

The influence of fairness and ethical trade-offs
on public support for road safety measures.

An international and intercultural exploration.

Thesis submitted by

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Declaration of Authorship

I, Wouter Van den Berghe, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Dedicated to my parents

Abstract

The research questions of this thesis are: 'When is a road safety policy measure fair?' and 'Which factors influence the support for road safety policy measures?'. The core approach used to address these research questions was to present citizens, experts and policy-makers with contentious measures in road safety and identify the factors associated with their views on these measures. Three complementary methods were used: a global analysis of the associations between national indicators, in-depth interviews with experts and policy-makers in five countries, and an online survey of a representative sample of adults in ten countries. An original scheme has been developed for categorizing arguments in favour and against policy measures.

The research undertaken has led to a better understanding and operationalisation of fairness. A (road safety) policy measure is perceived as fair if it is equitable, not restricting human liberties, relevant and feasible to implement. Perceiving a measure to be fair is indicative but not sufficient for supporting it.

Many factors influence public support for policy measures. The level of support for policy measures in road safety differs strongly between countries, and is associated with the level of economic development and national culture. When road safety performance is relatively high and societies are individualistic, the opposition against new measures tends to be higher.

Important factors influencing public support are beliefs concerning the importance of the problem which the measure is intended to address, the expected consequences, and the confidence that the measure can be implemented effectively. Individuals' support for a policy measure is strongly associated with the social norm, i.e. the belief that their friends would support that measure.

Recommendations are made for further research on fairness and support for measures, as well as for improvement of policy-making in road safety.

Impact statement

This thesis focuses on the fairness of policy measures in road safety and the factors affecting public support for such measures. Three complementary methods were used in different countries: analysis of national indicators, interviews with experts and policy-makers, and an online survey. Original methods and tools were designed and applied such as a framework for arguments in favour or against measures, and methods for the operationalisation of fairness. The findings include insights in the dimensions of fairness that people consider when assessing policy measures, in the factors that influence support for such measures, and in differences between countries and cultures. Many findings can be generalised to a wide range of road safety measures and likely to apply in other policy areas as well.

The rich datasets created, in particular the national indicators and the survey data, can be used for further research. Examples are regression models for fairness and public support and the creation of country clusters based on factors such as subjective safety and/or behaviour in traffic. The findings can also help in creating a theoretical framework on factors influencing public support for road safety measures and for research on the factors associated with changes in public support.

The research has demonstrated the importance of culture in shaping road safety approaches and measures. I have also illustrated that several concepts used in relation to road safety in high income countries are less relevant in low- and middle income countries. There is considerable scope to expand on these cultural issues.

My research has raised already some interest in the research community. Early findings were presented at conferences and meetings in Austria, Finland (online), Canada (online), the UK (online), France (twice - online) and Sweden. Four published scientific articles and two public reports are already a direct result of the research undertaken, and more are to follow. The questions on support for policy measures in the global ESRA3 survey have been modified following the findings of this thesis. Some data and results have already been shared with other researchers. I have been approached by reputed scholars in road safety and culture to examine the potential for joint articles. Presentations and papers on topics of my PhD have already been accepted for international conferences in The Netherlands, the United States, Portugal and Qatar.

There will also be impact outside academia. My findings can assist policy-makers in considering fairness and ethical issues more explicitly in the preparation and ex-ante evaluations of new policy measures. My thesis also supports other findings that increasing the public support for policy measures requires changing the belief systems of people. To increase public support, policy-makers should be seen as legitimate and they should undertake action to change incorrect beliefs that are widespread within the population. I have already presented some findings at events attended by policy makers in Belgium, the Netherlands, the UK and Sweden, and more are to follow. An interview and a background article was published on the website of Hofstede Insights. I also intend to write to all the policy-makers who were interviewed and share some insights I have gained through this research.

Acknowledgement

This PhD was a journey in which I met many interesting people, that brought me to several new places, and gave me new insights. I learned a lot during the process. Combining the research activities with demanding professional responsibilities was sometimes tough, but overall I feel satisfied to have taken this challenge.

I feel grateful towards everyone who has supported me along my journey. Without them I would never have been able to finish this challenging project. Let me start with thanking my supervisor at UCL, Nicola Christie. She enthusiastically engaged me as her PhD student, despite my unusual profile, uncertainties on my real availability and the fact that my initial idea was based on a research method rather than on a research question. But she guided me gently onto the right track, often challenging my approaches, pushing me for greater focus and making it clear to me that a PhD was not writing yet another report, but a learning exercise in which I needed to be critical of the analytical methods that I had used as a consultant all my life. And a learning exercise it was! Thanks also to Nick Tyler and Benjamin Heydecker, who gave very useful comments when defending my upgrade report and to Helena Titheridge (UCL) and Bert van Wee (TU Delft), the examiners for this thesis, for making time available for analysing the thesis and their final feedback.

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provided me exclusively with the data on the updated cultural dimensions of Hofstede and put me in touch with Michael Minkov, the main author of the first scientific articles using these indicators. I learned a lot from them in relation to national culture and how it can be quantified; we also have already two joint publications.

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I started my PhD after my children, Nele, Marjolein and Kwinten, had obtained their higher education degrees. They wondered a bit what their 'student-father' was doing in his free time – but were always supportive and understanding, and even helped me out on certain parts. My final thanks go my late parents to whom I dedicate this thesis. They had to raise an often somewhat rebellious son and were decisive in giving me a desire to learn, an openness to the world, and a strong sense of fairness.

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Abbreviations and acronyms

Country codes

When codes are used for countries, the official 3-digit ISO code is used (e.g. BEL for Belgium, USA for the United States and GBR for the United Kingdom). The full list of country codes can be found in Table 69 (p.352) in Appendix A1.

Policy measures

Table 1 lists the codes of the measures discussed, followed by a short formulation of the measures and the chapters in which they are discussed. The exact formulations of the measures can be found in Table 15 (p.102), Table 16 (p.104) and Table 53 (p.210).

Table 1. Code and short formulation of the policy measures discussed

Code	Short formulation	Chapter 4 (country-level)	Chapter 5 (interviews)	Chapter 6 (dilemma survey)	Chapter 7 (policy measures)
30K	Maximum 30 km/h in urban areas		X	X	
ALC	Alcohol interlocks compulsory	X	X	X	
HEC	Children cyclists to wear a helmet	X			
HEL	All cyclists to wear a helmet	X	X	X	X
HEP	All PTW (<i>Powered two-wheeler</i>) drivers to wear a helmet	X			
INS	Differences in gender for insurance			X	
ISA	ISA (<i>Intelligent Speed Assistance</i>) systems in all cars	X	X	X	X
LIC	Free driving licence education			X	
NHC	No use of headphones cyclist	X			
NHP	No use of headphones by pedestrians	X			
NMP	No use of mobile phones in cars	X			
PAY	Traffic fines proportional to income		X	X	X
RFC	Cyclists to wear reflective material	X			
RFL	Pedestrians to wear reflective material	X	X	X	X
RFP	PTW to wear reflective material	X			
SCR	70+ to be screened for driving ability		X	X	X
SRE	Seatbelt reminder in all seats	X			
SWS	Speed Warning signs in all cars	X			
ZEN	Zero BAC (<i>Blood Alcohol Concentration</i>) for novice drivers	X			
ZER	Zero BAC for all drivers	X	X	X	X

Other abbreviations and acronyms used

Table 2. Other abbreviations and acronyms used

BAC	Blood Alcohol Concentration / Blood Alcohol Content
CBA	Cost-Benefit Analysis
DUI	Driving Under the Influence (<i>of alcohol or drugs</i>)
ESRA	E-Survey of Road Users' Attitudes
ESS	European Social Survey
EU	European Union
EVS	European Values Survey
GLOBE	Global leadership and organizational effectiveness (<i>project</i>)
HIC	High Income Country
ILO	International Labor Organization
ISA	Intelligent Speed Assistance (<i>also used for the measure on ISA</i>)
ISO	International Standards Organization
LMIC	Low or Middle Income Country
LOI	Length of Interview (<i>for a survey</i>)
PISA	Programme for International Student Assessment
PTW	Powered Two-Wheeler
SARTRE	Social Attitudes to Road Traffic Risk in Europe
SES	Socio-Economic Status / Socio-Economic Situation
TSC	Traffic Safety Culture
UCAN	United States, Canada, Australia and New Zealand
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
VRU	Vulnerable Road User
WHO	World Health Organization
WVS	World Values Survey

“Would you enforce a speed limit of 30 km/h in villages where you have no pedestrian crossings and no cycle traffic that you could not protect with other means?”

1. Context and aims

1.1 Road safety

The term '**road safety**' refers to both a policy area and a scientific discipline, addressing incidents, accidents and injuries that occur in traffic. Some authors and organisations use the term 'traffic safety', for example Ward, Watson, & Fleming-Vogl (2019) and NHTSA, the American National Highway Traffic Safety Administration (but not systematically). In most Germanic languages, the term used for road safety is the literal translation of 'traffic safety', for example *Verkehrssicherheit* (German), *verkeersveiligheid* (Dutch) and *trafiksäkerhet* (Swedish). In Romanic languages often the equivalent of "road safety" is used, for example *sécurité routière* (French), *seguridad vial* (Spanish) and *sicurezza stradale* (Italian). In this thesis I will systematically use the term 'road safety', as it is now the term commonly used by UK authorities (Department for Transport, 2019), the European Commission (2019) and the World Health Organisation (WHO, 2018).

A collision with a vehicle, road user or an obstacle on the road is often called an 'accident' or a 'road accident'. Increasingly, however, experts and policy makers prefer to use the term '**crash**' or '**road crash**', because in English 'accident' includes the connotation that the event could not have been avoided. The European Commission has recently decided to use the term (road) crash in its communications on road safety. 'Crashes' is also used in the recent international Stockholm declaration on road safety (Ministerial Conference on Road Safety, 2020). In this thesis I will use systematically the terms 'crash' or 'road crash', unless when citing sources that use the term 'accident'. Please note that in road safety research and policy, the focus is on 'injury crashes', referring to road crashes in which at least one person is injured or killed.

Road crashes are one of the major causes of deaths and injuries across the globe. The World Health Organisation (WHO) estimated that in 2016 over 1.35 million people died on public roads and over 50 million were injured (WHO, 2018). Despite considerable progress over the last four decades in Western Europe and other highly developed countries, it remains an important challenge for all countries to reduce the number of road casualties and fatalities. Actually, over the last years (except during the Covid-pandemic), in several European countries the number of road crash fatalities is no longer decreasing (Adaminaite, Jost, Stipdonk, & Ward, 2017; European Commission, 2020a). In many low- and middle-income countries (LMICs), the numbers are still increasing (Wegman, 2017).

1.2 Challenges for road safety policy making

1.2.1 Making policy choices

The central purpose of policy measures and interventions in road safety is to reduce the numbers of people killed and injured on the road, or to minimize the harm and burden when crashes have occurred. The three main intervention areas of road safety policies are road infrastructure, vehicle technology and people behaviour in traffic. Measures can target or benefit one or more types of road users such as car drivers, motorcyclists, cyclists or pedestrians; sometimes they focus on particular subgroups such as novice drivers, professional drivers or seniors.

For a given problem, different types of measures and interventions can be considered. Choosing between different road safety interventions is not straightforward. One reason is that the effectiveness of measures is difficult to predict. Uncertainty margins on the expected effects of measures are often high and transferability of results across countries and traffic situations can be problematic. Cost-benefit analysis, a method that is often used for major infrastructure and transport projects (van Wee, 2012), is still in its infancy when it comes to road safety measures (Daniels et al., 2019). Moreover certain interventions may have undesirable side effects, such as restricting mobility.

Many (potential) measures in road safety can be considered as trade-offs or dilemmas. Should cyclists be obliged to wear a helmet? Should people undergo mandatory screening at a certain age if they still want to drive a car? Is it fair that novice car drivers have to pay a much higher insurance premium than more experienced drivers? Should all cars be equipped with (expensive) active safety systems? Both arguments in favour and against such measures can easily be identified. They illustrate the conflicting perspectives and ethical principles that can often be found in road safety measures – and hence make choices difficult.

Choices also need to be made between investing in road safety measures and other policy measures. For example, how important is it to reduce the number of people injured on the roads in comparison with reducing environmental pollution or preventing crime? According to Elvik (2003) the aim of reducing traffic deaths is an application of the more general principle of minimising mortality. But road safety measures are not the only way to minimise mortality. There could be other ways to reduce deaths that are more effective or cost-effective, e.g. promoting a healthy lifestyle. From that perspective, Elvik states that the priority for spending public resources should be on measures where the marginal rate of life-saving is the highest (Elvik, 2003).

1.2.2 Road safety at the crossroad of policy areas and levels

Improving road safety can be considered as a public health objective. Although adequate post-crash care is crucially important for reducing the consequences of crashes, public health authorities are not the major actor in reducing the burden of injuries. Most road safety measures are part of other policy areas such as road infrastructure (design, construction and maintenance of roads), transportation (traffic flows, vehicle specifications), interior affairs (law enforcement), justice (sanctions and rehabilitation), education and prevention (campaigns). The need to involve such a broad group of public authorities and stakeholders makes it a real challenge to define a coherent and comprehensive policy, and implement it in a coordinated way.

International organisations, such as the United Nations (UN), the World Bank and the WHO, therefore recommend that road safety policy design and implementation should be coordinated by a 'lead agency' (Peden et al., 2004, p.184);

"Identify a lead agency in government to guide the national road traffic safety effort. Each country needs a lead agency on road safety, with the authority and responsibility to make decisions, control resources and coordinate efforts by all sectors of government – including those of health, transport, education and the police. This agency should have adequate finances to use for road safety, and should be publicly accountable for its actions."

In most countries, however, such a central lead agency does not exist. In countries where it does, it is often tied to a particular ministry and has limited control and coordination power. Examples in Europe are Vias institute in Belgium (tied to Federal Public Service Transport and Mobility), the National Road Safety Observatory in France (part of the Ministry of Interior) and BASt in Germany (which receives its funding from the Federal Ministry of Transport). Spain is a special case in the sense that the Ministry of Traffic (DGT) can be considered as the central (federal) agency, but it is strongly linked to the police. Ireland (Road Safety Authority) and Bulgaria (State Agency Road Safety) are among the few countries in which road safety agencies are 'structurally' linked with the whole road safety spectrum.

A second complicating factor is that road safety measures often need to be taken at different levels of jurisdiction, from the local level (e.g. design of urban infrastructure) over the regional and national to the international level (e.g. vehicle safety specifications in the European Union). Especially in federal countries with strong regional authorities, such as Belgium (regions), Germany (Länder), the USA (States) and Spain (Autonomous Communities), the distribution of decision-making power

across federal and regional levels makes it more difficult to design and implement coherent road safety policies.

1.2.3 The impact of public support on policy-making

Public policy is often not the outcome of a fully rational decision-making process. The policy decisions made may be influenced by the intrinsic motivation of policymakers. This is often rooted in a combination of the scientific evidence politicians are aware of and their 'ideological' views, for example support of active mobility such as cycling, beliefs in paternalism, environmental concerns, views on urban development, cultural preferences, etc.

An important factor in policy formulation is also the expected level of public support. The more a decision is unpopular, the less policymakers will tend to take that decision. Of course, this need not always be the case, in particular when the beliefs and intrinsic motivation of the policymakers are strong. But overall, when the level of public support for a particular measure is perceived to be low, policymakers will be hesitant to implement the measure.

The 'real' level of public support is often not very well known. Even less is known on why people support or oppose a measure. Sometimes people's beliefs may be wrong, for example that reducing the speed limit would lead to a considerable increase in travel time. Particular stakeholders and lobby groups may use arguments that look convincing but are not necessarily correct. Moreover, the loud voice of particular stakeholders may obscure that the large majority of the population is actually in favour of the measure or does not agree with the counterarguments.

A case in point is making it compulsory for cyclists to wear a helmet, a measure that is heavily opposed by national cyclists associations in Europe as well as the European Cyclist Federation (ECF, 2014). Studies have shown, however, that many of the counterarguments used by opponents of compulsory cycle helmets (e.g., a decrease in cycling) are not based on evidence (Høye, 2018b). Also a range of surveys have shown that in many countries a large majority of the population is in favour of making helmet wearing compulsory for cyclists (Buttler, 2016; Smith et al., 2014; Van den Berghe, Sgarra, Usami, González-Hernández, & Meesmann, 2020). Interestingly, the support is lowest in countries with a high number of cyclists, such as The Netherlands.

If policymakers want a particular measure to be implemented, then they have an interest to increase the level of public support. This requires an understanding of the factors that influence the resistance to particular measures (Smith et al., 2014). A high level of public support for a measure is also a requirement for ‘success’ of the measure, with people actually adapting their behaviour in the desired direction (Goldenbeld, 2002). If a measure meets with resistance from a large group of road users, this group is likely to organise itself and start a movement against the measure. A recent example is the massive protest in France against the reduction of speed limits on rural roads from 90 to 80 km/h, which even led to a partial reversion of the measure after it had been voted and implemented (Ligue de Défense des Conducteurs, 2020).

1.2.4 Fairness of road safety policy measures

Research on the implementation of road safety measures has so far mainly focused on their effectiveness and, to a much lesser extent, cost-effectiveness. A fairly recent synthesis of the state of the art in relation to effectiveness of road safety measures and interventions, can be found in the Road Safety Decision Support System developed by the SafetyCube project (www.roadsafety-dss.eu). Cost-effectiveness of measures has been considered for a limited number of measures in specific measures; a more general and systematic review of a range of measures was published by Daniels et al. (2019), an article to which I contributed.

However, an effective measure is not necessarily fair. For example, a measure could reduce the number of crashes for one group of road users (e.g., car drivers), but increase the risk for another (e.g., cyclists). A typical example is constructing a roundabout as a replacement for a crossing. Such a measure decreases the crash and injury risks for car occupants, but may increase the risks for cyclists (Daniels, Brijs, Nuyts, & Wets, 2010). It is discriminatory when one group gets more benefits or less negative effects than another. Such situations may create a feeling of unfairness, which is likely to decrease public support. Thus, policymakers should ensure that the measures they propose are perceived as fair by the population.

Very little research has been conducted on the fairness of road safety policy measures and how this is associated with public support. Also, despite the intrinsically ethical dimension of road safety policy – its main concern is to avoid harm to people – not much research has been undertaken on the ethical aspects of road safety interventions and on whether these are fair from an ethical perspective. During my research I did not encounter any official guideline on how and to what extent ethical considerations ought

to be taken into account in road safety policies and measures. For example, there are no clear guidelines on how to balance moral considerations with economic ones. Or to strike a balance between preserving individual freedom and restricting mobility.

1.3 Overall aims of the PhD

1.3.1 *Towards better policy-making in road safety*

The previous sections have illustrated that making a just choice in road safety policy-making is often complex. Now, with public spending under pressure, with the role of regulation for shaping society being questioned and with expectations of citizens increasing, it is important to understand what the real choices are, how citizens and policymakers look at these choices, and to identify mechanisms for making ‘just’ choices, based on an adequate balance of different considerations.

When I joined Vias institute in 2013 (then called ‘Belgian Road Safety Institute’) as the Research Director, I had two main objectives: (1) to improve the quality of road safety research; and (2) to contribute to road safety policy-making. This thesis is mainly related to the second objective. My professional activities and responsibilities include giving advice on the choice and formulation of policy measures in Belgium. In 2021 I was asked to coordinate the drafting of the Belgian federal and inter-federal road safety roadmaps and strategies (Van den Berghe, 2021). At European level I had or still have key responsibilities in policy related projects such as Baseline (baseline.vias.be), ERSO (European Road Safety Observatory – see https://ec.europa.eu/transport/road_safety/specialist/erso_en), SafetyCube (www.roadsafety-dss.eu) and ESRA (E-Survey of Road users’ Attitudes - see www.esranet.be). At global level, I represent Vias institute in UNRSC (United Nations Road Safety Collaboration) and drafted a guide to assist UN Member States in formulating indicators for supporting their policies (Van den Berghe, Fleiter, & Cliff, 2020).

With this PhD I want to contribute to better policy making in road safety, by analysing a neglected aspect of it: the fairness of road safety measures and its relation to public support. How can we ensure that measures are taken that are both effective and fair? Fair policy measures in road safety require the balanced consideration of the legitimate interests of different stakeholders, as well as respecting ethical principles. Fair decisions on road safety require that policymakers understand these perspectives. In a democratic society, such understanding should lead to better and fairer decisions. It

can help aligning public authorities and other stakeholders on which measures should be taken and why. This brings me to the central questions at the core of this thesis:

- (1) When is a road safety policy measure fair?
- (2) Which factors influence the public support for road safety policy measures?

1.3.2 Using contentious measures as a basis for analysis

The main mechanism that I envisaged to understand the factors affecting fairness and support for measures was to present citizens, experts and policymakers with a number of contentious measures in road safety and identify the factors that were associated with their views on these measures. By confronting people with such (possible) contentious measures, one can gain a better understanding on what factors play a role in people's support or opposition to policy measures.

A policy measure is 'contentious' when strong opposition from certain stakeholders can be expected and/or because the measure violates established rules or principles. Such measures lead to heavy public debate and strong opposition from particular groups. Those who benefit are often different from those who lose. In other words, at least one stakeholder group may consider the measure to be unfair. Other stakeholders may have the view that not taking the measure is unfair from their perspective. Measures can be contentious because a compromise has to be sought between health considerations – the measure could lead to more or less injuries or modify the physical health of the population – and mobility considerations – the measure could lead to changes in people's individual mobility. Another trade-off that often arises is between the overall benefits for society and the restriction of individual rights.

Let me give an example of such a contentious measure, which is also discussed in this thesis: the obligation for older people to undergo regularly a medical screening to determine whether they are still capable of driving a car safely. Some countries have introduced such a measure but others did not. The mere observation that policies vary strongly between countries suggests that the decision to implement such a measure is not an easy one to take. Such a decision can be considered as a dilemma because the obvious intended advantage that should result from the measure – protecting society and the older people themselves against crashes on the road, and hence reduce the number of fatalities and injured people – has to be balanced against the implications and counterarguments such as:

- the relatively high costs of such regular universal screenings, compared to the limited benefits (the number of casualties and fatalities avoided)

- the limitation of the mobility of older people and hence also a drastic reduction of their quality of life, in particular for those living in isolated locations with limited access to public transport or other affordable transport options
- a stigmatisation of older people, most of whom know perfectly well when they should drive or not
- the unproven fact that such a measure would actually lead to a reduction of the road crashes with older people.

In this example, the arguments in favour of such a measure are clearly ethical – we should diminish the number of fatalities and casualties – and partially economic – the gain in crashes leads to lower financial burden and hence the costs can be justified. But the counterarguments also span a wide spectrum of perspectives, including economic, political, ethical, scientific and pragmatic considerations. Moreover, there is some counter-intuitive evidence (Martensen, 2017; Siren & Haustein, 2015) suggesting that such a measure may not have the intended effect at all, rather the contrary.

