supposed to inform about the driver's characteristics that can be established during the MVA (Motor Vehicle Accident) Interview process. Based on the information entered, the card can help to establish hypothesis regarding the social and cultural factors and contributes to explain the accident causation process and gives a better identification of specific risk groups.

	Age	Gender	socio-prof.	education
<b>Accident scenario</b>				
<b>membership</b>				
<b>Peer Group</b>				
<b>Trip related information</b>				
<b>Habitat</b>				
<b>Observations</b>				

Figure 13: Social identity card

In addition to the objective of a larger human factor analysis frame, the social spheres scheme presents a tool for comparative analysis in an international context.

For example, once a specific configuration is analyzed for a given country, complementary analysis permits to compare if the content of the upstream levels

- 1) do have the same "sense" for another socio-cultural context, and,
- 2) do produce equivalent risks inside the individual sphere.

### 6.2.1.3 Examples for application of the social identity card <sup>25</sup>

The following two cards are the translation of the “foreign driver case” (case 3) and the “drink driving case 2 from 6.2.1.a:

	Age	Gender	socio-prof.	education
	40-49	M	Aeronautics Engineer	Engineers academy degree
<b>Priority conflict, disorientation</b>				
<b>membership</b>	German nationality		German drivers permit	
<b>Peer Group</b>		Businessmen Manager		
<b>Trip related information</b>	Business trip in a foreign country, First time stay to France			
<b>Habitat</b>				
<b>Observations</b>				

Figure 14. An example of “priority conflict” to illustrate the social identity card

	Age	Gender	socio-prof.	education
	40-49	M	Manager (sales director)	Bac + 3
<b>Speed, drink driving</b>				
<b>membership</b>				
<b>Peer Group</b>	General Management	Speed culture		Recidivist
<b>Trip related information</b>	Professional trip, countryside; after business lunch			
<b>Habitat</b>			92 Paris, suburbs	
<b>The person actually follows a training for driver’s permit point recuperation</b>				

Figure 15. An example of “drink driving” for illustration of the social identity card

<sup>25</sup> NB: the above “social identity cards” are constructs; their objective is to show examples of realistic accident scenarios by emphasizing on the social human factor. There could be other constructs, for example, on young drivers having an immigration context or workless drink drivers, which are also realistic but at the same time would appear somewhat caricatured.

The last case presents a construct which is generated from the diverse experiences in 'child restraint systems'-misuse. The factors that will in the end contribute to produce the "human error" are situated in a combination of the specific social context (bringing his son in time to school; rush hour; 5 minutes left until school begins), social conventions (it is only 5 minutes to school, why bother with the child seat, everybody does...) and possibly a lack of knowledge regarding the risks for the non-secured child.

	Age	Gender	socio-prof.	education
	30-39	F	Engineer	PhD
<b>Speeding, priority conflict, non conform CSR use</b>				
<b>membership</b>				
<b>Peer Group</b>				
<b>Trip related information</b>	Giving a lift to school to her 7 year old son; urban area; 8.25 a.m.			
<b>Habitat</b>	75014 Paris			
<b>Observations</b>				

Figure 16. An example of CRS misuse for illustration of the social identity card

## 7 Conclusions and recommendations

In this report, a proposal for a larger perspective on human factor related accident causation analysis was introduced. The approach via a “social spheres analysis scheme” is designed to visualize latent social and cultural factors, which are potentially affecting individual decisions and so behaviour.

**The “social spheres” is a tool that allows locating the socio-cultural influences outside of the individual sphere. This tool is supposed to enhance accidentologists’ sensitivity to such potential influences for the benefit of the accident causation analysis procedure.**

Especially in the context of an evolving European Community, the aspect of comparing the different societal and cultural backgrounds is an important challenge for further accident causation research, the understanding of socio-cultural differences being a key issue for future European road safety governance.

However, the field of accident causation research has to evolve towards more interdisciplinary approaches and new, especially more “soft” sciences approach must be integrated step by step. To integrate the social spheres approach in existing accident causation research, a number of conditions should be realized:

1. The social sphere scheme is an explanatory scheme on social and cultural factors that are only applicable when the information was actually collected in the first place. Consequently, the data collection procedure should be organized with an objective of flexibility and lean procedures.
2. The collection of relevant social and cultural data should ideally take place in the framework of the EDA interview. To do so, the technicians who are supposed to realize the data collection must be trained and accompanied (supervision) to conduct an interview in line with social science standards.
3. Training of accident investigators, interpretation of social and cultural dynamics and the development of an evolving analysis grid refers to a know how of sociologists, ethnologists or social psychologists.
4. The objective supreme of data collection on socio-cultural dimensions should always be done with the supreme objective of enhancing sustainable safety and societal benefit for society as a whole, and not serve to stigmatize specific social groups or individuals.

The present methodological contribution to Work Package 5 of TRACE European project adds a complementary view on human factor inside the accident causation process, by putting the individual in a larger framework of socio-cultural influences.

The presented approaches permit the integration of a more complete view on additional accident mechanisms, which are generated outside the individual, and can so help to improve accident data collection and its interpretation for future research.

This method will be applied inside Work Package 3, which is dedicated to the operational analysis of Accident Factors.

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