1.3.3 *Generalisability of findings*

Several studies are already available on the acceptability of road safety policy measures, listing a range of factors that contribute to people's willingness to support those measures. In most cases, however, it concerns support for one particular measure in a single country. Given my ambition to contribute to better road safety policy-making, my interest was to obtain findings that would be generalizable or transferable to a wide range of measures and countries. In order to achieve this, three requirements needed to be fulfilled:

- (1) A variety of policy measures should be studied, incorporating different types of ethical trade-offs, targeting different road users and using different intervention strategies.
- (2) The research should have an international dimension, covering countries that differ in terms of culture, level of development and road safety performance.
- (3) Different types of data and data analysis methods should be used so that policy measures can be considered from different perspectives.

In Chapter 3 on methodology I will show how I went about to meet these requirements.

1.4 Structure of this thesis

Following this introductory chapter, this thesis is structured as follows:

- Chapter 2 presents the main results of my review of the literature. The main topics covered are: ethical issues, fairness, culture and public support for measures – all in relation to road safety.
- Chapter 3 on methodology includes a detailed presentation and justification of the three methods that were used in order to answer the research questions: analysis of associations between national indicators, in-depth interviews, and the organisation of a dedicated survey, called the ‘dilemma survey’.
- Chapters 4 to 6 present the findings resulting from the three methods used. In each chapter I consider public support for road safety measures from a different perspective. Factors affecting the perceived fairness and the level of public support for these measures are identified.
- Chapter 7 discusses and compares the key findings from the different methods on six policy measures. The results are put in context and compared to findings from other research.
- In Chapter 8, the overall results of the research are discussed. I answer the two main research questions, discuss the limitations of the methodologies adopted and make recommendations for further research and road safety policy-making.
- The References section includes bibliographic information on the over 430 publications referred to in this thesis.
- The Appendices include additional information on the national indicators considered, background information on ESRA, the interview guide, the survey questionnaire and details on the arguments used by the interviewees.

1.5 Own publications and presentations in relation to this thesis

Early results of the PhD research have been published in a number of peer reviewed articles and public reports. The articles concern ethical issues in road safety policy-making (Van den Berghe, 2018), preliminary results of the country level analyses (Van den Berghe, Schachner, Sgarra, & Christie, 2020) and selected findings from the dilemma survey (Van den Berghe, 2020; Van den Berghe & Christie, 2022). I was also co-author of articles which were related to my analyses on ESRA data (Pires et al., 2020), national culture (Granié et al., 2020) and priority setting between measures (Daniels et al., 2019). I was author or co-author of four externally reviewed reports that

were published by Vias institute and are related to the topics of my PhD thesis (Martensen et al., 2018; Meesmann, Torfs, & Van den Berghe, 2019; Van den Berghe, 2017; Van den Berghe, Sgarra, et al., 2020).

In addition, over the past few years I have presented early findings at conferences and meetings, including:

- TRA – Transport Research Arena, Vienna (Austria), April 2018
- Vlaamse Conferentie Verkeersveiligheid, Turnhout (Belgium), March 2020
- ESRA Webinar series, Ottawa (Canada, online), November 2020
- CROW Webinar on ISA, Ede (The Netherlands, online), April 2021
- FERSI General Assembly meeting, Helsinki (Finland, online), April 2021
- RFTM – Rencontres Francophones Transport Mobilité, (Paris, online), June 2021
- PACTS meeting, London (UK, online), November 2021
- POLIS conference, Gothenburg (Sweden), December 2021
- ESRA Conference, Paris (France, online), April 2022.

At the time of submitting this thesis, presentations had already been accepted for the following international conferences:

- FERSI Conference on Evidence-Based policy making, The Hague (The Netherlands), October 2022
- Road Safety on Five Continents, Grapevine (USA), October 2022
- Transport Research Arena, Lisbon (Portugal), November 2022
- International Traffic Safety Conference, Doha (Qatar, online), February 2023.

“Many things that we could not imagine five years ago are now possible. ISA would have been impossible five years ago.”

2. Literature review

2.1 Introduction

2.1.1 Purpose and scope

The main purpose of the review of the literature was to gain insight in the current state of knowledge in relation to the aims of the PhD and to identify the knowledge gaps that I should address with my research. The literature review was also meant to identify possible questions and items for the dilemma survey, to be well prepared for the interviews and to be able to interpret correctly the results of my analyses.

Thanks to my activities at Vias institute I have a very broad understanding of road safety topics. The focus of my literature review was therefore on areas and topics where I was less familiar with. I reviewed the literature in the following areas: applied ethics; the concept of fairness; social equity; dilemma's and trade-offs in policy making; factors affecting public support for policies; and intercultural differences between countries. I examined these areas both generally and in relation to road safety. The findings of the literature reviews have been grouped into five sections:

- Ethics and ethical issues in road safety
- Fairness
- Fairness in road safety
- Culture
- Public support for policy measures.

2.1.2 Approach adopted for the literature reviews

The typical approach adopted for reviewing the literature search was as follows:

- (1) Identifying relevant publications with the Explore search engine of UCL by using specific keywords and combinations of these keywords. Potentially useful publications were identified on the basis of the title and/or abstract.
- (2) Identifying additional publications through snowballing and reverse snowballing, as well as through suggestions from people in my national and international networks. Through this second method, some relevant grey literature was identified (e.g. reports from road safety institutes).
- (3) Categorizing the identified publications in a Mendeley database.
- (4) Analysing the publications on a particular topic and copying relevant parts (abstract, text sections, tables, graphs, references) into working documents.

The various working documents were the initial source for this chapter on Literature. In three cases the working documents also evolved into a publication: a report on the relation between socioeconomic status and road safety (Van den Berghe, 2017), an article on ethical issues in road safety policy making (Van den Berghe, 2018) and the introductory part of a scientific article on cultural differences in support for policy measures (Van den Berghe, Schachner, et al., 2020).

The literature review process continued during the whole duration of the PhD (2015-2021), with the highest intensity in 2016 and 2017. Between 2013 and 2015, when I was developing the ideas for the PhD project, I had read several books in relation to ethics and applied ethics. This included books from Bergmann & Sager (2008), Driver (2007), Rachels & Rachels (2003), Rawls (1999), Singer (2011) and van Wee (2011).

2.2 Ethics and ethical issues in road safety¹

2.2.1 What is ethics?

The main purpose of the literature review on ethics was to understand how ethical concepts, principles and theories can be applied to road safety, and in particular to road safety measures and policy-making. In this thesis I will mostly use the term 'ethics' rather than 'morality' and 'ethical' rather than 'moral'; many authors use these terms interchangeably.

Numerous definitions of ethics have been put forward. The Oxford Learners Dictionary (<https://www.oxfordlearnersdictionaries.com/>) gives three meanings of ethics: (1) moral principles that control or influence a person's behaviour; (2) a system of moral principles or rules of behaviour; and (3) the branch of philosophy that deals with moral principles. Lefkowitz (2003, p.6) defines ethics as *'the study of how one should properly live one's life, especially with respect to behaviour toward others'*. Rachels & Rachels (2003, p.13) describe morality as *'[...] the effort to guide one's conduct by reason – that is, to do what there are the best reasons for doing – while giving equal weight to the interests of each individual affected by one's decision.'*

Applied ethics is concerned with the practical application and implementation of ethical principles and concepts. The two concepts at the core of applied ethics are ethical values, i.e. what is regarded as good or bad and ethical norms, i.e. prescriptions on

¹ Important parts of this section are based on an article published in the peer-reviewed conference proceedings of the TRA conference in Vienna (2018) (Van den Berghe, 2018).

how one should act, including duties and rights (Vanem, 2012). Ethical principles are neither eternal nor universal. What is currently perceived to be good behaviour may have been considered unacceptable in the past – and vice-versa. Cultural differences may also be considerable, for example on the extent to whether harmful behaviour is still unethical when it is unintentional (Saxe, 2016).

A major challenge for the literature review on ethics was to create a meaningful structure for ethical issues in relation to road safety. One possible way was to start from 'ethical theories'. Ethical theories provide a framework and a series of principles for ethical conduct. There are many ethical theories (see e.g. Carnis, 2015; Elvebakk, 2005; Pereira, Schwanen, & Banister, 2016; van Wee, Hagenzieker, & Wijnen, 2014). These theories can be grouped into different categories, such as:

- deontologist theories, that relate ethical conduct to the respect of norms and rules
- consequentialist theories, such as utilitarianism, that base the ethical nature of conduct to its consequences
- egalitarian theories, that have the equitable treatment of people as their guiding concept
- libertarian theories, that put forward the autonomy and rights of individuals.

In general, most people use deontological and consequentialist considerations as the basis for their conduct in a particular situation, whereby in general the deontological considerations prevail (Douglas & Swartz, 2015; Hunt & Vitell, 2006). Most ethical theories are geared towards the individual, i.e. they set a framework of what ethical behaviour for an individual would imply. However, some ethical theories such as utilitarianism and egalitarianism can also be applied at the level of policy-making. Ideological differences between policymakers can often be related to principles of the predominant ethical theory they adhere to most. Van Wee & Roeser (2013) discussed briefly how policy measures such as the implementation of speed limits can be related to different ethical theories.

In egalitarian theories moral considerations such as justice and fairness are very important; such considerations are missing from consequentialist theories. Famous egalitarian theories are those of John Rawls (discussed briefly below), Amartya Sen (1987) and Martha Nussbaum (2013). Rawls (1971, revised in 1999) argued that political institutions should strive to enhance the well-being of those who are the worst off. In his view, the focus of the state should be on the provision of goods which are primary for all persons: basic liberties, including freedom of association; freedom of

movement and choice of occupation; powers and prerogatives of offices and positions of responsibility; income and wealth; and the social bases of self-respect (van Wee & Roeser, 2013). Rawls states that the equalization of goods of the first two categories must be complete and has priority over the (distribution of) other primary social goods. Viegas (2001) has pointed out that 'Mobility' is a basic right that had not been considered by Rawls; the author considers it a basic right in modern societies that people can drive freely to gain access to any part of the territory.

After reading the publications on ethics I had doubts on whether ethical theories would provide a useful framework for my analyses. Given the wide range of ethical theories and the broad range of road safety topics this risked becoming a huge and very unproductive approach. Instead, I adopted a logic similar to that of Fahlquist (2007), based on a limited number of ethical 'principles'.

A central ethical principle is to do no harm to people, and this principle is also at the core of road safety policies and measures. Many other ethical principles are relevant for road safety; I identified four which are of particular importance for road safety policy-making: individual freedom, assuming responsibility, fairness/equity and respect for privacy. To some extent, each of these five key ethical principles can be considered as a central value in an ethical theory (Table 3).

Table 3. Link between ethical principles and central values in ethical theories

Ethical principles	Central value in
Reducing harm	Consequentialism
Preserving freedom	Libertarianism
Assuming responsibility	Deontology
Being fair	Egalitarianism
Respecting privacy	Libertarianism

Table 4 shows the association between these five principles and ethical categorisations that are used or have been proposed in other contexts, such as the moral foundations theory (Graham et al., 2011; Nilsson & Erlandsson, 2015) and the framework with normative standards of conduct in health care (Beauchamp & Childress, 2013; Henning et al., 2016; Mullen, 2014). The table includes also key ethical issues in road safety identified by Fahlquist (2007, 2009).

Table 4. Association between the ethical principles selected and other categorisations

Ethical principles	Fahlquist (2007)	Moral Foundations Theory	Health model of Beauchamp and Childress
Reducing harm	Risk imposition	Harm/care Sanctity/degradation	Non-maleficence
Preserving freedom	Paternalism	Authority/subversion	Autonomy
Assuming responsibility	Responsibility	Loyalty/betrayal	Beneficence
Being fair	Fairness/Equity	Fairness/cheating Loyalty/betrayal	Justice
Respecting privacy	Privacy	Sanctity/degradation	Non-maleficence

2.2.2 Ethics in road safety policy and measures

Road safety is interwoven with other disciplines such as transportation, infrastructure, public health, security, law enforcement, criminal justice, vehicle technology, ICT and education. Hence, an ethical issue in road safety can often also be seen as an ethical issue in transportation, in public health care, in criminal justice, etc.

Ethical issues in road safety appear to have been neglected largely by philosophers and ethicists (Fahlquist, 2009; Hansson, 2014; Husak, 2004; Ori, 2020). To the best of my knowledge, a comprehensive overview of all key ethical issues in relation to road safety has not yet been published. Only a few authors have addressed a range of ethical issues in relation to road safety. The first one was Fahlquist in her PhD thesis (Fahlquist, 2007) and related publications (Fahlquist, 2006, 2007, 2009). She focused on five dimensions: criminalisation, paternalism, privacy, justice and responsibility. Carnis (2015) elaborated on issues like privacy, freedom, fairness, the value of life and criminalisation. Through different publications Elvik (2001; 2006; 2009; 2013) addressed several ethical aspects of road safety such as the value of life, equity and criminalisation. In his book on Transport and Ethics, van Wee (2011) discusses several ethical topics in relation to transport and road safety, including equity, freedom of movement, accessibility and the value of life. Most other authors typically address only one aspect of ethics in road safety, often in relation to restriction of freedom (e.g. Elvebakk, 2015; Gostin & Gostin, 2009; McKenna, 2007).

Recently, privacy has emerged as a topic of increasing concern (e.g. Eriksson & Bjørnskaug, 2012; Losavio, Pastukov, & Polyakova, 2015; Zimmer, 2005). Another recent research area is ethical decision-making in automatic vehicles (Evans et al., 2020; Hevelke & Nida-Rümelin, 2015; Lin, 2016; Santoni de Sio, 2021). Interestingly,

the debate on ethics in vehicle automation has also led to a new interest in ethical driving behaviour in not-automated vehicles (Bergmann et al., 2018; Dietrich, 2021; Krügel & Uhl, 2022; Radun et al., 2019).

Policy choices often have an ethical dimension; in some cases one could even speak of an ethical dilemma. Crone and Laham (2015) state that ethical dilemmas demand trade-offs between competing moral goods, such as causing one harm to prevent another. According to Allen (2012) an ethical dilemma requires choosing between two or more alternatives, when no matter what course of action is taken, at least some ethical principle would be compromised. Carnis (2015) argues that road safety policy makers are almost always confronted with dilemmas since whatever measure is taken, the benefits differ for different groups of people.

Dilemmas may also result from the tension between the benefit/harm of individuals and the overall good for society. This is often the case in road safety. Elvebakk (2015, p.300) states: *“The individual driver [...] will relate to accidents as a matter of personal risk, and this risk, for any given individual at any given time, is actually very low [...]. Thus measures that can easily be justified on the aggregate level, as saving tens of lives every year, might, to the individual driver, represent a significant limitation of individual liberty or privacy, and only a very marginal reduction of individual risk.”*

Let us consider some examples of how ethical dilemmas are often at the core of road safety policy measures. When seatbelts were gradually introduced in most of the developed countries in the 70s and 80s it led to heavy debate and opposition (Hingson et al., 1988; Leichter, 1986). Wearing a seatbelt was considered by opponents of the measure as ineffective and an attack to personal freedom. This debate seems absent these days, at least in Europe. The current high acceptance of seatbelts suggests that people now hardly perceive it as an infringement of freedom and/or understand that the overall benefits in terms of harm reduction far outweigh the restriction of freedom. The debate on the use of seatbelts is still alive in many Low and Middle Income Countries (LMICs) and also in some parts of the USA, in particular for rear-seat passengers. As of 2021 adults in New Hampshire are not required to use safety belts; only children (up to 18 years) need to be restraint (Consumer Protection Bureau, 2021).

Another classic case of an ethical dilemma is the use of helmets by motorcyclists. There is ample evidence that wearing a helmet reduces strongly the risk of severe head injuries and the risk of dying on the road (Liu et al., 2009; Tabary et al., 2021).

This has even been recognized by courts in American states who had ruled that helmet legislation was an infringement on personal rights (Jones & Bayer, 2007). The arguments against helmet-wearing laws have typically targeted that the potential harm is self-inflicted (Elvebakk, 2015). I agree with some authors that this argument is actually not well founded. According to Cherry (2010) the socioeconomic costs related to medical expenses, insurance costs, lost earnings and wages, unemployment compensation, and disability might constitute harm to society as a whole, extending beyond the individual who chose not to wear a helmet during a motorcycle crash. Hundley et al. (2004) point out that since non-helmeted motorcyclists in the USA frequently do not have insurance, reimbursement in this group of patients is poor and the burden of caring for these patients is transmitted to society as a whole.

The case of mandatory motorcycling helmets comes down on how to balance arguments for individual safety, burden to society and the individual's right on assuming certain risks. There are no common scales to compare these arguments and hence different people can come to different conclusions. For instance, compare the statement *"in activities such as motorcycle riding [...], the benefits of reducing common, severe injuries and deaths outweigh the possible dangers of undue infringement"* (Bachynski, 2012, p.2219) with that of the Supreme Court of Illinois stating *"The manifest function of the head-gear requirement in issue is to safeguard the person wearing it [...] from head injuries. Such a laudable purpose, however, cannot justify the regulation of what is essentially a matter of personal safety rights"* (Jones & Bayer, 2007, p.210).

Unlike for motorcycle helmets, there are only a few countries in the world – including Australia, New Zealand and Argentina (Esmailikia, Grzebieta, & Olivier, 2018) – where helmet wearing is compulsory for all cyclists. The number of countries where such helmets are compulsory for children is increasing though, and this obligation now exists in the majority of EU (European Union) countries. All evidence on the use of helmets by cyclists points to a considerable reduction of head injuries (Høye, 2018). From a health policy perspective, however, making cyclist helmets mandatory may not be desirable. Some claim that imposing helmets might be a deterrent to cycling and might reduce the overall public health benefits that result from cycling. There is a lot of debate on this topic (Bateman-House, 2014). The European Cyclist Federation is against mandatory helmet laws (ecf.com/what-we-do/road-safety/ecf-position-helmets) – even if recent results seem to indicate that the deterrent effect is probably minimal or inexistent (Høye, 2018). It should be recognized that the average burden for society of

a cyclist head injury is lower than for a motorcyclist, if both would not wear helmets. However, the sheer number of cyclists in some countries (Denmark, the Netherlands, parts of Germany and Belgium, many LMICs, ...) results in a much higher number of severely injured people. Whether to impose a helmet for cyclists is a classic question of public health ethics, concerned with whether a compulsory policy should be imposed on individuals in order to obtain an aggregate benefit (Bateman-House, 2014).

Another example of ethical dilemmas in road safety policy is the use of 'alcohol interlock systems' or 'ignition interlock systems'. These systems are installed in cars to prevent that people can drive a car when they have been drinking over the legal limit. These systems are still very expensive and have a high maintenance cost; therefore they are typically only used in rehabilitation programmes after a driver has been sanctioned for drunk driving. In some countries alcohol interlock systems are used as a preventive measure and installed in certain vehicles regardless of the drink driving history of the driver, e.g. buses in Finland, France and Sweden (Ecorys, 2014). From a utilitarian perspective, it is quite obvious that the installation of alcohol interlock systems can be justified, since their effectiveness has been proven for reducing the risky behaviour and the number of crashes of persons that had been convicted for drunk driving (Nieuwkamp, Martensen, & Meesmann, 2017). Grill & Fahlquist (2012) point out that the avoidance of self-inflicted harm comprises a large part of the rationale for the policy, limiting the liberty of drink drivers for their own good. But many people consider such a measure as an infringement of personal freedom; moreover it causes some inconvenience when driving. This illustrates the debate on when paternalistic measures could be justified.

In the next sections I discuss the relevance of the ethical principles of 'Reducing harm', 'Preserving individual freedom', 'Assuming responsibility' and 'Respect for privacy' in the context of road safety. 'Fairness' will be discussed in Section 2.3.

2.2.3 Reducing harm – avoiding injury risks on the road

The prime purpose of road safety measures is to prevent that people are injured or killed on the road. Since reducing harm is a central value in all ethical approaches, the core aim of road safety has a strong ethical dimension. It is, however, not straightforward to assess the ethicality of road safety measures, since such measures are mainly intended to reduce injury risk for people, rather than preventing the act of injuring. Hansson (2010, p.585) states: *"Issues such as risk-taking and risk imposition have been left out of ethics since they are believed to belong to decision theory, and*

consequently the ethical aspects of these issues have not been treated in either discipline." A further complication is that crashes most often result from the coincidence of many factors at once. This context makes it difficult to establish direct decision-cause-effect relationships, which are essential components of most ethical theories.

By engaging in traffic, people understand that they incur a certain level of risk and also that they may harm others. There are no universally agreed criteria for what levels of risk are acceptable (Vanem, 2012). Hansson (2003, p.305) develops the following tentative moral criterion for risk acceptance: *"Exposure of a person to a risk is acceptable if and only if this exposure is part of an equitable social system of risk-taking that works to her advantage."* Thus, even from an ethical perspective, it is not necessary for an individual or for society to assure that all risks are zero. Actually, the individual and societal price of such a zero-risk solution might be very high, since it may cause problems – ethical and economical ones – in other areas. As stated by Carnis (2015, p.233) (own translation):

"Indeed, at what level of risk do we endanger the lives of others? [...] Should the road user be required to have an ultra-secure vehicle travelling at an extremely low speed to prevent any risk of death in order to have zero risk? Wouldn't such an obligation simply lead to the impossibility of using motor vehicles, which could then generate other forms of harming people?"

From a utilitarian logic it is a moral obligation to reduce risks if the benefits outweigh the drawbacks. Morain & Largent (2019) use prevention of harm as the dominant ethical argument for reducing the legal BAC (Blood Alcohol Concentration) limit for driving after drinking alcohol. Similarly, Smids (2018) argues that making ISA (Intelligent Speed Assistance) compulsory can be justified on ethical grounds, i.e. the harm it prevents, which is more important than the possible infringements of freedom.

Quantifying costs and benefits of policy measures is not easy to conduct in road safety (Daniels et al., 2019). But even when such a cost-benefit approach may be possible, it may not be the morally 'optimal' approach: some groups might actually be worse off even if the total benefit for society is positive (Hayenhjelm & Wolff, 2012). This would go against Rawls difference principle stating that *"Social and economic inequalities are to be arranged so that they are both: (a) to the greatest benefit of the least advantaged, consistent with the just savings principle, and (b) attached to offices and positions open to all under conditions of fair equality of opportunity"* (Rawls, 1999, p.266). Hokstad and Vatn (2008) give other arguments why a rational utilitarian approach may not always be the best perspective on risk reduction. For rare events such as road crashes the estimate of the risk is often very uncertain; therefore, its value should not be the sole

basis for the decisions. The authors also point out that fear which people have for a high perceived risk, is real, and should also be considered when taking measures.

From an ethical point of view a distinction should be made between risks imposed on oneself and those imposed on others. A common feature of cycling and motorcycling is that the risk to get injured mainly concerns the riders. The opposite situation can be seen with drivers of trucks and, to a lesser extent, (big) SUVs. Some philosophers and ethicists even question whether such vehicles should be allowed on our roads, given the amount of harm they produce, including pollution and use of space (Husak, 2004; Ori, 2014; Vanderheiden, 2006). Miller (2012) discusses arguments both in favour and against. He first presents arguments supporting the view that the automobile's widespread use is ethical. These arguments include the increased freedom of action, greater autonomy for individuals, safety, saving lives of others, possibilities to travel and also indirect effects such as reducing class barriers and heightened environmental awareness. Miller also points out that not having a car in many societies and areas would create hardship for people, because of the difficult access to certain jobs and services. But he also discusses moral arguments against the widespread use of cars, both general and specific. These cover the strong dependency on external resources and forces (limiting freedom), the low energy-efficiency of cars, the negative health impact because of pollution and lower use of active travel modes, and the injuries incurred in crashes.

2.2.4 Preserving freedom versus justifying state intervention and paternalism

Freedom of deciding, acting and moving around is a fundamental human right and a cornerstone of our civilised societies. Freedom is the central value within libertarianism, a group of ethical theories that advocate minimizing coercion and emphasize freedom, liberty, and voluntary association. The 19th century philosopher John Stuart Mill introduced the so-called 'harm principle': the state should only regulate actions that cause (or have a high probability to cause) unacceptable harm to others (Mill, 1859, republished in 1985). A lot of state regulations in Western democratic societies respect Mill's harm principle. Elvebakk (2005) observed that in Norway the freedom to drive where, when and how much is seen as the 'natural state'; restrictions to this state must be justified by reference to harm that could be done to others, directly or indirectly.

Public authorities tend to intervene less in activities that are in the private sphere such as leisure and sports activities, even if some of these activities are more risky than participating in traffic (e.g. horse riding or ice hockey playing). In the context of leisure

activities, the public health duty to prevent avoidable harm must be balanced with the freedom to assume voluntary risks (Bachynski, 2012). Currently the main line of thought seems to be that traffic is in the public sphere. Following that logic the state has a responsibility in regulating traffic for reducing harm in society, even if this implies some restriction of freedom (Elvebakk, 2015; McKenna, 2007).

Preserving freedom is an important concern in road safety policy-making, since many measures are seen or perceived as a restriction of freedom and even paternalistic. According to The Stanford Encyclopaedia of Philosophy, paternalism is *“the interference of a state or an individual with another person, against their will, and defended or motivated by a claim that the person interfered with will be better off or protected from harm”* (Dworkin, 2017, p.1). Bany (2013, p.10) gives the following definition: *“An ethical belief that allows limiting a given person’s or group’s autonomy for their own good. [...] Such kind of action appears as ethically justified when somebody in the position of authority is convinced that he is better equipped with the knowledge concerning what is good for the subordinates than they are themselves.”* Typical examples of road safety measures that some perceive as paternalistic are the obligation to wear seatbelts (in cars) or helmets (on motorcycles).

Accusations of paternalism are common in the history of traffic safety debates (Fahlquist, 2009). The main argument used against paternalistic measures is that individual freedom and responsibility are diminished and that people should decide for themselves on accepting a certain risk. McKenna (2007) argues that paternalistic approaches in road safety can be justifiable, in particular because freedom can be more fundamentally lost through death, which is irreversible. The case for paternalism becomes stronger when the obvious benefits in terms of harm reduction for society outweighs the restrictions in personal liberties (Bachynski, 2012). Elvebakk (2015) observed that paternalistic measures such as motorcycle helmet wearing and seatbelt laws seem to be widely accepted in Europe – whilst mandatory diet and exercise regimes probably would not be so. She concluded that some level of paternalism is acceptable to the public and identified a number of factors that seem to increase the acceptance of paternalistic measures (Elvebakk, 2015):

- The level of risk you expose others to: the higher it is, the more a measure is acceptable (and it becomes no longer a paternalistic measure).
- The level of risk you expose yourself to: if the risk is low, the measure will be considered as highly paternalistic and will be more opposed.

- The magnitude of state intervention: the more/deeper/longer the state intervenes, the lower the acceptability.
- Whether the intervention is perceived to concern citizens' private sphere. When the state is seen to intrude too deep in the private sphere (e.g. imposing a cycle helmet when you use a bike for leisure), acceptability will be low.

One of the reasons for the acceptance of paternalistic measures is that often paternalism is not the only argument – and hence, strictly speaking, the measure is no longer paternalistic. Many measures that protect you as the driver of a vehicle, simultaneously protect others (Elvebakk, 2015).

Public attitudes towards paternalistic measures may change over time. Elvebakk (2015, p.303) states that *“many measures that are highly controversial prior to their introduction, are widely accepted after having proven their usefulness – and relative convenience – in practice.”* Thus, after road safety measures have been introduced, even controversial ones, habits often become a stronger determinant of public support than the ethical counterarguments. This is in line with Wolff (2019) who contends that many of our moral convictions are based on current practices or habits and that we can get used to new rules and develop a different set of intuitions.

Can it be justified to impose a restriction of autonomy to all individuals, even if only part of them might have caused harm without the measure? Carnis (2015) and Grill & Fahlquist (2012) give the example of a generalised obligation for alcohol interlock systems, which would also penalise people who do not drink. They argue that it can be morally justified to install an alcohol interlock system in every vehicle. Even responsible drivers who normally never drink are hence protected against themselves would they make a rare exception to their normal behaviour. Grill & Fahlquist (2012, p.125) state that *“it is not obvious that interlocks entail a greater limitation or interference with liberty than do policing and punishment. [...] Random police tests are less intrusive only to the extent that they are less frequent.”* The authors argue that even when rejecting paternalistic arguments, the costs to society of drunk driving are so high that universal alcohol interlock systems could be justified.

A final point to be mentioned in this section is that restriction of mobility is not the only type of freedom restriction associated with road safety. Another one is the temporary or permanent disability of people injured in road crashes, reducing their options for many activities. Also, the perception that engaging in traffic is unsafe may lead people to adapt their behaviour and limit their movements. Older persons may prefer to stay at

home because they perceive travelling to be too risky. Or people may like cycling but are traveling by car because they perceive cycling to be unsafe (van Wee et al., 2014). Van Wee and colleagues have argued that the unsafety feeling and the reduced freedom of movement should be considered as 'avoidance costs' and incorporated in cost-benefit analyses of infrastructure and road safety measures (van Wee, 2011; van Wee et al., 2014; van Wee & Rietveld, 2013).

2.2.5 Assuming responsibility

Aristotle argued that exercising responsibility requires at least two conditions to be met: to be in control of what you are doing; and to know what you are doing (Coeckelbergh, 2016). The traditional view of responsibility for road safety is that crashes are caused by drivers (Fahlquist, 2009). Indeed, in the very large majority of road crashes, human error or risky behaviour – speeding, distracted driving, driving under the influence of alcohol, etc. – is one or even the most important contributory cause of the crash, in particular in high income countries (HICs) (NHTSA, 2015). This observation is at the core of many road safety campaigns, which are aimed at making drivers and other road users more aware of their responsibility in traffic.

People who perceive an ethical basis for their attitudes tend to show greater correspondence with behavioural intentions and greater resistance to persuasive messages, than people who do not link such moral basis to their attitudes (Luttrell, Petty, Briñol, & Wagner, 2015). This finding may suggest that if road users are better made aware that driving on the road has (several) ethical dimensions, they might be more likely to behave in a responsible way.

Over the last five decades there has been a gradual 'overtaking' of the responsibility for road safety from the individual to the state. A road safety approach which has taken the responsibility of the system designers to the extreme is 'Vision Zero'. It was developed in Sweden to serve as an ethical foundation for the work to be conducted on road safety (Elvebakk & Steiro, 2009). Vision Zero was ratified by the Swedish Parliament in 1997. In its initial formulation, Vision Zero was presented as a paradigm shift in road safety approaches. It stated that it was ethically unacceptable that people are killed or seriously injured when moving around and that safety cannot be traded for mobility (Tingvall & Haworth, 1999). Safety on the road is thus seen as a basic human right. The concept 'Vision Zero' is now seen as both an attitude to life (the unacceptability of allowing people to die in traffic) and a strategy for designing a safe road transport system (Bany, 2013). In the traditional road safety paradigm the car user was seen as

an aggressor, and vulnerable road users needed to be protected. Within Vision Zero, however, the car user involved in a road crash is seen as the victim of a flawed system. The answer, therefore, consists not so much in restricting the drivers as in reconstructing the system, so as to be 'forgiving' (Elvebakk, 2007).

The European Commission and an increasing number of European countries have now embraced the 'Safe system approach' (European Commission, 2019; ITF, 2016; Wegman & Aarts, 2005). It is based on similar principles as Vision Zero and puts a high responsibility on the system designers to avoid road crashes and, if these occur, to reduce the harm caused.

In Europe the state² nowadays assumes its 'road safety responsibility' in three complementary ways:

1. by regulating the road safety system, through setting standards and norms for infrastructure and vehicles and specifying requirements for behaviour on the road
2. by stimulating good practice in traffic, e.g. through education, campaigns, messages and incentives
3. by enforcing the traffic law, through inspection, control and sanctions.

Policy-makers could be accused of immoral acts when they, knowingly and with sufficient budget available, do not implement certain measures with proven high effectiveness, or when they lift existing life-saving restrictions. In relation to the safety policy of the US government, Evans (2008, p.6) states: *"Is it morally acceptable to ignore known knowledge if doing so leads to so much harm?"* Hansson (2014) even questions whether it is defensible that states allow the sale of cars and motorcycles that can be driven at much higher speeds than is allowed on their public roads. Not making speed limiting technology mandatory could be considered as unethical. Hansson makes a similar argument with respect to alcohol interlocks: *'Drunk driving is forbidden, so why are cars allowed that can be driven by an inebriated person?'* (Hansson, 2014, p.373).

It can also be argued that the goal of achieving zero deaths in traffic may not necessarily be the best option for public authorities. Indeed, eliminating all road traffic deaths would either require a very considerable expenditure – which could be used in other areas where more lives could be saved (Elvik, 2009) – or may require restrictions to people that lead a new set of deaths associated with a lack of available transport

² In this section, I use the term "the state" in a generic meaning, referring to public authorities, governments, public administrations at national, regional or local level.

needed for accessing goods and services, including health care services (Mullen, Tight, Whiteing, & Jopson, 2014). So, surprisingly maybe, it could be considered inappropriate to continue to invest very heavily in road safety from a certain threshold onwards. This is also one of the main criticisms on the Vision Zero and related Safe System approaches (when taken to the extreme), with their emphasis on the sanctity of life and a strong, even radical deontological perspective (Bany, 2013).

2.2.6 *Respecting privacy*

When people participate in traffic, they give up some of their privacy. Other people can see where you are, where you move and who is with you. This limitation of privacy seems to be largely accepted by the population, and considered as a necessary consequence of participation in traffic. Eriksson & Bjørnskau (2012) list several studies that considered privacy issues in relation to the use of ICT in the transport sector showing that already about ten years ago ICT-systems and applications were quite acceptable to the public and that privacy issues were not regarded as a major concern.

Over recent years new technologies have emerged which may lead to further reductions in the privacy of road users. Some of these have been primarily introduced for road safety purposes – e.g. speed cameras, section control systems, event data recorders – whilst other systems came along for other purposes such as traffic control and security – e.g. car tracing systems, automatic toll systems, surveillance cameras – but with possibly an impact on road safety. Do such systems constitute an unacceptable intrusion of privacy? According to Elvebakk (2015) a car user occupies a semi-private space and hence the right to remain unobserved should be respected. She argues that people spend such a great percentage of their free time in traffic, that constant observation or control would be an undue intervention on privacy, and a serious infringement on citizens' autonomy.

Privacy is not an absolute value. According to Bartczak (2012), the basic ethical justification of privacy violation should be the good of the people monitored. Thus, protecting safety on the road can be a valid reason for applying surveillance of people and their vehicles – with the implication that their privacy is somewhat reduced. Moreover, such systems can be helpful in providing forensic evidence after the crash (Losavio et al., 2015). Yet, since such technologies enable the collection of information on where drivers went, when they made their trips, and what routes they used, they represent a shift from drivers sharing only general and visually observable information

to the widespread and constant broadcasting of precise, digital information about their daily activities (Zimmer, 2005).

Unjustifiable privacy violations may occur when systems and information are not used the way they were intended to. Risks reported in the literature (Bartczak, 2012; Carnis, 2015; Lin, 2016; Losavio et al., 2015) include:

- Improving safety may not be the prime purpose of the system. Other, possibly unofficial purposes might be more important, e.g. supervision and control of people, income generation through traffic fines, possibilities to commercialise the data obtained, research purposes, etc.
- Road users may be unaware that they are being monitored. They may have been insufficiently informed, or not have been informed at all.
- Part of the information gathered may be visible or accessible to unauthorized persons. This could be caused by voluntary leaks or through hacking.
- The information may be deliberately disseminated to third parties without road users having given their consent or knowing what information is being transmitted.
- The information gathered may be used to influence the road user (e.g. advertising, routing manipulation).
- Personal data and images may be used against the person to which they refer to.
- There may be a risk of voyeurism (in its broad sense) and access to people's intimacy.

Since such risks often cannot be excluded, the official protection of privacy may not be as high as is publicly announced. This weakens the moral justification for the use of such systems.

2.3 Fairness

2.3.1 What is fairness?

The major aim of the literature review on fairness was to gain understanding of the meaning, components and underlying concepts of 'fairness' and 'being fair'. I was only interested in the philosophical and ethical meanings of the terms fair and fairness – so not the meanings of fair like in 'fair weather' or 'fair hair'. The focus was on the macroscopic level, in particular on fairness in policy measures.

Philosophers have looked at fairness in ancient times. Rasinski (1987) mentions that one of the fundamental equity dimensions, i.e. proportionality, goes back to Aristotle, whilst egalitarianism goes back to Plato. According to Nyaupane, Graefe, & Burns

(2007, p.425) *'The most prominent approach is Aristotle's equity theory, which states that goods or rewards should be distributed among individuals in proportion to their contributions. The Aristotelian approach to equity led to meritocratic ideology and the Protestant ethic, which provide the value framework of Western capitalism.'*

Audard (2014) identified several semantic meanings of the term 'fair' (when used in an ethical or philosophical context) which I have reworded and simplified as follows:

- irrepachable, morally untarnished and without stain
- impartial, honest, with no undue favour (e.g. as in 'fair play')
- justified and deserved, taking the conditions into account
- moderate but sufficient, proportional.

Audard (2014) also states that the concept of fairness has gained more interest over the last decades because of the original way it was used by John Rawls (1958). Rawls defines justice as fairness in the sense of equal respect to which all rational beings have a right. Rawls' view on fairness combines the impartiality of the conditions of choice, the honesty of procedures and equity with regard to those entering contracts (Audard, 2014).

When conducting the literature search, I quickly found out that most publications discuss only one type of fairness applied to a particular topic – from equal opportunities in education (Marginson, 2011) over price fairness (Xia, Monroe, & Cox, 2012) to intergenerational responsibility for global warming (Kverndokk, Frisch, & Rose, 2008).

In daily life and in the scientific literature many terms are used, either as a synonym for 'fair' or to define a particular aspect of it. Table 5 shows examples of these terms, resulting for my literature review; all of these terms have of course also their antonyms (unacceptable, inappropriate, inconsiderate, etc.). This long list of alternatives or synonyms of 'fair' means that the perception of fairness may actually be expressed by another word, e.g. 'honest', 'equitable' or 'impartial'. In a particular context such terms may be more appropriate to use than 'fair', since they may convey better the particular dimension of fairness that is applicable. The implication is that even if people do not use the term 'fair', they may formulate a fairness judgment in a particular situation.

The review of the literature has also revealed a strong overlap between the terms 'fairness', 'justice' and 'equity'. Despite some differences in semantic meanings and the contexts in which these terms are typically used, in many situations the words mean (almost) the same. English dictionaries often use one of these terms in the definition of

the other, or suggest it as synonym or proxy. Where one author uses the term ‘fairness’, another one may ‘justice’ or ‘equity’ to refer to the same concept. For this reason I used also the keyword ‘equity’ in my literature searches.

Table 5. Words used as synonyms or proxies for ‘fair’

Acceptable	Equitable	Moderate	Reliable
Appropriate	Even handed	Neutral	Respectful
Balanced	Honest	Non-biased	Right
Considerate	Human	Non-discriminating	Sensible
Correct	Impartial	Non-discriminatory	Sustainable
Decent	Judicious	Objective	Unbiased
Empathic	Just	Proportional	Unprejudiced
Equal	Legitimate	Reciprocal	Upright

2.3.2 Translation of fairness into other languages

The complications generated by the different semantic meanings of fairness and the subtle differences in the English language between fairness, justice and equity are also found in other languages. In the other languages which I understand (Dutch, French, German and Spanish), it is not straightforward to translate the three English terms in three distinct terms. Moreover, the translated terms overlap and sometimes the same translation is used for different English terms. For instance, both equity and fairness are often translated as ‘*équité*’ in French. To illustrate my point, Table 6 includes translations of the terms ‘fair’ (in the ethical/ philosophical meaning), ‘just’ and ‘equitable’ in French, German, Dutch and Spanish.

Table 6. Translation of fair, just and equitable into French, German, Dutch and Spanish

English	French	German	Dutch	Spanish
Just	<i>Juste, Équitable</i>	<i>Gerecht</i>	<i>Rechtvaardig, Gegrond</i>	<i>Justo, Correcto, Justificado</i>
Fair	<i>Juste, Passable, Équitable, Honnête</i>	<i>Fair, Gerecht, Angemessen</i>	<i>Eerlijk, Billijk, Fair</i>	<i>Razonable, Equitativo</i>
Equitable	<i>Équitable, Juste</i>	<i>Gerecht, Fair, Recht und billig</i>	<i>Billijk</i>	<i>Equitativo</i>

Source: Google Translate (<https://translate.google.com>)

According to Audard (2014), it is impossible to translate ‘fairness’ correctly in other languages. She points out that because of the particular combination of meanings of

the English word 'fairness', some languages, like German, have taken over the term without translating it. In French several words are used to translate fairness (such as *équité*), but according to Audard (2014) none of these articulates well the central ideas of honesty, impartiality, justice and equity in the same way as fairness.

2.3.3 Types of fairness

2.3.3.1 Different types of fairness

There are several 'types' or 'categories' of fairness mentioned in the literature; the same could be said about justice. Examples of such categorisations are: alfa-fairness; distributive fairness; horizontal fairness; interactional fairness; intergenerational fairness; min-max fairness; outcome fairness; procedural fairness; proportional fairness; substantive fairness; vertical fairness. Whilst some of these terms overlap, others refer to quite distinct perspectives on fairness. Below I first discuss the three most frequently used types of fairness – distributive, procedural and interactional fairness – and then the other types.

2.3.3.2 Distributive fairness

Distributive fairness was the first type of fairness that was thoroughly studied. According to Mikula, Petri, & Tanzer (1990) early justice research focused exclusively on distributive justice, i.e. the fairness of outcomes people receive from distributions, mainly on pay or other material goods. Different names have been used in relation to distributive fairness, such as distributive equity, distributive justice, substantive justice and outcome fairness. Questions on distributive fairness concern one or both of the following:

- (a) How fair is the distribution or allocation of amounts, quotas and ratios to individuals or groups of people?
- (b) How fair is the contribution of individuals or groups of people towards achieving a particular objective?

Not all authors cover both dimensions of distributive fairness; in particular many refer to the first one only.

Researchers concerned with distributive fairness have developed criteria that allow to assess whether a distribution or contribution is fair or not. Deutsch (1975, p.139) identified eleven criteria for justice, all of which can be related to distributive fairness:

- "Justice has been viewed as consisting in the treatment of all people:
 - (1) so that all receive outcomes proportional to their inputs.
 - (2) as equals.
 - (3) according to their needs.

- (4) according to their ability.
- (5) according to their efforts.
- (6) according to their accomplishments.
- (7) so that they have equal opportunity to compete without external favoritism or discrimination.
- (8) according to the supply and demand of the market place.
- (9) according to the requirements of the common good.
- (10) according to the principle of reciprocity.
- (11) so that none falls below a specified minimum."

Similar lists of criteria and/or perspectives on fairness are also mentioned by other authors. For example, in referring to Leventhal (1976), Lissak & Sheppard (1983) used the criteria equity, equality, need, code, contract, precedent, intentionality, legitimacy, and right. Savas (1978) considered equity only and used four alternative formulations: equal payments (for equal services/distributions rendered); equal outputs/results; equal inputs; and equal satisfaction of demand. Thus, many criteria exist that can be used to judge whether a particular distribution is fair or just.

2.3.3.3 Procedural fairness

Procedural fairness (De Cremer & Tyler, 2007; Visschers & Siegrist, 2012) refers to the fairness of a particular procedure or process. In this context fair means impartial and correct. Other terms are used in the literature such as 'procedural justice' (Barrett-Howard & Tyler, 1986; Chan Kim & Mauborgne, 1993) and 'fairness of the process' (Peterson, 1994; Stuart, 2002). In specific contexts a more original terminology has been introduced, such as 'Accountability for reasonableness' in health care (Daniels, 2000; Kipiriri, Norheim, & Martin, 2009), although this concept is not exactly the same as procedural fairness. Initially the term 'procedural justice' was used most often, and defined as the fairness of the process by which outcomes are determined (Lind & Tyler, 1988). Barrett-Howard & Tyler (1986) mention how the field and scope expanded, starting with early research by Thibaut & Walker (1975) which demonstrated the importance of procedural justice in structured courtroom settings. Subsequent research on procedural fairness showed its importance in different settings, not just in the decision-making process but also in the implementation of decisions and all kinds of processes. Rathgeber, Schrogl, & Williamson (2010, p.1) state: *"The concept of fairness and justice can be applied to both processes and to distributions. Regarding processes, fairness and justice refer to institutions, mechanisms and policies."*

Leventhal (1980) proposed six requirements for procedural fairness (Sheppard & Lewicki, 1987):

- (1) consistency over persons and time
- (2) suppression of personal bias or self-interest

- (3) utilization of accurate information
- (4) correctability of an error
- (5) representativeness of all the relevant constituencies
- (6) consistency with prevailing standards or ethics.

These 'rules' were defined by Leventhal for decision-making processes in relation to resource allocations. In my view these criteria also apply to a much wider range of processes. A more recent list established by Tyler (2000) includes four criteria for procedural fairness: opportunities to participate, neutrality, trust in the motives and treatment of people with dignity and respect. These criteria can be seen as an aggregation of those of Leventhal.

2.3.3.4 Interactional fairness

Interactional fairness is about how fair people are treated and dealt with when they interact with authorities, administrations, companies or any other type of organisation they are in contact with. Interactional fairness first emerged as a special category within procedural fairness. Bies (1986) and Bies & Moag (1986) showed that people are sensitive to the quality of interpersonal treatment they receive during the enactment of procedures such as respectful treatment and truthfulness of communication. Mikula et al. (1990) found in their study on everyday experiences of injustice that a very considerable part of the perceived unfairness was related to interactional unfairness.

Some authors see interactional fairness as part of procedural fairness, others see it as a separate category. A few authors have made further divisions within interactional fairness, like Greenberg (1993) who proposed to distinguish two facets of interactional justice: informational justice and interpersonal justice. Webler & Tuler (2000) discussed citizen participation and viewed fairness as the opportunity for all interested or affected parties to assume any legitimate role in the decision-making process. They developed 'discursive standard criteria for fairness' which centered around citizens having an equal chance in influencing the agenda, choosing the moderator and moderator method, and in participating in the discussions.

2.3.3.5 Other types of fairness

Longitudinal fairness refers to the fair impact of a decision in the long run. The main difference with distributional fairness is that the latter is concerned with the immediate consequences of a decision. A related term is 'intergenerational equity', used by Williams (1997) and many others. Longitudinal fairness has become more important over the last two decades because of the growing recognition of the importance of

sustainability. Intergenerational fairness has also been considered in relation to transport infrastructure projects (Penyalver, Turró, & Zavala-Rojas, 2018), health care (Williams, 1997), and the use of outer space (Rathgeber et al., 2010).

Many authors discussing public health issues use the terms '**horizontal fairness**' (or horizontal equity) and '**vertical fairness**'. 'Horizontal fairness' means that people with the same needs receive the same treatment and care. 'Vertical fairness' implies that people with greater (medical) needs will also be treated more favourably (Wagstaff & van Doorslaer, 2013). Viegas (2001) illustrated that these concepts are also applicable to other policy areas such as urban road pricing. In my view, vertical and horizontal fairness are ways of rephrasing the concept of equity within distributive fairness.

The terms **alfa-fairness**, **max-min fairness** and **proportional fairness** are used within economic theory, and have been applied in various areas such as health policy (e.g. McCoy & Lee, 2014), game theory (e.g. Rabin, 1993) and ICT communications (e.g. Mo & Walrand, 2000). Like vertical and horizontal fairness, in my view these are no first-line fairness categories neither. Rather they refer to ways of distributing resources, and are hence to be considered as mechanisms for ensuring distributional fairness, using particular equity criteria.

2.3.4 The importance of fairness in society

The need for fairness in society is part of the broader need for ethical behaviour, since without respect of ethical principles, our societies would deteriorate and disintegrate. This was formulated by Devlin and Magill (2006, p.495) as follows:

"Society could not function well across the spectrum of its global interests, conflicts, and dilemmas without a sense of common morality which constitutes the foundation or system upon which so many practical decisions in multiple contexts are commonly based."

Tyler (2000) states that people's views about what is just or fair are a social facilitator through which the interaction among people and groups is enabled. He adds that because of a feeling of justice, people can interact without conflict and societal breakdown. Rasinski (1987) concluded that perceptions of fair procedures and distributions are powerful determinants of satisfaction in political and legal settings and of motivation for political behaviour. Referring to Tyler (2006) and Tyler, Boeckmann, Smith, & Huo (1997), Besley (2010, p.259), stated that '*Much of the way that Western countries have set up their political and legal institutions is grounded in the belief that it may not be possible for everyone to get exactly what they want but that citizens should*

be assured a fair process, whether it be before the courts or in electing our representatives.'

The following examples illustrate the importance of fairness in specific situations:

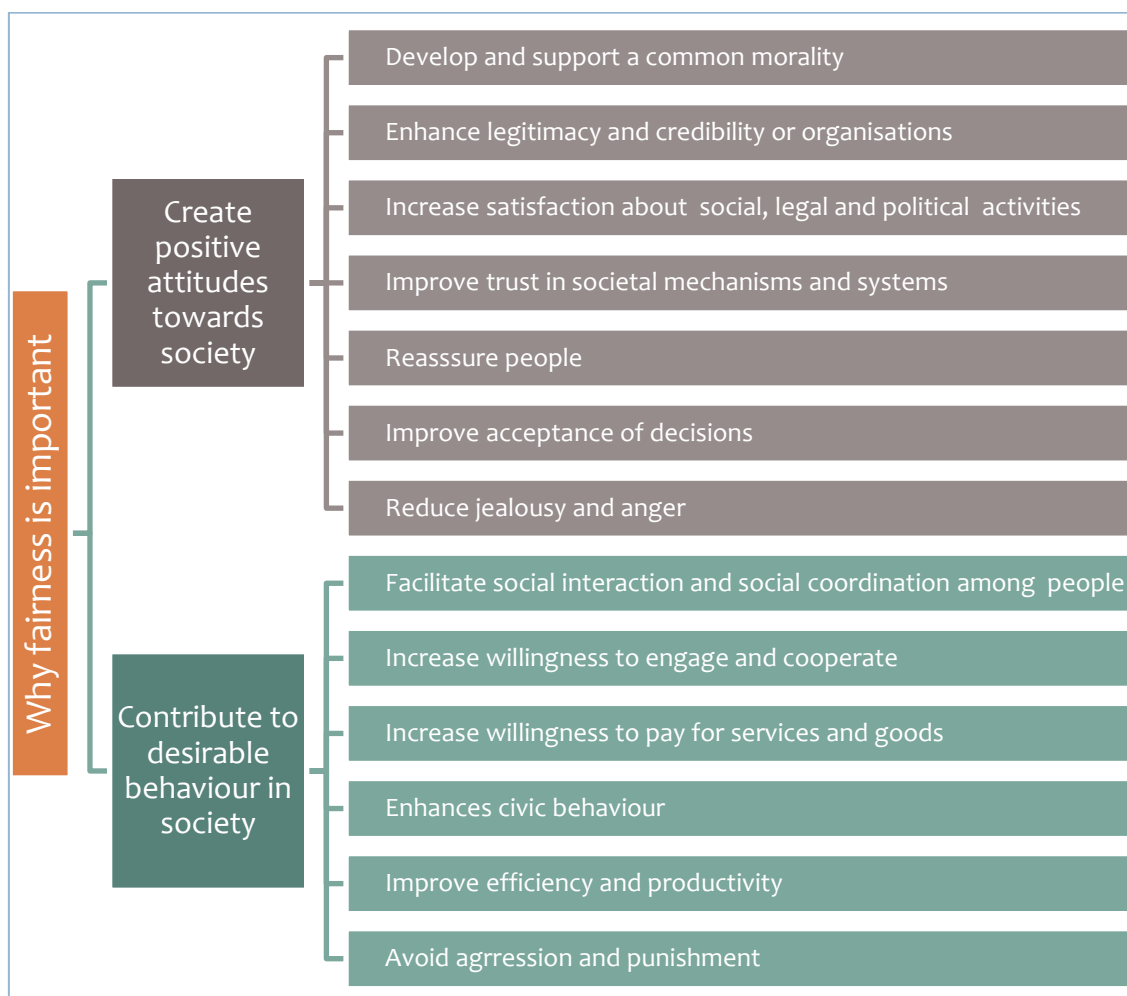
- Fairness increases the **acceptance and acceptability of decisions** taken by authorities and organisations. People are more willing to accept decisions, even if these are not particularly advantageous to them, as long as they feel that those decisions have been arrived at using just and fair decision-making procedures. (Napier & Tyler, 2008; Siegrist, Connor, & Keller, 2012).
- A built-up fairness record improves **trust and willingness to engage**. For example, Seiders & Berry (1998) pointed out that an implicit promise of fairness is particularly salient in service transactions because services are difficult for customers to evaluate prior to purchase.
- Acting and proceeding fairly increases the **legitimacy** of an organisation that takes decisions and/or implements procedures. Tyler (1994) has shown how the perceived procedural fairness influences the evaluation of the legitimacy of a national-level political institution.
- The perceived fairness of an organisation increases the **willingness to pay** for its services and goods. Schröder & Mieg (2008) found that the amount of money people would be willing to pay for a public good, might depend strongly on whether or not they consider it just to pay for it.
- Fairness in interactions between people, between people and organisations, and between organisations, leads to a stable environment that increases **efficiency and productivity**. This has been analyzed in a range of contexts, such as the strong link between organisational justice and job satisfaction (Cohen-Charash & Spector, 2001), the relationship between multinationals' headquarters and subsidiaries (Chan Kim & Mauborgne, 1993) and the impact of fair procedures on internal cooperation (De Cremer & Tyler, 2007).

It should be noted that the importance of fairness depends on the situation. Barrett-Howard & Tyler (1986, p.296) are of the opinion that *"Fairness is likely to be most important, therefore, in relationships of intermediate emotional intensity – ones in which participants have no strong feelings toward each other but still reap benefits from their interactions."* Some studies have examined the negative consequences of being treated unfair, such as anger, penalties, revenge, etc. Rabin (1993, p.1282-1283) states that *"[...] the behavioral implications of [un]fairness are greatest when the material consequences of an economic interaction are not too large. [...] much*

anecdotal evidence suggests that people sacrifice substantial amounts of money to reward or punish kind or unkind behavior.”

I conclude that there are two main arguments for acting fairly. The first one is about avoiding negative feelings and attitudes of people towards society if they would be treated (un)fairly. The second group of arguments is related to the indirect and subsequent implications, in particular their intended and actual behaviour following their experience with fair or unfair situations. I have summarised the arguments discussed in Figure 1 below.

Figure 1. The importance of fairness for society



2.3.5 Fairness of policy measures

In order to determine whether a policy is fair, one can start from the principle of equal concern for people (Mullen et al., 2014). Policy measures should show equal concern for each person (or groups of persons with similar characteristics), meaning that measures and provision should take account of people's differing needs (Dworkin,

1977). This does not imply that everyone should be affected equally. Even egalitarian ethical theories support distinguishing between categories of people, e.g. car owners versus non-car owners, modes of transport, or income groups. This means that unequal treatment is morally justified if morally sound arguments for such unequal treatment exist.

Fairness has been extensively studied in the context of public health policies. Culyer & Wagstaff (1993) considered several definitions of equity in health care: equal utilization; distribution according to need; equal access, and equal health outcomes. They noted the 'incompatibility' of these definitions in terms of their practical implications.

(Braveman, 2006, p.168) cites the following from publications from Whitehead (1990, 1992):

"Health disparities/inequalities/equity [...] as differences in health that "are not only unnecessary and avoidable but, in addition, are considered unfair and unjust. [...] Equity in health implies that ideally everyone should have a fair opportunity to attain their full health potential and, more pragmatically, that no one should be disadvantaged from achieving this potential, if it can be avoided". [...] [*equity in health care is*] equal access to available care for equal need, equal utilization for equal need, equal quality of care for all."

Fleurbaey & Schokkaert (2009) noticed that in the literature on health inequality, it is implicitly accepted that health inequalities within a socioeconomic group are less problematic than health inequalities between socioeconomic groups.

2.3.6 *Measuring and assessing fairness*

It is difficult to assess whether a situation, decision or measure is fair, since fairness is both a qualitative and a multi-dimensional concept. I found very few publications that showed how (un)fairness could be measured. Braveman & Gruskin (2003) observed that distributional fairness can be assessed with respect to specified measurable outcomes, whereas judging process fairness was more open to interpretation. Wagstaff & van Doorslaer (2013) discussed two indices for measuring horizontal fairness in access to medical care. This example illustrates that in particular contexts it is feasible to quantify the level of fairness. However, the approach of Wagstaff & van Doorslaer is not easily transferable to other contexts.

An underlying assumption in the early scientific literature on fairness and justice was that fairness was to be based on standards and criteria and hence that it could be objectively measured. However, in the middle of the 20th century this view was put into question. Rawls' (1999) views on justice and fairness start from agreements between people, not by reference to external standards (except for basic human rights). Baumol

(1982) stated that a distribution is fair if it involves no envy by any individual of any other. Rasinski (1987) observed that the normative conceptualization of fairness was being replaced by a view that individual rather than societal values determine fairness judgments. Hail & McQuaid (2021) state that fairness assessments in transport are based on individual perceptions, influenced by factors such as socio-demographic characteristics, background, social position, views on justice, and the expected outcomes of the transport measures.

Thus, fairness 'measurements' are increasingly seen as subjective 'assessments'. They are based on individuals' comparisons between the characteristics of a situation and their personal norms. Which characteristics and dimensions people consider for their assessment depends strongly on the particular context they are experiencing. For example, Xia et al. (2012) examined the factors influencing people's fairness judgment when they are confronted with a changing pricing policy for goods. They identified factors like the difference with the previous price, the difference with prices of a comparison party, the distribution of cost and profit, attributions of responsibility and the trust in the buyers-seller relationship stage. Obviously, when assessing the fairness of an intervention in road safety, a very different set of criteria would need to be used.

An additional complication for measuring fairness is that 'fairness' and 'unfairness' are conceptually different constructs. Asaria, Cookson, & Griffin (2014) pointed out that 'fair' and 'not unfair' are not the same; one can relate the concept 'not unfair' to individual choice or unavoidable bad luck. According to Xia et al. (2012) one can be clear about one without having clarity about the other. The authors observe that notions of unfairness are typically clearer, sharper, and more concrete than those of fairness.

Several factors contribute to people's views of how fair a particular situation, action or decision is. A first factor which influences the fairness judgment is the existence of a **standard** or norm, even a personal norm (Lissak & Sheppard, 1983; Rübhelke, 2011; Seiders & Berry, 1998; Tyler, 2000). Even if people reject the standard, it nevertheless will influence their fairness assessment. The existence of a standard has the effect of reducing the variation in fairness assessments between people.

A second factor influencing fairness assessments is the **expected consequences** or the level of utility (Coombes, 1997; Imazai & Ohbuchi, 1998; Williams, 1997). Seiders & Berry (1998) found that intense unfairness perceptions are triggered when the consequences are severe and when the event is recurrent.

Another factor is **cognitive bias** (Kaplow & Shavell, 2001; Messick, Bloom, Boldizar, & Samuelson, 1985; Skitka, 2002). When people perceive something as fair or unfair they may not know all the facts or arguments that led to particular decision or situation. They may lack particular information. The information that is available to them may be incorrect. They may ignore relevant facts, implications and effects because it does not fit with their existing mental model to avoid cognitive dissonance (Osberg & Smeeding, 2006; Peterson, 1994). People may not be capable of understanding the complexity of a particular situations and/or of the fairness dimensions that are to be considered. Osberg & Smeeding (2006, p.451) state that *“Individuals’ value-based attitudes toward inequality (i.e., how much inequality respondents think would be “fair”) also are conditioned on their personal cognitive estimates of the extent of inequality (i.e., how much inequality individuals believe actually exists).”*

Past performance and trustworthiness of the person or entity in charge is another factor to consider. People’s fairness assessment of a particular situation will be influenced by how similar situations were perceived in the past and/or how fair organisations and people have acted in the past. Peterson (1994) observed that once an impression of fairness is produced by an organization, it becomes extremely resistant to change.

Whether something is seen to be fair or not also depends on **the circumscription** of the situation. Something that is fair within a particular community may become unfair if another or a wider community is considered. Marginson (2011) pointed out that fairness policies are typically nation-bound; if one would apply the logic of fairness at global level, most national policies could be considered as unfair. Deutsch (1975, p.142) stated that *“the narrower one’s conception of one’s community, the narrower will be the scope of situations in which one’s actions will be governed by considerations of justice.”* Tyler (2000, p.123) also observed that *“people are less concerned about justice when they are dealing with people who are outside of their own ethnic or social group”*.

The assessment of fairness may **evolve over time**, even if the situation itself has not changed. Xia et al. (2012) point out that the perceived unfairness may decline over time, as an a priori situation has become ‘accepted’ as is no longer be seen as unfair. Kahneman, Knetsch, & Thaler (1986, p.731) state that *“Terms of exchange that are initially seen as unfair may in time acquire the status of a reference transaction.”*

2.3.7 Limitations of pursuing a strict fairness perspective

Often, the fairness of a particular intervention or policy measure cannot be fully assessed without considering some additional perspectives. I will discuss briefly three of these perspectives: (1) fairness is only one criterion amongst others; (2) decisions that are meant to improve fairness may create new forms of unfairness; and (3) other interventions may be viewed as more important than the one being examined.

When judging a situation, fairness is not the only perspective to consider and it is often not the most important one. Lissak & Sheppard (1983) found that fairness is only one of the elements considered when assessing procedures in relation to disputes; others are speed of decision, cost, airing of the problem, personal control and minimizing disruption. The WHO (2004) proposes three ethical principles for resource allocation: (1) efficiency (maximizing population health); (2) utility (greatest good for the greatest number); and (3) fairness (minimizing health differences). Daniels et al. (2009) stress the importance of efficiency (as an ethical issue) in health: high unit costs lead to covering fewer health needs. Guindo et al. (2012) point out that both normative and feasibility criteria are required for decision making and priority setting of healthcare interventions: effectiveness, stakeholders interest, cost-effectiveness, strength of evidence, safety, etc. These principles are often conflicting and hence a compromise has to be sought.

A second challenge for assessing the fairness of an intervention is that in practice a policy measure is typically a compromise that may create unfair side effects for some. *"In an unjust world, correcting some clear injustice to one group may result in more injustice to another group"* (Kamm, 2011). Blumberg (2003) mentions the risks that equity intended measures may create perverse incentives and that targeted measures often lead to new inequalities. Nyaupane et al. (2007, p.426) state: *"Although Rawls' equity theory ethically and morally supports less well-off people in society, it creates resentment among people who contribute more. If the outcome is distributed equally, it encourages free riders. Consequently, people who produce more will not have any incentive, which may increase inefficiency and compromise everyone."*

A third consideration is that even if a particular measure may be perceived as fair by most people, it may be less needed or much more expensive than other interventions. In other words, the fairness of a particular measure may be less important than other criteria for other measures within the same policy area or even in other policy areas. Even if a potential measure is fair, it may be fairer to implement another measure that

will have greater impact or requires less resources. Cost-benefit analyses (CBA) or Multi-Criteria Analyses (MCA) can help decide on priorities within a particular policy area, in particular if ethical considerations can be integrated, but are difficult to apply across different policy areas.

2.4 Fairness in road safety

2.4.1 *Applicability of the concept of fairness to road safety*

Unfairness in road safety could refer to a situation – e.g., particular road users face a higher crash risk – or to a decision or intervention – e.g., that certain groups would be worse off when a policy measure is implemented. Van Wee & Roeser (2013) have pointed out that Rawls' approach of the veil of ignorance is applicable to road safety policy-making, since we do not know if we will ever get involved in a road crash. In the context of elderly driver licensing policies Kelly, Nielson, & Snoddon (2014) proposed equity as one of four criteria for assessing road safety policies, in addition to cost-effectiveness, transparency and feasibility.

It is often challenging to determine whether road safety policy measures are fair, because this depends on the importance that people give to particular dimensions of fairness. Hokstad and Vatn (2008) mention some examples: (a) should higher expenditure be used to prevent major accidents (disasters) rather than 'ordinary' accidents; (b) should public transport be safer than private transport; (c) should priority be given to the protection of specific groups like children or people exposed to high risks? These are all examples of unequal treatment that could be justified from a particular perspective.

The dominant underlying logic for deciding on policy measures is utilitarian, i.e. the desire to maximise the overall benefits to society. The utilitarian logic can be operationalised through cost-benefit analyses (CBAs). Based on an analysis of road safety measures in Norway, Elvik (2009) concluded that road safety measures with a favourable benefit-cost ratio will often not reduce differences in fatality risk between groups of road users and will at least initially favour wealthy households. This illustrates that unfairness may result from decisions on road safety measures that are only based on cost-benefit considerations.

Van Wee & Rietveld (2013, p.312) discussed the importance of the distribution of safety effects from an ethical perspective and the absence of fairness considerations in

ex ante evaluations: “[...] *not much attention is paid to the question of who loses out (victims) in an accident, whereas it could really matter from an ethical and evaluative perspective [...]. Trading-off therefore is inevitable.*” Holstad & Vatn (2008) support the idea that fairness should be a leading principle in policy making and should have preference to pure utilitarian thinking, especially when it comes to life-saving expenditures. The authors object the use of cost/benefit as the only principle for allocation of resources for risk reduction in society and insist that fairness considerations should also be taken into account. They suggest a way out of the conflict between fairness and utility by considering fairness as an aspect of utility, thus promoting the view that society has a moral obligation to share welfare (including risk) relatively equally.

Achit & Carnis (2014) point out that road safety policies and measures are often assessed in a depersonalised way. People are considered as indifferent or generic, without reference to their cultural, social and economic context. The implication of such an approach is that policy measures may privilege certain groups, and hence be unfair towards other groups. Indeed, a structural source of inequality in road safety is the asymmetry of the risks: a road safety measure often does not reduce risks to the same extent for all road users, and may even increase the risks for some. Van Wee & Roeser (2013, p.755) give the example of urban traffic: *“In the case of local measures to reduce speeds, such as speed bumps, those who lose are the car drivers and people travelling by bus and those who gain are the people who live on the streets and cyclists using those streets.”*

2.4.2 Unfairness in relation to vulnerable road users (VRUs)

When it comes to inequalities in road safety, the area most discussed in the literature is the difference between car occupants and pedestrians – or more general, the difference between motorized vehicles and vulnerable road users (VRUs). VRUs are typically seen to include pedestrians and cyclists, and often also children, seniors, people with a handicap, and motorcyclists. When controlling for exposure to traffic, VRUs have a much higher risks to get injured and killed in road crashes than occupants of cars, trucks and busses; for example for Belgium see Martensen (2014).

According to Mullen et al. (2014), if some groups face higher risks because of a new measure, then those people can claim they are not being treated as equals. Fahlquist (2009, p.389) goes even further. She states that *“since vulnerable road users have a high risk exposure and have to use the roads every day, perhaps they should be the*

primary focus of safety interventions in areas they are unable to avoid.” Van Wee (2016) concludes that safety regulations which improve the safety of vehicle occupants at the cost of others raise ethical concerns. He also recognizes that if fairness would be the guiding rule for spending resources on road safety, additional resources ought to be spent on VRUs such as child pedestrians, even if it is not the most cost-efficient way to spend public funds.

Bringing such an approach into practice is not straightforward, since it needs to make links between people characteristics and safety relevant policy options. But safety impacts at the individual level are very difficult to estimate (van Wee et al., 2014). This being said, specific measures, such as speed bumps, pedestrian tunnels or separate cycle lanes can be expected to improve safety levels for VRUs – even when taking into account some possible negative side effects (e.g. pedestrians crossing the streets despite the availability of a tunnel).

2.4.3 Socioeconomic situation (SES) as a predictor of unfairness in road safety

Different terms are used in the literature for socioeconomic situation: social class, socioeconomic status, social stratification, social group, etc. These terms do not necessarily refer to the same categorisations; even for a particular term different experts use somewhat different definitions. But in practice the terms are often used interchangeably, despite their different theoretical bases (Bollen et al., 2001; Galobardes et al., 2006). I will use the terms socioeconomic situation or socioeconomic status, both abbreviated as SES.

SES is typically determined by three dimensions: employment status and profession, education and income. Sometimes housing aspects are also considered (Galobardes et al., 2006). SES characteristics of people determine strongly people's options in life, including the nature and extent of risks they are exposed to.

Elvik (2009, p.820) interprets Rawls' difference principle within road safety as follows:

- “1. The current distribution of risk between groups of road users will be regarded as fair if those who travel the most extensively also have the highest risk of fatal injury. Changes in the distribution of risk between groups of road users as a result of the optimal use of road safety measures will be regarded as fair if the differences in risk are reduced.
2. The current distribution of risk between income groups will be regarded as fair if the group with the lowest income has the lowest risk of fatal injury. Changes in the distribution of risk between income groups as a result of the optimal use of road safety measures will be regarded as fair if they favour the group with the lowest income.

3. The provision of road safety will be regarded as fair if those who gain the most also pay the most for the gains in safety, in other words if there is proportionality or more than proportionality between who pays and who benefits.”

He concludes that an optimal use of road safety measures is likely to benefit high-income groups more than low-income groups, which goes against Rawls’s difference principle. On the other hand, Elvik observed that the current distribution of risk between income groups is not altogether unfair, because the travel risk per km does not differ a lot between income groups (at least in Norway) and higher income groups on average travel much more and are hence more exposed to risk. I would like to add that such findings may not be automatically generalised to other countries, even Western democracies, because Norway is a much more homogeneous country in terms of SES than many others (Wilkinson & Pickett, 2011).

I undertook a thorough literature review on the relationship between SES and road safety. The results were published by Vias institute (Van den Berghe, 2017). This section summarizes the main findings; all literature references can be found in that report. The overall picture is that in high income countries people from lower SES groups have often a higher risk of being involved in road crashes than people from higher SES groups. This finding is, however, not universal; there are situations where no such association exists or where the relationship is even reversed. Thus, social inequality in road safety is a widespread phenomenon, but it is not universal and ‘generic’.

More specific findings which apply to many, but not necessarily to all high-income countries and regions, are summarized below. The full list of references can be found in my report (Van den Berghe, 2017); I include for each finding one reference by way of illustration:

- The highest SES differences for crash risks are found with children. Children from disadvantaged families and areas have much higher crash risks, in particular pedestrian crash risks (e.g. Laflamme, Hasselberg, & Burrows, 2010).
- The strength of association between SES and road safety for children varies considerably by children’s age (e.g. Haddak et al., 2012).
- SES-linked road safety differences tend to diminish with age. For adults and seniors there may be hardly any difference or the association might even be reversed (e.g. Lenguerrand et al., 2008; Lyons et al., 2003)

- SES differences are more pronounced in pedestrian crashes than in car crashes. For cyclist crashes the general association might also be opposite to the general trend (e.g. Reimers & Laflamme, 2005)
- SES-based differences are often more pronounced for men than for women (e.g. Camilloni et al., 2013).
- Differences between low and high SES groups often increase with the severity of the injury (e.g. Cairney et al., 2016).
- SES linked differences for crash risks vary considerably between countries (e.g. Borrell et al., 2005).
- The association between SES categories and road safety often differs between rural, suburban and urban areas (e.g. Bingham, 2011).

I also found that the factors associated with elevated or decreased risks for particular SES groups are poorly known and documented (Van den Berghe, 2017). This had also been observed by Laflamme et al. (2009) and Christie and Whitfield (2011). What is clear, though, is that the socioeconomic patterning of casualties and fatalities is influenced by a variety of mechanisms – and it is the interaction between those mechanisms and the extent to which these are present that leads to the observed differences. This also explains why the social gradient differs between age categories, travel modes, areas, countries and over time – and why it sometimes may be reversed. The main factors which have been suggested or proven to be a predictor for SES based differences in road safety are (Van den Berghe, 2017):

- exposure related factors, such as access to cars, the use of transport modes, the length of trips, and the hazardous nature of the environment and the trips
- attitudes, behaviour and culture, such as risk appraisal and understanding, parental supervision of children, seatbelt use and wearing of helmets, impaired driving, speeding and unlicensed driving
- other contributory factors, such as the safety of cars used, access to and understanding of (safety) information, health status and fragility, and hyperactivity of children.

Whilst most of these risk factors are more prevalent with lower SES groups, some risk factors may be more associated with higher social classes, particularly speeding and the distance travelled.

A neglected aspect in the literature is to what extent people from particular SES groups are worse off after a crash. There is not much evidence on this topic, but the few studies that are available seem to indicate that people with low SES, when hospitalised

after a road crash, suffer longer and have a higher risk of dying (Ali et al., 2013; Cairney et al., 2016; Chen et al., 2012; Moore et al., 2015; Sturms et al., 2002).

2.4.4 Some other fairness issues in relation to road safety

Some studies have found that people in **rural areas** are less well off in terms of road safety. A Canadian study illustrated that the longer distance between the living areas of the patients and the hospitals is leading to longer time periods between the crash and the medical treatment (Moore et al., 2015). Also Cubbin & Smith (2002) noted that rural residents have reduced access to quality trauma care, which may disproportionately affect the poor.

Another fairness issue is whether it is fair that **responsible and skilled drivers** who are cautious and never cause a crash need, through their taxes, need to share the cost of safety measures such as roadside safety barriers and speed cameras (Grill & Fahlquist, 2012). Hokstad & Vatn (2008) discussed whether society should give priority in its protection to law-abiding people rather than to e.g. drunk drivers and speeding offenders. A survey conducted by the authors showed that for most people it is fair that resources for risk reduction should favour those obeying the laws. The authors also state that giving priority to the 'innocent' would educate the public to law-abiding behaviour and hence reduce the overall risk (Hokstad & Vatn, 2008).

Prioritising law-abiding road users will also have an impact on the programming of **self-driving cars**. Lin (2016) gives the example of an autonomous car facing an imminent crash, where it could select either a motorcyclist who is wearing a helmet, or a motorcyclist who is not. Since the one without a helmet would probably not survive such a collision, from a utilitarian point of view it seems justified to programme the car to swerve into the motorcyclist with the helmet. But from a fairness point of view, it seems unacceptable to target the person who adheres to the traffic law. This might even encourage some motorcyclists to not wear helmets, in order to avoid targeting by autonomous cars (Lin, 2016).

It appears fair to spend more resources on improving the safety of **the poor**, since often they have a higher crash risk (see Section 2.4.3). However, Hokstad & Vatn (2008) list arguments to support the seemingly unfair attitude that less resources should be spent for improving the (road) safety of poor people. The main argument is that the poor may rather want such resources to be used for other benefits, instead of

increased safety. Adopting a logic to put safety first for the poor could be considered as paternalistic.

Achit & Carnis (2014) identified another fairness issue in road safety: the hesitation of policy makers to define measures for certain (often disadvantaged) groups, because of the (perceived or real) risk of **stigmatisation**. Not taking just and evidence-based measures because of public opposition could be considered as unfair.

Promoting a fair distribution of safety may also lead to **inequities in other areas**. Christie et al. (2012) have pointed to the potential conflict between some strategies seeking to promote young driver safety and the impact this may have on equity and social disadvantage. Policies restricting licence holding and car ownership among all young people would have a greater impact in deprived areas, thus reducing inequities in life expectancy. However young people who wish to decrease their dependency on others, and widen their opportunities, may inevitably look towards car ownership as the solution to their transport problems (Christie et al., 2012). Thus a policy that would make it more difficult for young people to drive a car, may be in their interest from a safety perspective, but is likely to lead to further inequalities between young and old, and amongst young people themselves.

2.5 Culture

2.5.1 What is culture?

The Oxford Learners Dictionary (<https://www.oxfordlearnersdictionaries.com/>) gives six meanings of the term 'culture', of which the first one comes close to the concept of culture that I will use in this thesis: *"the customs and beliefs, art, way of life and social organization of a particular country or group"*. Hofstede defined culture as *"the collective programming of the mind that distinguishes the members of one group or category of people from others"* (Hofstede, 2011, p.3). This refers to norms, beliefs, values, and practices that are found more frequently among some people than among others. Schwartz viewed culture as *"the rich complex of meanings, beliefs, practices, symbols, norms, and values prevalent among people in a society"* (Schwartz, 2006, p.138). Scientific consensus tends to emerge around two key characteristics of culture: (1) culture as a collective phenomenon that is shared among members of a cultural group; this 'shared' component tends to distinguish one group of people from another; and (2) culture is learned and passed on through socialisation processes within these cultural groups (Fischer, 2009).

Culture shapes the society and vice versa. Culture itself is a product of various factors, including tradition, history and how systems such as regulation, education, law enforcement, the labour market, social security, public health and infrastructure function. For instance, in many societies the attitudes towards drunk driving have changed considerably since the late twentieth century (Lerner, 2012) – a cultural change that was the result, at least in part, of changing legislation and increasing enforcement levels.

2.5.2 National culture

Following Hofstede et al. (2010) **national culture** should be seen as the collection of norms, beliefs, values, and practices that distinguish the citizens of one country from those of another. Hofstede assumed that all societies face similar basic challenges such as inequality, an uncertain future, and the relationship between individuals and groups (Hofstede, 2001). However, societies tackle these challenges differently, and these different practices are part of their culture. Culture has a regulatory role in that it determines the behaviour that is considered normal and acceptable within a country – see e.g. Zou et al. (2009). Despite lack of consensus on what national culture exactly entails, it is generally accepted that it is a key characteristic underlying systematic differences in behaviour between countries (Malhotra & McCort, 2001).

An important achievement of Hofstede was his finding that (national) culture could be operationalised through a number of cultural dimensions (discussed in Section 2.5.3). This paved the way for comparing the culture of countries numerically and also incorporate national culture as a variable in statistical modelling and analysis. Other approaches and studies have produced many more cultural dimensions: Schwartz Value Survey (Schwartz, 1999); the World Value Survey and Inglehart's analyses (EVS/WVS, 2020a, 2020b; Haerpfer et al., 2020; Inglehart, 1997; Inglehart & Welzel, 2005); the GLOBE (Global leadership and organizational effectiveness) study (House, Javidan, Hanges, & Dorfman, 2002); and Trompenaars' analyses (Smith, Dugan, & Trompenaars, 1996; Trompenaars & Hampden-Turner, 1997). However, many of the cultural dimensions proposed in the literature have unclear interpretations (Fog, 2020; Minkov & Hofstede, 2012a).

Thus, a range of cultural variables, factors and dimensions have been developed by different social scientists using different perspectives. While Hofstede started from measuring culture in the workplace in general, the GLOBE study was mainly interested in the effect of culture on leadership styles. The World Value Survey focuses on the

effect of culture on political attitudes and changes thereof over time. This has led to a variety of cultural variables, factors, and dimensions, which some researchers have tried to cluster (Fog, 2020; Maleki & de Jong, 2014; Minkov, 2011). Fog (2020) recently showed that most dimensions of cultural models can be clustered into two main factors: one 'superfactor' that reflects the combined effects of development and modernization, together with social-psychological effects such as collectivism, conservatism, regality, and tightness. The second factor combines several effects related to East Asian cultures, and possibly also differences in response style (Fog, 2020).

Cultural variables at national or regional level are aggregates that are only meaningful at that level. At the level of individual people, other variables such as personality characteristics, political attitudes, ethical values and social behaviour should be considered. But of course the variables at the individual and the country level are interdependent: differences in national culture also reflect underlying differences in ethical choices. This was illustrated in a very large experiment on people's opinions on decisions to be made by automatic vehicles (Maxmen, 2018). Hofstede & McCrae (2004) found that five key personality dimensions – Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness – were significantly associated with at least one dimension of culture.

National culture is not static. Kaasa & Minkov (2020) found evidence for a global shift in the direction of cultural traits typical of the rich Western individualist countries. This is strongly linked to economic and human development and the associated evolution from a priority on existential security towards expressive freedom (Inglehart, 1997). There is increasing evidence that greater economic prosperity and equality eventually leads to a more tolerant, egalitarian, autonomous, and trusting societies (Tarabar, 2019). Beugelsdijk & Welzel (2018) showed that younger generations across the world have become more individualistic and more joyous; they also observed that roughly half of the variation in national cultural orientations is unique to each country. The latter observation is consistent with the conclusion of Witchalls (2012) that despite increasing international interconnectivity, national culture remains strong due to it referencing itself when interpreting new information.

2.5.3 The dimensions of national culture of Hofstede

Hofstede initially introduced four dimensions and later expanded these to six (see Table 7). The method used to calculate the original Hofstede values, obtained from a survey of IBM employees worldwide, are well documented in Hofstede's original

articles and books (Hofstede, Hofstede, & Minkov, 2010). Scores not originating from Hofstede's initial research have been added over the years, mostly through various specific research projects such as those reported by Finuras (2013) and Huettinger (2008). The values are available for 128 countries or parts of countries and can be accessed through the website of Hofstede Insights (www.hofstede-insights.com). The full dataset was provided to me directly by Hofstede Insights.

Table 7. Hofstede's six traditional cultural dimensions

Power distance	How a society generates solutions to resolve inequality among members
Uncertainty avoidance	The cultural tendency to be uncomfortable when encountering an unknown future
Individualism versus collectivism	The societal position on the value of loose ties among members versus the integration of members with their own groups
Masculinity versus femininity	The cultural tendency for differentiating emotional roles based on gender
Long-term versus short-term orientation	The cultural preference of placing individuals' focus on the future versus on the past and present
Indulgence versus restraint	The culture preference for gratification versus control of basic human desires related to enjoying life

Source: Based on publications by Hofstede (G. Hofstede, 2001; G. H. Hofstede et al., 2010)

There are numerous studies in which Hofstede's cultural dimensions are linked to other national indicators. Examples of recent ones include the link with risk taking (Gaganis, Hasan, Papadimitri, & Tasiou, 2019), human capital (Dermol, 2019), corruption (Boateng et al., 2021) and ethical codes of companies (Vitolla et al., 2021). In Section 2.6.2 I will mention some examples of associations with road safety performance.

Recent research has led to an update of two of Hofstede's original dimensions: 'individualism versus collectivism' and 'long-term versus short-term orientation' (Minkov, 2018; Minkov et al., 2018, Minkov et al., 2017). The update of the second dimension was called 'Flexibility versus Monumentalism' (Minkov et al., 2019). Some characteristics of these dimensions are shown in Table 8.

Table 8. Hofstede's two updated cultural dimensions

Individualism versus collectivism	Individualistic societies stress the needs and rights of the individual while collectivist societies start from the needs of the group as a whole. Important values in individualistic countries include personal freedom, autonomy, uniqueness, self-reliance, hedonism and assertiveness. Within collectivist societies, important attitudes are conformity, restrictiveness, power-seeking, dependency, conflict avoidance and in-group favouritism.
Flexibility versus monumentalism	Flexible cultures emphasize adaptability, a modest opinion of one's self, and reluctance to help people. In monumentalist cultures people prefer to stay the same, have high self-regard and self-confidence and want others to feel good about them.

Source: Based on publications by Minkov (Minkov, 2018; Minkov, Bond, et al., 2018; Minkov et al., 2019, 2017)

Since I use these two new Hofstede dimensions in my country analyses (Chapter 4), it is useful to provide some background information. This is based on publications of Hofstede and Minkov already referred to. In individualist cultures the ties between individuals are loose and people are expected to look after themselves. In collectivist cultures people are integrated into cohesive in-groups that continue protecting them in exchange for unquestioning loyalty, and oppose other in-groups. Collectivist societies tend to divide people into in-groups and out-groups. In-group members get tolerance, respect, and various privileges, but people from out-groups are excluded from the circle of those who deserve any privileges. Nepotism and corruption is more widespread in such cultures. On the other hand, in 'individualist' cultures the distinction between in-groups and out-groups is much smaller. There is a more universalist treatment of all people in the public sphere, there is more transparency and rule of law (Minkov, 2011, 2016). Minkov (2011, 2016) pointed out that collectivistic cultures are predominantly found in the developing world. Table 9, taken from Hofstede (2011), lists a number of differences between predominantly individualistic or collectivistic countries.

Table 9. Differences between individualistic and collectivistic countries

Individualistic countries	Collectivistic countries
Everyone is supposed to take care of him- or herself and his/her immediate family only	People are born into extended families or clans which protect them in exchange for loyalty
"I" – consciousness	"We" –consciousness
Right of privacy	Stress on belonging
Speaking one's mind is healthy	Harmony should always be maintained
Others classified as individuals	Others classified as in-group or out-group
Personal opinion expected: 1 person 1 vote	Opinions and votes predetermined by in-group
Transgression of norms leads to guilt feelings	Transgression of norms leads to shame feelings
Languages in which "I" is indispensable	Languages in which the word "I" is avoided
Purpose of education is learning to learn	Purpose of education is learning how to do
Task prevails over relationship	Relationship prevails over task

Source: Hofstede (2011)

The dimension 'Flexibility versus Monumentalism' explains some of the cultural differences between the Confucian societies of East Asia at one extreme and Africa, the Middle East and Latin-America on the other (Minkov, 2018). It is closely related to Fog's 'East-Asian factor' and the traditional Hofstede dimension 'Long term orientation' – which actually had been labelled 'Confucian work dynamism' initially (Hofstede, 2011). The cultures which are strong on this dimension exhibit thrift, persistence, ordering relationship by status and sense of shame, all of which are characteristic of East Asian countries (Fog, 2020; Hofstede, 2011). Unlike for 'Individualism versus Collectivism', the theoretical concepts behind this dimension appear to be incoherent. It is also difficult to explain why these cultural characteristics are related to each other (Fang, 2003; Minkov, Bond, et al., 2018). For the new Hofstede dimension the lowest values are for Latin-American and African countries.

*In this thesis, I have given the two updated Hofstede dimensions a shorter name. 'Individualism versus Collectivism' is renamed as '**Independent**'. This avoids confusion with the traditional Hofstede cultural dimension 'Individualism' and stresses the independent thinking which characterises individualist societies. The dimension 'Flexibility versus Monumentalism' is called '**Confucianist**'; I will sometimes use 'Dionysian' as the opposite of it.*

2.5.4 Other indicators of culture

Schwartz' cultural value orientations are based on analysing common problems faced by every society and the societies' preferences in addressing these issues (Schwartz, 1999). His seven societal value orientations are listed in Table 10. Data currently exist for 72 countries.

Table 10. Schwartz' seven cultural value orientations

Intellectual autonomy	Encourages individuals to pursue their own ideas and intellectual directions independently. Important values include broadmindedness, curiosity, and creativity.
Affective autonomy	Encourages individuals to pursue affectively positive experience for themselves. Important values include pleasure, exciting life, and varied life. Meaning in life comes largely through social relationships and through identifying with the group.
Embedded cultures	Emphasise maintaining the status quo and restraining actions that might disrupt in-group solidarity or the traditional order. Important values are social order, respect for tradition, security, obedience, and wisdom.
Cultural egalitarianism	Induces people to recognise one another as moral equals who share basic interests as human beings. Important values include equality, social justice, responsibility, help, and honesty.
Cultural hierarchy	Relies on hierarchical systems of ascribed roles to ensure responsible, productive behaviour. Important values include social power, authority, humility, and wealth.
Harmony	Emphasises fitting into the world as it is, trying to understand and appreciate rather than change, direct, or exploit. Important values include world peace, unity with nature, and protecting the environment.
Mastery	Encourages active self-assertion to master, direct, and change the natural and social environment to attain group or personal goals. Important values include ambition, success, daring, and competence.

Source: Based on Schwartz (2006)

GLOBE (<https://globeproject.com>) is the acronym for 'Global Leadership and Organizational Behavior Effectiveness', an international initiative in which 17,000 managers in over 60 countries were interviewed (House et al., 2004, 2002). The GLOBE project investigated how cultural values are related to organizational practices, conceptions of leadership, the economic competitiveness of societies, and the human condition of its members. Based on the analysis, nine dimensions of leadership culture were defined, some of them very similar to those of Hofstede. For each country each of the cultural dimensions was conceptualized in two ways: 'practices / as is', and 'values / should be'. The nine GLOBE cultural dimensions are listed in Table 11. Currently, the

‘GLOBE 2020’ project is in the process of updating its survey and expanding it to 150 countries (see <https://www.globeproject.com/>).

Table 11. GLOBE’s nine cultural dimensions of leadership

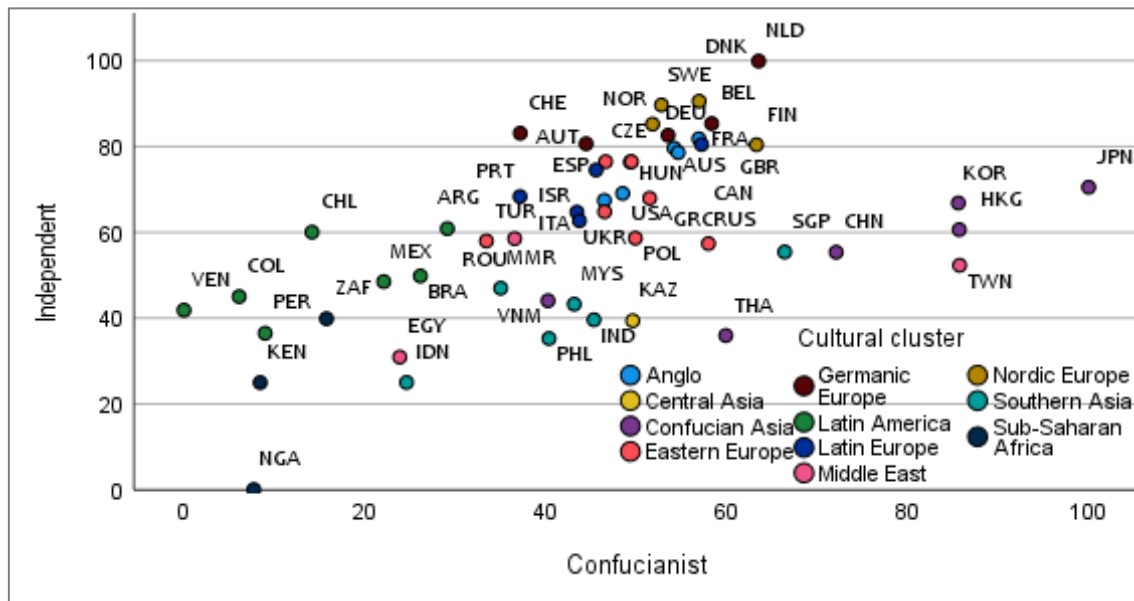
Performance orientation	The degree to which a collective encourages and rewards (and should encourage and reward) group members for performance improvement and excellence.
Assertiveness	The degree to which individuals are (and should be) assertive, confrontational, and aggressive in their relationship with others.
Future orientation	The extent to which individuals engage (and should engage) in future-oriented behaviours such as planning, investing in the future, and delaying gratification.
Humane orientation	The degree to which a collective encourages and rewards (and should encourage and reward) individuals for being fair, altruistic, generous, caring, and kind to others.
Institutional collectivism	The degree to which organizational and societal institutional practices encourage and reward (and should encourage and reward) collective distribution of resources and collective action.
In-group collectivism	The degree to which individuals express (and should express) pride, loyalty, and cohesiveness in their organizations or families.
Gender egalitarianism	The degree to which a collective minimizes (and should minimize) gender inequality.
Power distance	The extent to which the community accepts and endorses authority, power differences, and status privileges
Uncertainty avoidance	The extent to which a society, organization, or group relies (and should rely) on social norms, rules, and procedures to alleviate unpredictability of future events. The greater the desire to avoid uncertainty, the more people seek orderliness, consistency, structure, formal procedures, and laws to cover situations in their daily lives.

Source: House et al. (2004)

2.5.5 Cultural clusters of countries

Based on data provided by Hofstede Insights, I reproduced a scatterplot using the data of the two updated cultural dimensions in Figure 2, similar to one initially published by Minkov (2018). He stated about it *“This new map of the world is very much like the real one, drawn from a traditional European perspective, without the world’s oceans. There is one logical exception: the English-speaking countries are not scattered across the world but form a fairly compact cluster right above the center of the map.”* (Minkov, 2018, p.251). Or, simplistically but also thought provoking, the two dimensions could also be labelled as “North-South” and “East-West”, with the “Anglo world” in the centre.

Figure 2. Mapping of countries based on the two main cultural dimensions



Data source: Hofstede Insights

Despite their different perspectives, the different international cultural models often identify similar cultural clusters of countries. The GLOBE researchers divided the world into a number of regional cultural clusters with some typical value characteristics, which are shown in Table 12. Other authors, such as Ronen & Shenkar (2013), have come to very similar clusters. An interesting observation from these authors is that some clusters, such as the Arab (Middle East) and the Anglo one are much more cohesive than others, such as the Latin American and Confucian cluster.

Table 12. Cultural clusters of countries, based on the GLOBE project

Cultural cluster	Some typical value characteristics
Anglo	competitive; result-oriented
Germanic Europe	value competition; aggressiveness; more result-oriented
Eastern Europe	forceful; supportive of co-workers; treat women with equality
Nordic Europe	priority on long-term success; women treated with equality
Latin Europe	individual autonomy
Latin America	loyal and devoted to their families and similar groups
Middle East	loyal and devoted to their own people, women have less status
Sub-Sahara Africa	concerned and sensitive to others; strong family loyalty
Southern Asia	strong family oriented; deep concern for their communities
Confucian Asia	result-driven; encourage working together over individual goals

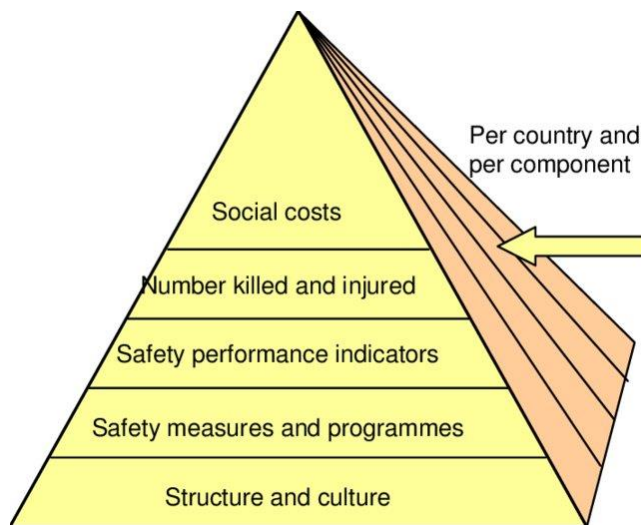
Source: Gupta, Hanges, & Dorfman (2002)

2.6 The relationship between culture and road safety

2.6.1 National culture as a predictor of road safety performance

The insight that culture affects road safety performance is not new. In 2000 a road safety target hierarchy was developed in New Zealand in which ‘Culture and Structure’ was the lowest layer, and road safety performance and outcomes were the highest layers (LTSA, 2000). This conceptual framework was presented under the form of a ‘road safety pyramid’ which gained popularity in the road safety world (Figure 3). This road safety pyramid has often been used as a framework for assessing national road safety performance (Bliss & Breen, 2009; Koornstra et al., 2002) and for benchmarking (Schoeters, Daniels, & Wahl, 2019). Within this logic, culture is seen as an input factor (in addition to demography, geography, climate, political organization, ...) for the road safety policy, measures and interventions. In other words, cultural characteristics influence how and what policy measures can be taken. However, for this ‘culture and structure layer’, there are no internationally comparable quantitative indicators.

Figure 3. The road safety pyramid



Source: Koornstra et al. (2002)

That countries with different cultures can differ strongly in road safety performance has been illustrated by Atchley, Shi, & Yamamoto (2014), when examining road safety culture in China, Japan and the United States. They found that China has an emerging driver population and cultural values that result in aberrant driving behaviours and ‘scrambling’ to gain the right of way, producing a high number of crashes. Japan, on the other hand, has an established driver culture, with an emphasis on reducing risk, resulting in a lower rate of crashes. In the United States there is a cultural view of the car as a representation of freedom; according to the authors this explains why the USA has higher crash rates than many other developed countries (Atchley et al., 2014).

The behaviour of road users in traffic can thus be seen as an expression of the national culture. For example, if the national culture in a particular country highly values risk taking, risky behaviours on the road are likely to be more acceptable in that country than elsewhere. And if the national culture is strongly opposed to governmental interventions, one can imagine a strong resistance against road safety measures seen to restrict freedom of mobility. Through analysing data across 48 US States, Nagler (2013) demonstrated that social capital, measured by level of trust and civic engagement, had a statistically significant and sizable negative effect on crashes, traffic fatalities, traffic injuries, and pedestrian fatalities.

The religious history in a country influences the values held in a country and hence its culture. Melinder (2007) showed that in Western Europe road safety performance is associated with the predominant (historical) religion. For instance, being a non-wealthy Catholic country was associated with more road fatalities. I would like to add that even in neighbouring European countries with similar characteristics – e.g. the Netherlands/Belgium and Switzerland/Austria – the countries with a Protestant culture (Netherlands and Switzerland) have a better road safety performance than their neighbours with a Catholic tradition (Belgium and Austria) (European Commission, 2021). In countries with a (historically) Protestant culture people tend to be more supportive to institutions and the rule of law than in countries with a catholic culture (Arruñada, 2010); this probably also applies to respecting traffic regulations.

Minkov (2016) mentions various studies showing that compliance with traffic law is more typical of the rich individualist countries than of the developing collectivist countries. A literature review by Ishaque & Noland (2008) showed that people in high income (and hence more individualistic) countries are more likely to comply with red traffic lights than people from developing countries. Based on a study of 15 EU countries, Vereeck & Vrolix (2007) found that the social willingness to comply with the law had significant positive effects on traffic fatalities. They also noticed that willingness to comply with the traffic laws mattered more than legal specificity. Solmazer, Uzumcuoglu, & Özkan (2016) found that law enforcement can explain the relationship between culture and fatality rates, in particular for speed, helmet and child restraint systems. Thus, compliance with traffic regulations and the scope and extent of traffic law enforcement shape the national road safety culture and hence the road safety performance.

2.6.2 Road safety culture

'Road safety culture' can be seen as a container concept referring to road users' safety attitudes and behaviour in traffic. Taking such a perspective on road safety culture has the advantage that a huge number of research findings are available on the behaviour and attitudes of road users. Some of these studies include sufficient variables to create sub-groups and compare components of road safety culture between groups, for instance attitudes towards drunk driving, using a helmet, respecting red lights and enforcement methods.

Studies have often found a relationship between unsafe driving and certain personality characteristics such as low conscientiousness, low agreeableness, and high neuroticism (Linkov et al., 2019). Ward et al. (2010) argue that the relatively high crash risk of young drivers is related to a subculture encouraging risk engagement and risk-taking. In particular sensation seeking appears to correlate with risky driving and mistakes in driving (Constantinou et al., 2011; Dahlen et al., 2005; Iversen & Rundmo, 2002; Jonah, 1997). Sensation seeking was also found to be a predictor of road crashes by Dahlen and White (2006).

Some researchers have examined the relationship between the dimensions of national culture and the road fatality rate. Publications include those of Hofstede himself (Hofstede, 2001), Özkan & Lajunen (2007), Melinder (2007), Gaygisiz (2010b, 2010a) and Solmazer, Uzumcuoglu, & Özkan (2016). Minkov (2016) examined the link between a GLOBE dimension and the road fatality rate. In the studies mentioned, the dimensions of uncertainty avoidance, individualism/collectivism, masculinity, power distance, embeddedness and autonomy have been found to be correlated positively or negatively with the number of road traffic fatalities. Relationships between the Hofstede dimensions and safety practices in other contexts have also been found (Minkov, 2016; Reader et al., 2015; Tear et al., 2020). It should be noted that the studies mentioned in this paragraph were conducted at different moments in time and using different sets of countries. The findings should therefore not be generalised nor should it be assumed that all findings still hold. Analyses in relation to road safety using Hofstede's updated cultural dimensions (Table 8, p.76) had not yet been undertaken when I started my PhD.

2.6.3 Traffic safety culture (TSC)

A fairly recent perspective on road safety culture has been labelled as 'Traffic Safety Culture' (TSC). The TSC concept evolved out of organizational safety culture in the United States (Wiegmann, von Thaden, & Gibbons, 2007). It is of particular importance for companies working in hazardous environments. Originally TSC referred to a strong road safety culture within companies, but it was gradually given a broader meaning (Edwards et al., 2014) and gained interest outside the United States (e.g. Nævestad & Bjørnskau, 2012).

Edwards et al. (2014, p.296) define TSC as *"the assembly of underlying assumptions, beliefs, values and attitudes shared by members of a community, which interact with the community's structures and systems to influence road safety related behaviours."* In a chapter of a recent book on TSC (Ward et al., 2019), the following definition of TSC is proposed: *"The shared beliefs of a group that affect behaviors related to traffic safety"* (Ward, Otto, & Finley, 2019, p.32). The authors further state that *"the traffic safety culture of a group emerges from actions taken by stakeholders across the social ecology"* (ibid. p.33), whereby stakeholders not only refer to public authorities but also to families, schools and workplaces. TSC can be examined at a number levels, and differences in cultural and contextual factors may be present at each level. Within a country there can be a series of nested cultures that together form TSC and its effect on safety (Edwards et al., 2014).

Efforts have been made to operationalize TSC into quantitative indicators. Girasek (2012) found that the factors that explained the most variance in TSC were support for increased government attention to traffic safety, strict monitoring and control of alcohol-impaired drivers, disapproval of speeding, and avoidance of aggressive driving. Recently Otto, Ward, & Finley (2019) have proposed to measure traffic safety culture by analysing the components of shared beliefs, such as values, assumptions, attitudes, perceived norms, perceived self-efficacy, etc. and link these to behaviour. Such an approach is also underlying the international ESRA survey (see Appendix A2); some recent articles based on ESRA data discussing cultural issues are Granié et al. (2020), Meesmann, Torfs, & Cools (2020) and Van den Berghe, Schachner, et al. (2020). Brandstätter et al. (2019) found that the data of a predecessor of ESRA, the fourth SARTRE (Social Attitudes to Road Traffic Risk in Europe) survey (Antov et al., 2010), allowed to distinguish five TSC components and compare these across European countries: acceptance of safety technology and enforcement; attitudes towards risks; behaviour control; personal concern for road safety; and perception of other road users'

safety performance. A study on the relationship between organizational safety culture, worker-driver attitudes, and crash risk in Great Britain concluded that there was a moderate relationship between traffic safety culture and attitudes, and between attitudes and road crashes (Department for Transport, 2004).

Yet, despite such efforts, there appears to be no scientific consensus on what transport safety culture really entails and what indicators would be most appropriate. Moreover King, Watson, & Fleiter (2019) argue that the logics underlying TSC have been developed in Western countries and that these are not fully transferable to LMICs. They state that many psychological processes differ in important ways between HICs and LMICs, and that understanding road safety culture in LMICs requires a more anthropological and qualitative approach.

2.6.4 Subcultures

The road safety culture of particular demographic, social, professional or geographic groups may differ from the mainstream or 'average' road safety culture of a country. Nævestad & Bjørnskau, (2012) have even pointed out that differences between countries in terms of road safety culture are often smaller than the variations the risk levels of subgroups of road users within the countries. Probably the best-known fact is that males, and in particular **young males** are more willing to engage in risky driving behaviour than other groups in a society (Cordellieri et al., 2016; Granié et al., 2020). This phenomenon is related to personality characteristics such as higher openness to risk taking and sensation seeking. Constantinou et al. (2011) showed that these high risk traits are at a peak among young male drivers.

Another example of subgroups with a road safety culture that differs from the 'average' are **professional drivers**, such as taxi, van and truck drivers. Several studies from different parts of the world (Forward & Samuelsson, 2008; Mehdizadeh, Shariat-Mohaymany, & Nordfjærn, 2019; Mekonnen et al., 2019; Nordfjærn, Jørgensen, & Rundmo, 2012; Xiao, 2020) have shown that such drivers often take more risks in traffic than non-professional drivers; however, differences between types of professional drivers and between countries can be large. Nordfjærn et al. (2012) found that professional drivers in Norway reported significantly less seat belt use and watchful driving than non-professional drivers. On the other hand, professional drivers reported significantly less fun riding and significantly safer behaviour related to drink driving. Mehdizadeh et al. (2019) found that Iranian taxi drivers were more likely than truck drivers to commit errors and violations.

Characteristics such as the areas in which people live – and hence the exposure to traffic – can be a contributory factor to road crashes. Some studies on **drivers from rural areas** have revealed that such drivers engage in riskier behaviour, such as not wearing seatbelts, because they perceive the risks associated with such behaviours to be lower (Rakauskas, Ward, & Gerberich, 2009). Rural drivers also perceived the utility of government-sponsored traffic safety interventions to be lower than urban drivers.

In Section 2.4.3 I pointed out already that crash risks for **lower SES groups** are sometimes higher than average; this holds in particular for pedestrian children. These higher risk can partially be explained by more unsafe attitudes and risky behaviour such as lower risk appraisal and understanding, less parental supervision of children, less seatbelt use and wearing of helmets, more drinking and driving and more unlicensed driving (Van den Berghe, 2017). Higher crash risks are also often found with **ethnic minorities**. Thomson and Tolmie (2001) showed that in almost all countries where data were available, children of ethnic minorities had an above average risk of being involved in a pedestrian injury. The trend observed at that time applied to quite a range of different countries, including Sweden, the UK, the USA, Israel, Singapore and New Zealand. It should be noted however, that it is difficult to disentangle in such studies the cultural from the SES factors. Pressley et al. (2007) showed that black and American Indian/Alaskan Native children have fatal crash risks that are significantly higher than those of white children. Factor, Mahalel, & Yair (2008) found that crash risks were significantly higher for non-Jewish drivers than for Jewish, and for drivers whose origins were in Africa and Asia than in America and Europe. Unfortunately, in studies on crash risks of ethnic minorities little insights are provided on what factors, and more particular what cultural factors tend to cause the higher crash risk. One counterexample is Christie and Whitfield (2011) who found some evidence on differences in parental perception of the risks children face in traffic between 'non-White' families and the White population.

In some European countries with several national **languages** (e.g. Belgium and Switzerland) there are significant differences in road safety performance between the different language communities. This appears to be linked to differences between their attitudes (Meesmann & Schoeters, 2016), although other factors also contribute to the differences, such as geography, exposure and SES.

2.6.5 International differences in road safety culture

A few decades ago Hillman et al. (1990) noted differences between German and English children in terms of exposure to risk which were related to cultural differences. These included the greater supervision of children on streets in Germany, the observation of children by other adults when their behaviour fell below the behavioural norms expected, and the German law which forbids children to use the street for play.

More recent findings are often based on questionnaire surveys that were conducted in a number of countries at once. Examples of surveys that have been used for international comparisons are the Manchester Driver Behaviour Questionnaire (DBQ), (Warner et al., 2011; Winter & Dodou, 2016), SARTRE (Antov et al., 2010; Cestac, Kraïem, & Assailly, 2016; Goldenbeld, 1998) and ESRA (Meesmann et al., 2018; Meesmann, Torfs, & Van den Berghe, 2017; Pires et al., 2020). Some recurring findings from such surveys are:

- people are often well aware of the risks of engaging in traffic
- females and older people engage less in risky behaviours
- there are considerable differences between countries in terms of risky behaviour in traffic, in particular in relation to drunk driving, speeding and seatbelt use
 - in LMICs people drive on average more risky and less safe than in HICs
- survey participants often state that certain behaviours are unacceptable, yet admit to doing so anyway.

Smaller scale international surveys, involving a more limited number of countries, have also been conducted and confirmed such findings (Nordfjærn, Jørgensen, & Rundmo, 2011; Nordfjærn, Simsekoglu, & Rundmo, 2014). An interesting finding from Nordfjærn et al. (2011) was that their predictive model of driver behaviour was poorly fitted for the African countries they considered.

2.7 Public support for policy measures in road safety

2.7.1 Introduction

It is well known that the impact of public opinion on public policy is substantial (Burstein, 2003). In my literature review I focused on public support for policy measures, both generally as specifically for road safety. The literature searches were also meant to identify possible predictors for public support for road safety policy measures that I could include in the dilemma survey and the country level analyses. Some authors distinguish between ‘acceptability’, ‘acceptance’ and ‘support’ for policy

measures (Eagly, 1993; Kyselá, Ščasný, & Zvěřinová, 2019). I will use the terms 'support' or 'public support' throughout this thesis.

In the next sections I present some factors that have been reported to influence public opinion on policy measures. Although most studies referred to relate to a specific policy area or even one specific policy measure, the factors listed are likely to be applicable or generalizable to other policy areas, including road safety. In Section 2.7.3 I present additional specific factors, that have been found to be associated with support for policy measures in road safety.

Some of the studies reported on in the next sections use theoretical frameworks and models for explaining the opposition to policy measures. Examples of such frameworks are theories on cognitive dissonance (De Vos & Singleton, 2020; Festinger, 1957), technology acceptance (Davis, 1989) and psychological reactance (Steindl et al., & Greenberg, 2015; Ward et al., 2021). The cognitive dissonance theory (Festinger, 1957) states that humans will try to avoid dissonance between beliefs and behaviour or beliefs and facts. To this end, dissonant convictions are unconsciously made less important or even changed into new convictions that are in line with the behaviour or the facts. Thus, attitudes such as support for measures can also change through behaviour. This is particularly the case when behaviour occurs automatically (Aarts et al., 2014). The cognitive dissonance theory can also partially explain why acceptance for road safety measures grows rapidly after their introduction (Elvebakk, 2015).

Using transport pricing as a special case, Schlag & Teubel (1997) identified the following factors that can affect the acceptability of traffic measures: problem perception, important aims, mobility-related social norms, knowledge about options, perceived effectiveness and efficiency, equity (personal outcome expectation), attribution of responsibility, and socio-economic factors. Eriksson, Garvill & Nordlund (2006, 2008) developed a model for the acceptability of transport measures, combining the value-belief-norm theory (Stern, 2000) with policy specific beliefs (perceived fairness and perceived effectiveness), problem awareness and personal norms.

The existing frameworks and models, such as the cognitive dissonance theory do not, however, adequately cover all relevant factors that could affect support for road safety policy measures. For instance, context dependent factors such as traffic regulation and enforcement seem to be largely ignored in such theories, often because studies are conducted within one country only. In conclusion, no comprehensive theoretical and

experimentally validated theory or model seems to exist that brings together all the key factors and variables that could explain people's views on policy measures in road safety.

2.7.2 Factors influencing support for policy measures (general)

Tobler, Visschers, & Siegrist (2012) found that in Switzerland the perceived costs and perceived climate **benefit** were the strongest predictors for willingness to act or to support climate policy measures. In a study on support for fuel taxation Kallbekken & Sælen (2011) found that support is best predicted by beliefs about environmental **consequences**, followed by beliefs about consequences to others. Several authors have also pointed out that uncertainty about the **effectiveness** of a particular policy negatively influences the support for it (Hensher & Li, 2013; Wang et al., 2018). Ziller & Helbling (2021) showed that citizens can accept far-reaching state surveillance measures if they believe in their necessity, extensiveness and reliability.

The perceived **legitimacy** of the government in taking particular measures is also an important factor for public support. People obey the law if they believe it is legitimate (Tyler, 2006). Vringer & Carabain (2020) found strong correlations between public support for measures related to energy transition policies and their perceived legitimacy. Legitimacy was operationalised through eight criteria; the highest correlation was with fairness. Christiansen (2018) showed that citizens opposing restrictive measures, such as local road tolls, were more dissatisfied with the performance of local democracy. In the context of climate policies, Davidovic & Harring (2020) found that the quality of government and **trust** in political institutions and people were positively associated with support for taxes, but not for subsidies en bans. Generalized social and political trust were also found by Lachapelle et al. (2021) to be associated with support for measures. Kallbekken & Sælen (2011) found that public support is higher when the government is trusted on how it spends the revenue.

It is to be expected that people's **political orientation** (Crawford et al., 2017) influence their opinion on measures, in particular if these would affect their social or economic situation. According to Boston et al. (2018) there is an association between some personality characteristics and political views. Harring, Jagers, & Matti (2017) demonstrated that ideological orientation and personal values both independently affect pro-environmental policy support. Tobler, Visschers, & Siegrist (2012) found that respondents from the right wing of the political spectrum were less willing to change their mobility behaviour. Often the ideological dimension of policy measures is not very

strong or may not be relevant in relation to someone's core ideological beliefs and values. In such cases people appear to view pragmatic responses to issues more favourably, regardless of their general ideological bent (Tavits, 2007).

Using both traditional survey methods and survey-based randomized experiments, Gilens (2001) found that the **knowledge** of policy-specific facts and information has a significant influence on people's political judgments (e.g. the direction of change in the crime rate or the amount of the federal budget devoted to foreign aid). General knowledge and cognitive capacities appear to facilitate the incorporation of new policy-specific information into political judgments. Schueler & West (2016) examined the role of information in shaping public opinion in the context of support for education spending. They found that providing specific quantitative information influenced the level of support for particular measures. The effects were larger among respondents who had underestimated the figures provided. Johnston & Ballard (2016) observed that citizens give substantial weight to **expert opinion** on highly technical issues for which few have strong prior attitudes (e.g. the revenue consequences of tax cuts), but largely ignore expert opinion on more salient and politicized issues in American politics, such as immigration.

Kangas, Niemelä, & Varjonen (2014) used a telephone survey to identify the most effective discursive devices to manipulate public opinion in relation to social assistance in Finland. It appeared easier for respondents to construct an opinion on the basis of **moral sentiments** (something is right or wrong) than on factual statements. The authors also found that extra information included in the factual questions had led to increasing uncertainty instead of clarifying the picture. Kallbekken & Sælen (2011) found that support can be explained well by capturing a broad range of **motivational** factors, implying that there is no magic formula for increasing public support for environmental taxes.

According to Koch & Peter (2017) **framing** policy statements positively can lead recipients to feel that the source is trying to persuade them, which triggers reactance, reducing the perceived truth of the message and the trustworthiness of the source. Negative statements are often assessed to be more trustworthy. In an experimental study Nyhan and Reifler (2010) found that when people are presented with facts correcting misperceptions that are relevant to their ideology, they may actually double down on these misperceptions. Particularly among conservatives, attempts to correct misperceptions activated a 'backfire effect' against empirical facts, with participants

more strongly expressing a non-factual belief. However Wood & Porter (2017) did not find such backfire effects in their experiments. They concluded that evidence of factual backfire is far more tenuous than prior research suggests.

2.7.3 *Factors associated with support for road safety policy measures*

Studies analysing public opinion on policy measures in road safety often list a few factors or variables that are associated with differences in the level of support. Most studies have found **gender** to be a statistically significant predictor of support for policy measures in road safety, with females almost universally showing higher support than men, in particular in relation to alcohol (Eby et al., 2017; McCartt, Wells, & Teoh, 2010; Munnich & Loveland, 2011; Robertson & Vanlaar, 2008; Runyan & Earp, 1985; Shults & Bergen, 2012). Older people are frequently inclined to be more in favour of road safety measures (Runyan & Earp, 1985; Robertson & Vanlaar, 2008), albeit less systematically so than women.

Arguments for supporting or opposing policy measures are often linked to the perceived **consequences and effects** of the measures. An early experiment from Runyan & Earp (1985) showed that exposure to effectiveness information was significantly associated with favouring mandatory seat belts or passive restraints over the existing regulation at that time. Eby et al. (2017) found that support for lowering the blood alcohol concentration (BAC) limit for drink driving was partially tied to beliefs about the impacts of a change in BAC standards. In relation to making alcohol interlock systems mandatory in the vehicles of people convicted for driving under the influence of alcohol, McCartt et al. (2010) found that most people favouring the measure thought that it would prevent alcohol-impaired driving, save lives, or prevent crashes.

Tapp, Nancarrow and Davis (2015) identified reasons to support or to oppose 20 mph speed limits in urban areas. The main reasons to support were fewer serious crashes, children who could play safely, and streets that would be more pleasant to live in; opposition was mainly related to the expectation that the limit would not be respected, that the measure would not be enforced effectively and that it would lengthen travel times. Another British study (Toy et al., 2014) concluded that the 'headline benefit' for advocating a 20 mph speed limit in urban areas should be the reduction of road crashes. Molin and Brookhuis (2007) showed that the understanding of the effects of speeding, the support for the policy goal and the perceived effectiveness were among the factors increasing the acceptability of ISA. Vlassenroot (2011) concluded that factors such as the perceived effectiveness of ISA, as well as equity of penetration,

effectiveness of ITS and personal and social aims had the largest effect on the acceptability of ISA. Smith et al. (2014) showed that there was considerable public support for evidence-based road-related laws such as introducing red-light cameras and mandatory cycle helmets for children, and that overall support was augmented by exposure to research data.

Eriksson and Bjørnskau (2012) found that awareness that speeding was a cause of crashes and assessing measures as fair, effective, and less infringement of freedom and privacy, resulted in higher levels of acceptability for technology based speeding measures. **Fairness** has also been observed as an important factor in transport measures by Eriksson, Garvill & Nordlund (2006, 2008).

Studies that examined the support for alcohol related measures, such as lowering the BAC limit or making alcohol interlock systems compulsory in certain cases, have shown that drinking **behaviour** and drunk driving are associated with higher opposition to such measures (Bishop et al., 2017; Downs, Shults, & West, 2017; Eby et al., 2017; Runyan & Earp, 1985). In this context, Elvebakk (2015) observed that the opposition against a paternalistic measure is higher when it directly controls behaviour, even if it is only meant to enforce an existing law. Watling and Leal (2012) found that people are more prone to accept enforcement for behaviours they themselves are unlikely to engage in. In relation to early ISA systems Garvill, Marell, & Westin (2003) found that people reporting higher frequency of speeding occasions were more negative to intervening ISA-systems. Molin and Brookhuis (2007) have also reported that exceeding speed limits decreases the acceptability of ISA.

Trust in the government is also a factor at play. Runyan & Earp (1985) found that attitudes toward government regulation, views about personal freedom and views about policy effectiveness were significant predictors of policy preference in relation to seatbelts and passive restraints. Findings from a systematic literature review by Florent et al. (2021) showed that in general perceived legitimacy is associated with compliance with traffic rules; this perception can be related to different objects such as traffic rules, traffic violations, traffic enforcement and institutions. A study on the use of red light cameras (McCartt & Eichelberger, 2012) revealed that the main reasons for opposing such cameras were the perceptions that cameras make mistakes and that the motivation for installing them is revenue, not safety.

Several studies have revealed **regional** differences within a country in terms of support for measures. Debinski, Smith, & Gielen (2014) observed that road safety measures that enjoyed national support may not be supported locally. The two main regions of Belgium, Flanders and Wallonia, often differ in terms of driving behaviour and the support for measures, such as a penalty point system or the mandatory use of cyclist helmets (BIVV, 2016). Similarly, in France, opposition to reduced speed limits on roads outside urban areas was higher in rural areas than in urban areas (CEREMA, 2020). Albalade (2012) revealed that population density was a factor determining opinions on speed limits. Shults and Bergen (2012) identified regional differences in support for alcohol interlock measures. Munnich and Loveland (2011) observed the greatest difference in support for mandatory motorcycle helmets when comparing the most rural areas to others.

Other factors that have been shown to be associated with the level of support for a particular road safety policy measure include cost (McCartt et al., 2010; McInturff & Harrington, 2006), privacy (McInturff & Harrington, 2006), income level (Bishop et al., 2017; McCartt et al., 2010), and knowledge about the measure (Bishop et al., 2017; Downs et al., 2017). It is also worth noting that very few authors found education level to be a statistically significant predictor of support for measures.

2.7.4 Level of support for road safety measures

Public support for road safety has been analysed in several countries for one or more policy measures. Most of these studies are based on national opinion polls and surveys. Despite the differences in the type of measures analysed, the formulation of the survey questions, the scale used for measuring the level of support, the countries in which the survey was organised and the year in which the surveys were conducted, public support for the measures was often quite high. Some examples:

- A Dutch study using survey data from the 90s showed that all safety measures mentioned in the questionnaire were (largely) supported by a majority of the over 5700 respondents (Rienstra, Rietveld, & Verhoef, 1999).
- A study by Debinski, Smith, & Gielen (2014) summarizing findings from 26 American studies on opinions about existing or proposed road safety measures revealed generally high levels of support.
- In a national survey in New Zealand, 80 percent of the respondents stated that the speed limits on the roads they usually drove were about right. Enforcement of the current speed limits was supported by the majority of New Zealanders, with nearly

three-quarters (73 percent) agreeing that enforcing the speed limit helps lower the road toll (Ministry of Transport, 2019).

- A representative survey of 2,000 U.S. drivers showed that 64.7% of the respondents were in favour of conducting sobriety checkpoints at least monthly; 60.3% of respondents were in favour of using speed and red light cameras for automated enforcement and 70.1% were in favour of a law that required all cars to have seat belt reminders that continuously chime until the seat belt is buckled, including for rear seat passengers (Fell, 2019).

2.7.5 International findings on support for road safety policy measures

A limitation of most of the results mentioned so far is that they refer to only one country and relate to one or only a few specific measures. Such findings may not be generalizable outside these countries or for other measures. Only a limited number of studies have examined the support for a range of road safety policy measures across several countries. These include the international survey initiatives 'Social Attitudes to Road Traffic Risk in Europe' (SARTRE) (Antov et al., 2010; Goldenbeld, 1998) and 'E-Survey on Road Users' Attitudes' (ESRA) (Buttler, 2016; Van den Berghe, Sgarra, et al., 2020 - see also Appendix A2). The following can be learned from the publications based on SARTRE and ESRA1:

- Support for new policy measures to improve road safety is often high.
- Differences between countries are often considerable. In LMICs the support for policy measures is often higher than in HICs.
- Almost universally, women are more supportive for road safety policy measures than men.
- In general, the younger age groups are less supportive for measures than the oldest age categories.
- The level of support is often higher for alcohol related measures than for speed related measures.

Please note that SARTRE only covered European countries and Europe also predominated in ESRA1. Therefore, the findings cannot simply be generalized to the global level, particularly given the lower economic development level, cultural differences and higher crash fatality rates in Africa, Latin-America and most of Asia. Moreover, only the relation of gender, age and country with support for policy measures was analysed in publications based on SARTRE and ESRA1 data.

2.8 Conclusion on findings and research gaps

Almost all interventions in road safety have an ethical dimension, because their primary aim is reducing harm to people. Also their drawbacks have often an ethical dimension such as reduction of individual freedom, discrimination or restriction of privacy. I identified five ethical principles that are highly relevant for road safety: reducing harm, preserving freedom, being fair, assuming responsibility and respecting privacy. Often road safety policy measures include a conflict between two or more of these principles.

Fairness has not received much attention in the context of road safety. Often its meaning is limited to equity and non-discrimination. Even in this restricted definition, it has appeared difficult to operationalise and quantify fairness. It is also impossible to translate the word fairness into other languages by a single term that captures all its meanings. If people perceive a policy measure as fair then it appears plausible that they will support it; however the relationship between perceived fairness and support for policy measures in road safety has not yet been analysed.

Findings are available about the level of public support for road safety measures and about factors that influence it. However, these results are often based on the analysis of one specific measure in one country at a certain time. Generalisability is often problematic. Another weakness of the research to date is that typically only one research method has been used in the studies (e.g. an opinion poll), which may give a biased or at least incomplete picture of the situation. Also, hardly any comparisons have been made on how the contributing factors vary across types of measures and intervention areas (e.g. on drunk driving, speeding, distraction, ...). The inherent value conflict in the measures is mainly between reducing harm and preserving freedom; fairness is seldom an issue. Moreover, most findings relate to developed countries and few results are available for LMICs.

It is widely recognized that national culture has an impact on road safety performance, but how this actually works has not yet been established. National culture can be quantified in several ways, but there is no consensus on how to do so for road safety culture. The relationship between culture and support for policy measures in road safety has hardly been examined, and not at all in an international context – the main exceptions being my publications based on preliminary results of my PhD research (Van den Berghe, Schachner, et al., 2020; Van den Berghe, Sgarra, et al., 2020).

Based on these conclusions, I have refined the initial research questions and developed a methodology in order to address the research gaps identified. This is discussed in the next chapter.

*“It's much easier to know whether you've drunk or not than to
measure whether you've drunk a little bit, a little bit more.
Once you've crossed the line, you've taken the drink
and you may continue.”*

3. Methodology

3.1 Introduction

3.1.1 Research questions and overall approach

As mentioned in Section 1.3.1 the two research questions for this PhD thesis are:

- (1) **When is a road safety policy measure fair?**
- (2) **Which factors influence the support for road safety policy measures?**

The first research question can be broken down into the questions on what fairness actually means in road safety and what factors influence the perceived fairness of road safety measures. For the second research question I was particularly interested in how such factors differ across countries and cultures.

I used the following complementary methods to answer these research questions:

- (1) review the **literature** (Chapter 2)
- (2) analyse the association between public support for road safety measures and a range of **national indicators** for a large number of countries
- (3) organise and analyse **interviews** with policy-makers and experts in five European countries for discussing a range of policy measures
- (4) develop and analyse a dedicated **survey** on support for road safety measures in ten different countries (called '**dilemma survey**').

Both the international dimension and the complementarity of the methods were needed to be able to generalise the findings across measures and countries.

When developing and implementing the methodological approaches, much attention went to seeking and incorporating feedback. This extended far beyond the regular feedback from my supervisor. It also included numerous exchanges with colleagues and international experts on the use of particular methods and the interpretation of particular findings. I was grateful for colleagues from Vias institute, Université Gustave Eiffel in Lyon and the Kuratorium für Verkehrssicherheit (KfV) in Vienna who organised focus group sessions for discussing the policy measures I had selected for analysis. Some thirty people participated in reviewing the design of the dilemma survey and its different language versions. I used also the opportunity to discuss early findings with colleagues from my international network. The feedback received after presentations and from anonymous reviewers of articles was very useful as well.

Table 13 lists the software programmes used for collecting, processing and analysing the data, and for drafting the manuscript. Many of these programmes were new to me. The most challenging part was mastering advanced features (language versions, piping, randomisation of questions) of the survey software KeySurvey.

Table 13. Software programmes used for the PhD

Software	Use
DeepL Pro	Automatic language translation
MS Excel	Data organisation / Data cleaning / Linking data / Pivot tables / Descriptive statistics / Bar charts / Checks on analyses in SPSS
Google Translate	Automatic language translation
KeySurvey	Design of dilemma survey (all language versions) / Data collection
Mendeley	Documenting and referencing publications
Outlook	Email communication
MS Powerpoint	Design of figures and schemes
QDA Miner Lite	Coding and analysis of interviews
Skype, MS Teams	Video based interviews
Sonix	Transcription of interviews
SPSS (v. 25-27)	Weighting of data / Descriptive statistics / Correlation analysis / Factor analysis / Scatterplots / Regression analysis
Temi	Transcription of interviews
UCL Explore	Literature search
MS Word	Drafting reports

3.1.2 Scientific notations and conventions used

This thesis presents a large number of statistical analyses. The following symbols and conventions have been used:

- All correlation results presented are Pearson correlations. I use ' r ' to refer to such correlations and ' p ' for the level of significance.
- For correlation coefficients a double asterisk (**) means that the correlation is significant at the $p < 0.01$ level and a single asterisk (*) that the correlation is statistically significant at the $p < 0.05$ level.
- Correlations are shown with three digits; for readability in some large tables the initial 0 has been dropped (e.g. 0.412 becomes .412).
- For statistical variation, often shown in scatterplots, I use R^2 .
- N refers to the number of participants (interviewees, respondents in the survey).

- Sources of data in tables and figures are indicated below the table or graph. No source is mentioned when it concerns my own data and the context makes this obvious (e.g. most tables and figures in Chapter 5 on the interviews and in Chapter 6 on the dilemma survey).
- When quoting interviews, the quote is followed by the country, professional occupation and ID of the interviewee, e.g. (*Greece, Academic, 31*). For the professional occupation I used the categories Academic, Consultant, Manager, Official, Parliamentarian and Researcher.
- Chapter 4 includes a large number of scatterplots, with dots representing countries. When the number of countries is lower than 60, each dot is labelled with the 3-digit ISO-code (International Standards Organization). When the number of countries is higher, the country labels are left out, but the dots are coloured by country cluster.

3.1.3 Ethical approval

An ethical approval of the research was given by UCL, with reference 14207/001, in a letter of January 22nd, 2019 by Professor Michael Heinrich in his capacity as Joint Chair of the UCL Research Ethics Committee. For the countries outside the UK in which interviews were conducted (France, Sweden, Austria, Greece) it was not necessary to obtain additional national ethical approval, provided the procedures agreed on in the ethical approval by UCL were respected. This was confirmed to me by staff from road safety research entities in the countries concerned: KfV (Austria); Université Gustave Eiffel (France); CERTH/HIT (Greece); and VTI (Sweden). Following the conditions of this ethical approval, a brief report was written in December 2020 on the data collection process. No particular ethical issues needed to be reported.

3.2 Selection of policy measures as a basis for analysis

3.2.1 Initial selection of policy measures

An important choice was the selection of the contentious measures that would be at the core of the analyses. An initial longlist with 28 measures was subsequently reduced to eight measures that were to be used in the interviews and the dilemma survey (see Table 14). Once a policy measure has been tried out or implemented, opinions are often more favourable (CEREMA, 2020; Elvebakk, 2015; Schuitema, Steg, & Forward, 2010; Wolff, 2019). To maximize comparability between countries, I therefore selected policy measures that had not yet been implemented (with a few exceptions: ZER and partially PAY exist in Sweden and a measure similar to SCR in Greece).

Table 14. Initial selection of eight contentious measures

ZER: Zero tolerance for alcohol (0,0‰) for all drivers of vehicles on the road.
SCR: All people aged 70 or more should be screened on a 5 yearly basis, in order to decide whether they are still allowed to drive a car or not.
HEL: All cyclists should wear a helmet.
INS: The cost of insuring a car should be different between men and women.
ALC: All cars, trucks and buses should be equipped with an alcohol interlock system (which prevents starting the vehicle if the alcohol concentration is above the legal limit).
20K: In all urban zones and villages the speed limit should be 20 km/h for all vehicles (except on main thoroughfares).
RFL: Pedestrians should wear retro reflective clothing when walking in the dark on public streets.
PAY: The fines that people have to pay after they have committed a traffic offence should be proportional to their income.

The criteria for inclusion of measures were:

- (1) be implementable (in principle) over the next decade in the countries included (to avoid respondents regarding it as an imaginary measure)
- (2) make sense in all the countries in which the interviews and the dilemma survey were conducted (to avoid rendering international comparisons meaningless)
- (3) be neither too controversial (so that almost everyone would oppose it) nor too obvious (so that almost everyone would support it)
- (4) include at least one aspect that could be considered 'unfair' by certain stakeholders.

Moreover, when considered together,

- (5) some measures should be identical or similar to those of the ESRA2 survey
- (6) the set of measures should target different road users – not just motorists
- (7) the set of measures should cover different trade-offs and concern a range of ethical issues, such as avoiding harm, freedom, equity and responsibility.

3.2.2 Differences between the initial shortlist and the measures actually used

The measures eventually used in the interviews and the dilemma survey were not exactly the same as those initially selected. I made some changes to improve the comparability with ESRA data and to increase the potential of generalising the results. For the dilemma survey, which covered ten measures, a measure on ISA systems and one on driving education was added. For the interviews, the fourth measure in relation to insurance premiums was replaced by a measure on ISA systems, like in the dilemma survey. Both in the interviews and the dilemma survey, the 20 km/h in the

sixth measure was replaced by 30 km/h, in order to make the measure less unrealistic. Other changes consisted of slight reformulations, following feedback received during the focus group discussions in Vienna, Lyon and Brussels. An example was the measure on alcohol interlocks: in the final version the reference to buses and trucks was deleted, since the support for the measure could differ by type of vehicle. Also, after having conducted a few interviews the formulation of some measures was slightly modified to avoid misunderstanding; this change was subsequently also reflected in the dilemma survey. A final factor that caused changes in the formulation of some measures were demands for clarifications received as part of the feedback on the survey. For instance, in RFL, 'walking' was replaced by 'walking or running'.

3.2.3 Policy measures used in the interviews and the dilemma survey

Table 15 includes the formulation of the policy measures that was used in the interviews. This list was handed over to the interviewees during the face-to-face interviews. The three letters in the first column are codes that are used for the analysis and appear in tables and graphs later in this thesis. Table 53 in Chapter 6 lists the small differences with the formulation of the measures in the dilemma survey.

Table 15. Code and formulation of the policy measures used in the interviews

Code	Formulation of the policy measures in the interviews
ZER	Zero tolerance for driving under the influence of alcohol (0,0‰ blood alcohol concentration) for all drivers of vehicles (cars, trucks, motorcyclists, cyclists, ...).
30K	In all urban areas and villages the speed limit should be 30 km/h (20 mph) for all vehicles (except on main thoroughfares).
SCR	All people aged 70 or more should be screened on a 5 yearly basis, in order to decide whether they are still allowed to drive a car or not.
PAY	Fines that people have to pay after they have committed a traffic offence should be proportional to their income.
ALC	All cars should be equipped with an alcohol ignition interlock system (which prevents starting and driving the car if the driver's alcohol concentration is above the legal BAC limit).
HEL	All cyclists should wear a helmet.
RFL	Pedestrians should wear retroreflective clothing, shoes or bags when walking in the dark on public roads.
ISA	All cars should be equipped with an Intelligent Speed Assistance (ISA) system that automatically limits the speed of the car to the maximum speed limit ³ .

³ For clarity I added orally during the interviews "that cannot be turned off" in order to get stronger arguments, and to be more consistent with the formulation in the dilemma survey.

3.3 Country-level analyses

3.3.1 Scope and overall approach

The country-level analyses had a double purpose: to contribute to answering the research question on factors associated with public support; and to provide contextual information for the other analyses. For this part of the PhD, only secondary data was used. All analyses have been undertaken on the basis of national indicators from a variety of sources. These indicators can be grouped into four categories:

- (a) indicators on support for policy measures in road safety
- (b) indicators on road safety performance
- (c) indicators on culture
- (d) indicators on demographic, educational, political, transport and safety characteristics.

In Sections 2.5.3 and 2.5.4 of the literature review I have already discussed national cultural indicators; I used mostly the two updated Hofstede dimensions of national culture, Independent and Confucianist. There are several reasons for this choice: the values are recent, they are based on a representative sample of the population (which is not the case for the values for the other cultural dimensions) and the dimensions fit well in the two-dimensional cultural superstructure of Fog (2020). Moreover they appear to be better associated with objective indicators of cultural phenomena than other cultural constructs (Minkov, 2018; Minkov & Kaasa, 2021).

I derived the indicators on support for policy measures from the ESRA databases; these will be discussed in Section 3.3.2. The national indicators on road safety performance refer to road crash fatalities and fatality rates; these are discussed in Section 3.3.3. The fourth category of indicators were collected from a variety of international databases and are discussed in Section 3.3.4.

3.3.2 Indicators on support for policy measures in road safety

The main source for national indicators on public support for road safety measures is the ESRA2 database. ESRA2 refers to the second version of ESRA (E-Survey of Road Users' Attitudes). I initiated ESRA in 2015 and am still supervising this initiative. The ESRA data is collected through online market panels, the sample of respondents being representative for the adult population of the participating country. More information on the scope and methodology of ESRA is given in Appendix A2 and in the ESRA methodology report (Meesmann, Torfs, Wardenier, & Van den Berghe, 2021). The full

ESRA2 database is only accessible to employees of Vias institute and contact persons of the so-called 'core group' of ESRA partner organisations. The ESRA2 survey included a question on support for fifteen policy measures in road safety. The question and the measures are shown in Table 16. When reporting on the analyses in relation to these measures, often a code or short name or the code will be used; these are also included in Table 16. Five of these measures – ALC, ZER, ISA, HEL and RFL – are similar to the measures used in the interviews and the survey.

Table 16. Original formulation and shorter version of the 15 policy measures in ESRA2

Code	Original formulation (after the intro "Do you oppose or support a legal obligation to ...")	Short formulation
ALC	Install an alcohol 'interlock' for drivers who have been caught drunk driving on more than one occasion (technology that won't let the car start if the driver's alcohol level is over the legal limit)?	<i>Alcohol interlock for recidivists</i>
ZEN	Have zero tolerance for alcohol (0,0 ‰) for novice drivers (licence obtained less than 2 years ago)	<i>Zero alcohol novice drivers</i>
ZER	Have zero tolerance for alcohol (0,0 ‰) for all drivers?	<i>Zero alcohol all drivers</i>
ISA	Install intelligent speed assistance (ISA) in new cars (which automatically limits the maximum speed of the vehicle and can be turned off manually)	<i>Install ISA system</i>
SWS	Install dynamic speed warning signs (traffic control devices that are programmed to provide a message to drivers exceeding a certain speed threshold)	<i>Install Speed Warning signs</i>
SRE	Have a seatbelt reminder system for the front and back seats in new cars	<i>Seatbelt reminder all seats</i>
HEL	Require all cyclists to wear a helmet	<i>All cyclists wear helmet</i>
HEC	Require cyclists under the age of 12 to wear a helmet	<i>Children cyclists wear helmet</i>
HEP	Require all moped drivers and motorcyclists to wear a helmet	<i>PTW (powered two-wheelers) wear helmet</i>
RFL	Require pedestrians to wear reflective material when walking on the streets in the dark	<i>Pedestrians wear reflective material</i>
RFC	Require cyclists to wear reflective material when cycling in the dark	<i>Cyclists wear reflective material</i>
RFP	Require moped drivers and motorcyclists to wear reflective material when driving in the dark	<i>PTW wear reflective material</i>
NMP	Have zero tolerance for using any type of mobile phone while driving (hand-held or hands-free) for all drivers	<i>No use mobile phones in cars</i>
NHP	Not use headphones (or earbuds) while walking on the streets	<i>No use headphones by cyclists</i>
NHC	Not use headphones (or earbuds) while riding a bicycle	<i>No use headphones by pedestrians</i>

The ESRA2 database is quite unique because it includes comparable data for 48 countries. A drawback for the cultural analysis was that ESRA2 included only one Latin-American country (Colombia). However, the ESRA1 survey, which was conducted in 2017 in 13 Latin-American countries, also included questions on public support for policy measures, several of which were (almost) identical. By using the average (small) difference between the results for ESRA2 and ESRA1 for the countries that participated in both surveys, an estimate was made for 12 Latin American countries for the measures ALC, ZEN, ZER, HEL and NMP; these estimates were added to the database of national indicators. In the dilemma survey some of the questions were also similar or almost identical as those in ESRA2. Through a similar method as described above, for five policy measures (ALC, ZER, ISA, HEL and RFL) I added estimates for China to the database. Despite the differences in the formulation of the questions and the sampling strategy, I considered that adding these estimates for Latin American countries and China would be useful to get a more global perspective on cultural differences in support for policy measures.

3.3.3 Indicators on road safety performance

The World Health Organisation (WHO) collects data on road safety fatalities and context information. The data is reported in the Global Status Report on Road Safety, of which I used the most recent version, referring to fatalities in 2016 (WHO, 2018). The fatality figures published by the WHO are estimates based on statistical modelling. Particularly in LMICs, these estimates are considerably higher than the countries' official statistics on fatal road crashes. For a few countries or territories for which I had data on support for measures or national culture (e.g. Taiwan) but no crash data was available in the WHO database, I used crash data from the previous version of the WHO report or from official national sources.

The main indicator extracted from the WHO database was the fatality rate, expressed as the number of road traffic fatalities per 100,000 population. Other road performance indicators extracted were: % of car passengers fatalities, % of PTW fatalities, % of cyclist fatalities, % of pedestrian fatalities and % of alcohol related fatalities. These more specific fatality rates are not available for all countries in the WHO database (see Table 68 in Appendix A1); moreover it often concerns rough estimates. I used these data to calculate additional crash fatality rates per capita. It should be noted that 'crash fatality rate' refers to the number of fatalities of that type (e.g. pedestrians) per 100,000 population, not to pedestrian crash fatalities per 100,000 pedestrians.

Further indicators for road safety performance were constructed by relating the number of fatalities to rough proxies of exposure to traffic: the length of the road network, the volume of gasoline consumption and the number of vehicles (sources for these indicators are given in Table 68, p.346).

3.3.4 Other national indicators used

The criteria for the selection of other national indicators for the analyses were:

- (1) the indicator is likely to be associated in one way or another with either road safety performance or support for policy measures (following findings from the literature survey)
- (2) the indicator is available for a sufficient number of countries (at least 20, but preferably 50 or more)
- (3) the method for collecting the data and calculating the indicator values is known to be reliable.

In total 235 national indicators from 20 different international sources were included in the database; the sources are shown in Table 17 (p.107). The areas covered by the indicators include (in addition to support for measures, road safety performance and culture): Demography; Economic and human development; Education; Mobility; Behaviour in traffic; Subjective Safety; Traffic law enforcement; Happiness; Trust; and Political system. Table 68 in Appendix A1 lists all indicators and their source.

3.3.5 Data processing and creation of the database of national indicators

For most variables the data extracted from external sources was first copied to an Excel sheet. The data in each sheet was checked and corrected to ensure that missing values were not included as zero values. I used the data for the most recent year available; when data for a particular country was missing, the value of the previous year was taken. I added systematically the 3-digit ISO-3166 country code (www.iso.org/iso-3166-country-codes.html) to the records and made it the first variable. These country codes can be found in Table 69 in Appendix A1. In all Excel sheets the data was reordered alphabetically by using this code.

For the ESRA based indicators, I used data from the so-called 'ESRA Table Report'. The full dataset from the WVS/EVS (World Values Survey/European Values Survey) and ESS (European Social Survey) was downloaded, and subsequently I calculated the country means of the selected indicators, using the appropriate weighting variable

(calculations were done in SPSS). These means were copied to Excel sheets and the 3-digit ISO country code was added.

Table 17. Sources from which the national indicators were obtained

Source	Main source url or other access	Main year
CIA World Factbook	www.cia.gov/the-world-factbook/field/roadways/country-comparison	2013
Economist Intelligence Unit (EIU)	https://www.eiu.com/n/	2020
E-Survey of Road Users' Attitudes (ESRA)	Provided by ESRA Coordination Team (www.esranet.eu)	2018
European Social Survey (ESS)	www.europeansocialsurvey.org/data/	2018
GLOBE Project	globeproject.com/study_2014	2007
Hofstede Insights	Data provided directly (www.hofstede-insights.com)	2017 (new) 1985-2010 (old)
International Labour Organisation (ILO)	ilostat.ilo.org/data/...	2019
International Standards Organisation (ISO)	www.iso.org/obp/ui/#search/code/	2020
PISA – Programme for International Student Assessment (OECD)	gpseducation.oecd.org/IndicatorExplorer...	2018
Schwartz Cultural value orientations	www.researchgate.net/publication/304715744_The_7_Schwartz_cultural_value_orientation_scores_for_80_countries	1994
Transparency International	www.transparency.org/en/cpi/2019/index/nzl	2019
UN (HDR-UNDP)	www.hdr.undp.org/en/indicators/...	2019
UN (UNDESA)	population.un.org/wpp/	2020
United States' Energy Information Administration (EIA)	https://www.eia.gov/	2012
Varieties of democracies index (V-Dem)	https://www.v-dem.net/en/	2018
World Bank	data.worldbank.org/indicator	2017
World Economic Forum (WEF)	www.weforum.org/reports/gender-gap-2020-report-100-years-pay-equality	2020
World Happiness Report	worldhappiness.report/ed/2020/	2020
World Health Organisation (WHO)	www.who.int/publications/i/item/9789241565684	2016
World Values Survey / European Values Survey (WVS/EVS)	www.worldvaluessurvey.org/WVSEVSjoint2017.jsp	2017

Once the was arranged properly in the Excel sheets, the indicator values were integrated into the 'Master table' by using Excel lookup functions. The linking was

based on the ISO country codes. I also added some calculated variables in the master database. Absolute fatality rates for road user groups and alcohol related fatalities were obtained by multiplying the relative part of these fatalities with the national fatality rate. This was not done for countries where over 33% of the fatalities was classified as “other” or “unknown” and less than 15% of fatalities were car passengers, because such figures would be most likely a considerable underestimation of the real fatality rates. I also calculated some fatality rates in relation to proxies of traffic exposure. Other additional calculated indicators were road density, obtained by dividing road length by population, and the variation between the 10th and 90th decile in PISA results. The Excel sheet with the Master table was also transformed into an SPSS table. Whenever corrections had to be made on the Master table in Excel, a new SPSS table was created.

Indicators in the Master table were available for up to 173 different countries. The indicators with the lowest numbers of countries are those from the European Social Survey (29 European countries). Given the large number of countries, for certain analyses countries were grouped into clusters: geographical, regional (as used by international organisations) and cultural (Table 69, p.352). For the cultural cluster I started from the cultural groupings of GLOBE (section 2.5.5) and allocated countries which were not covered by GLOBE to the most logical cluster. Table 18 (p.109) shows for how many countries data are available for fatality rates and support for policy measures, grouped by cultural cluster. For certain clusters – Anglo group, Nordic Europe, Germanic Europe, Latin Europe – the number of countries with values for both indicators is (almost) identical. For Confucian Asia, Latin America and Sub-Saharan Africa there is an acceptable number of countries with data on support for measures, but this is not the case for Southern Asia and the Middle East. There are no indicators for support for measures from Central Asia.

3.3.6 Scope of the analyses conducted

I first examined the association between fatality rates and other national indicators in the database. I subsequently analysed the associations between the different cultural constructs (Hofstede, Schwartz, GLOBE) and examined how the national values of these constructs were associated with the other indicators in the database. These analyses were meant to give context for the ‘core’ analyses of the relation between support for policy measures on the one hand, and road safety performance and culture on the other. Finally I analysed and interpreted the association between national culture, road safety performance, economic development and support for measures.

Table 18. Regional distribution of countries and availability of key data

Cultural cluster	Number of countries with data on road traffic fatalities	Number of countries with data on support for measures
Anglo	6	5
Nordic Europe	5	5
Germanic Europe	6	6
Eastern Europe	24	7
Latin Europe	5	5
Sub-Saharan Africa	44	9
Middle East	19	5
Central Asia	8	
Confucian Asia	8	4
Southern Asia	13	2
Latin America	26	13
Other	9	
Total	173	61

3.3.7 Analysis methods used

Given the exploratory nature of this research and the lack of existing models and theoretical frameworks for explaining national differences in support for measures, I mostly used bivariate analyses (cross-tabulations, correlation analyses, and scatterplots). I first generated scatterplots to get insight in the association between variables and the distribution of the values across countries; this was complemented with correlation analyses. Only a small selection of all these analyses is reported in this thesis (Chapter 4). For all statistical analyses I used SPSS version 25 or 27 (IBM Corp., 2020; IBM SPSS Statistics for Windows, 2017). In scatterplots I labelled the point ID's with the 3-digit country code, except when the number of countries exceeded 60.

The methodology used for data sampling and processing in ESRA2 is described in the methodology report for ESRA2, which I co-authored (Meesmann et al., 2021). For most analyses I used indicators included in the ESRA 'Table Report' that are based on programming in R (R Core Team, 2020). I also conducted some additional data analyses and checks on the ESRA2 dataset by using SPSS 27.0.

The analysis approach chosen is similar to methods used by other researchers when using national indicators in the absence of existing models (Friendly & Denis, 2005; Shen et al., 2019). For instance, the recent articles of Minkov and colleagues on the new Hofstede dimensions also use correlation analyses and scatterplots extensively (Minkov, Bond, et al., 2018; Minkov et al., 2019, 2017; Minkov, Schachner, Sanchez, & Morales, 2018). Another illustration of the power of scatterplots in similar contexts is the book on inequality by Wilkinson and Pickett (2011).

I am well aware that correlation or visual association does not imply causation. When a causal link appears to be plausible it will nevertheless be mentioned. I have also included some partial correlations in cases where the strong association between two variables might be explained partially by a third variable.

It should be noted that the number and distribution of countries for which indicators are available, varies considerably between indicators (see Table 68 and Table 70 in Appendix A1). The varying number of countries implies that care should be taken when comparing correlations. Therefore, for certain important analyses, correlations were also calculated for common subsets of countries. In some cases the correlations became considerably stronger or weaker when using these subsets, and in a few cases even their sign changed.

I undertook also a number of ordinary least squares linear regression analyses in which the dependent variables were the fatality rate, the cultural dimensions and support for policy measures; the independent variables were various indicators from different areas. However, interpretation of the results was difficult because of the many missing values and the strong collinearity between many indicators (e.g. culture and economic development). For example, I used eight independent variables for a regression on fatality rate; using stepwise regression only one predictor was kept (Human Development Index), with an adjusted R^2 of 0.754 and $p < 0.001$. For the regression analyses on support for policy measures, the predictors used were the variables from different areas which had the strongest correlation with the support for those measures. The adjusted R^2 was often high (range 0.4 to 0.7, $p < 0.001$), but no consistent patterns could be derived from the sets of variables that were statistically significant for each of the policy measures. Moreover, these predictors differed when undertaking the regression analyses for particular subgroups of countries. For example, in the regression model for support for ISA, in Europe the two significant variables in the regression model were “Happiness” and “Exceeding speed limits outside built-up

areas” while for the non-European countries it was “GNI per capita”, “Driving after drinking alcohol” and “Checked for DUI last 12 months”. For both groups the R^2 was very high, but the models were overfitted. None of the regression results were contradictory to the findings from the correlation analyses, but neither did they provide additional insights on top of the bivariate analyses and (partial) correlations. For that reason, no results from the regression analyses for the country-level analyses are reported in this thesis.

The analyses were conducted in two stages. The first one took place in 2018 and 2019; some findings of this first stage have already been published (Van den Berghe & Schachner, 2019; Van den Berghe, Schachner, et al., 2020; Van den Berghe, Sgarra, et al., 2020). These first analyses were based on a much smaller dataset than the database used for the second analysis stage in early 2021, which included more indicators and also a higher number for countries for some of them. The main reason for this late expansion of the database was that the additional ESRA2 and WVS/EVS data were only accessible in December 2020. Most analyses that had been undertaken in the first stage were remade in 2021, and additional analyses with new indicators were undertaken. Therefore, almost all quantitative findings of the country-level analyses presented in this thesis are new and have not yet been published.

3.4 Interviews with policy-makers and experts

3.4.1 *Link with grounded theory*

The main purpose of the interviews was to understand how experts and policy-makers look at fairness and why they support or oppose policy measures. Other purposes of the interviews were to collect information for contextualising the answers of the participants in the dilemma survey, and to understand better the differences in national road safety contexts and approaches.

The interviews were an important qualitative component of my research. The approach used for designing and conducting the interviews was inspired by the principles and methods of ‘grounded theory’ (Charmaz, 2000; Glaser & Strauss, 1967; Okely, 1994; Strauss & Corbin, 1998). According to Bryman (2012) ‘grounded theory’ is the most widely used framework for analysing qualitative data. Despite some controversy about what it actually entails (Charmaz, 2000) the main elements are (Bryman, 2012):

- *Coding* (see Section 3.4.7).

- *Theoretical sampling* – my approach was close to the interpretation of theoretical sampling by Charmaz (2000) of iteratively refining theoretical categories when analysing data.
- *Theoretical saturation*, implying reaching a point where new data no longer suggests new insights into an emergent theory or no longer suggest new dimensions of theoretical categories (Bryman, 2012; Strauss & Corbin, 1998); in my research the last interviews undertaken did not add new insights and didn't require a modification of the coding scheme.
- *Constant comparison*, referring to the requirement for the researcher to constantly compare phenomena within a category as a basis for a theoretical elaboration; I applied this process for the arguments used by the interviewees.

The typical outcomes of grounded theory are (Bryman, 2012):

- *Concepts*, i.e. labels given to discrete phenomena following open coding (see Section 3.4.7); for the interviews this referred mainly to the meaning of fairness and the arguments used for supporting or opposing policy measures.
- *Categories*, i.e. a grouping of two or more concepts into concepts with a higher level of abstraction; the main categories developed in this thesis are the 'Argument areas' that are part of the classification scheme (Table 44, p.179).
- *Properties of categories* – in my thesis this meant for instance that the 'Argument areas' like 'Relevance' or 'Equity' could be used both for the meaning of fairness as for the support to a broad range of policy measures.
- *Hypotheses* – when designing the interviews I assumed that a common set of argument areas could be developed across all policy measures considered.
- *Theory*, a set of well-defined categories and their relationships that form a theoretical framework for explaining particular phenomena; in my thesis I did not go that far, but the classification scheme could become an element of a theories in relation to support for policy measures.

3.4.2 Sampling and selecting interviewees

The sampling strategy adopted can be described as purposive sampling, more specifically stratified purposive sampling, i.e. sampling of individuals within subgroups of interest (Bryman, 2012; Palys, 2008). The initial plan was using the same six countries for the interviewees and the dilemma survey: the UK, Belgium, Austria, Sweden, France and Greece. The choice of these six countries was based on the following strategic and practical criteria:

- sufficient variety in terms of road safety performance

- sufficient variety in terms of culture and traffic law enforcement
- be in Europe
- good personal professional contacts in the countries who could assist me in identifying suitable interviewees and introduce them to me
- the prospect to attend meetings in these countries in 2019 or 2020, in view of arranging face to face meetings and minimising travel time and cost
- interviewees with mother tongue or high language proficiency in English, French, Dutch or German, so that they could express their opinion accurately.

I decided to leave out Belgium for the interviews in order to avoid conflicts of interest with my roles on the Belgian road safety scene, and because of the risk to get evasive answers from interviewees whom I was in touch with professionally.

The target group for the interviews were policymakers and experts in the field of road safety. The initial goal was to interview three to five policymakers or road safety experts in each country. I soon realised, however, that this number would lead to insufficient coverage of the variety of views and perspectives across the country. Therefore I decided to interview eight experts and policymakers in each country, 40 in total. I consider this was sufficient for the purpose of this thesis. Indeed, after about 30 interviews I noticed saturation in the types of arguments and their distribution (Guest, Bunce, & Johnson, 2006). Also, Warren (2002) has observed that publications of qualitative interview studies in scientific journals require at least twenty to thirty interviews. Mason (2010) found that the average sample size in interview-based doctoral theses was 31 (median of 28).

The intended profiles of the interviewees were:

- a parliamentarian involved or interested in road safety and/or transport issues
- a senior public servant responsible for a road safety related department
- a director or senior employee of a road safety agency, research centre, ...
- a member of a road safety stakeholder organisation with experience in lobbying.

I discussed these profiles with my 'national contact persons', professional acquaintances who had agreed to help me in identifying suitable persons and who were all recognized national experts in the field of road safety. They suggested for their country between nine and fourteen possible interviewees. In some cases they checked beforehand the willingness of these people to participate in the interviews.

For each country, I contacted persons in a particular order, in order to achieve a sufficiently balanced set, and stopped the process when I had attained eight

agreements. Emails were sent to potential interviewees in the first half of 2019. These mails were in English for British, Swedish and Greek interviewees, in French for the French and in German for the Austrian interviewees. The emails included:

- a reference to the person who gave me their name and/or a reminder of my previous contact(s) with them
- a short presentation of myself, Vias institute and my professional responsibilities
- an introduction on the PhD project and how the interviews would contribute to it
- the question to accept to be interviewed, including a reference to the 'participant information sheet' and the consent form (in the same language as the email)
- information on how the interview would be conducted
- suggestions on when and how the interview could take place.

Overall, the reactions were very positive and sometimes even enthusiastic. Only three persons never reacted, even after two reminders. Two persons declined but suggested a colleague from the same organisation, who subsequently accepted.

Five of the experts interviewed (from four countries) were people I had cooperated with in research projects in the past; seven other interviewees I had met at least once in my life. Although I was concerned that this might introduce a bias, I did not notice any social desirability or other bias during my interviews with them.

3.4.3 Designing the interviews

There are several types of interviews, the main categories being structured interviews, semi-structured interviews and unstructured interviews (Bryman, 2012). I expected that the discussion would vary a lot between interviewees, and that I would often need to ask for clarification and engage in a discussion in order to understand the statements made by the interviewees. Therefore, I considered the semi-structured interview as being the most effective approach. According to Bryman (2012, p.212) *"It typically refers to a context in which the interviewer has a series of questions that are in the general form of an interview schedule but is able to vary the sequence of questions. [...] Also, the interviewer usually has some latitude to ask further questions in response to what are seen as significant replies."*

Appendix A3 includes the topic guide for the interviews. For each interview the same structure was used:

- (1) confirmation of consent and collection of information about the interviewee

- (2) questions on the perception of fairness and how road safety was organised in their country
- (3) discussion on the perceived fairness of, and support for eight policy measures
- (4) concluding observations by the interviewee.

I included two types of questions: closed questions (e.g. whether or not to support a measure) and open questions. Some open questions requested a short response (e.g., the main argument for opposing a measure) but others required a more elaborated answer and would often initiate a discussion (e.g., what would make interviewees change their position on the policy measure). The open questions on the meaning of fairness and the arguments for supporting or opposing measures were the core of the interview. The advantages of using open questions are (Bryman, 2012):

- they are useful for exploring areas on which there is limited knowledge
- interviewees can react in their own terms; this is also the reason that I conducted part of the interviews in French and German
- they do not suggest a particular type of answer, and may also lead to unusual and unexpected responses
- they are useful for generating fixed-choice formats in later surveys, as I actually did in the dilemma survey.

Disadvantages of open questions are that interviews are more time-consuming, are more difficult to master, require more efforts by the interviewees, and require a lot of preparation (transcriptions and coding) before the data analysis can start.

3.4.4 Conducting the interviews

For conducting the interviews I followed good practice principles that are well-documented in the literature (Charmaz, 2002; Gerson & Horowitz, 2002; Kvale, 1996; Lofland & Lofland, 1995; Sudman & Bradburn, 1982) such as:

- being well prepared
- making sure interviewees understand well the purpose of the research
- establishing rapport with the interviewees (with some informal exchanges, before the formal interview started)
- using an interview guide with a neutral and logical sequence of questions
- using clear language
- formulating the key questions always in the same way to interviewees
- not imposing my own views
- asking for clarifications when I wasn't sure I had understood the answer well

- remembering previous comments and relate to these when appropriate.

The same set of questions was used as a starting base in all interviews. As the interview progressed, this standard set was complemented with specific questions to seek clarification of what the interviewees had said or to discuss their arguments.

After confirming consent, the interviewees were first asked to provide information on age, educational qualifications, employer, professional position, experience with road safety and membership of a political party. This last item was only asked to politicians and people who had been a politician before they assumed their current position.

This introductory part was followed by questions and a discussion on fairness, road safety policy and support for policy measures. The interviewees were first asked about their understanding of the concept of fairness and what 'fairness in policy' meant to them. Some immediately jumped to fairness in (road safety) policy. In the French interviews I used both the terms 'fairness' and '*équité*' (the French term which comes closest to fairness). In German language the term 'fairness' is not translated, but sometimes I also used the term '*Angemessenheit*', which means more or less 'Appropriateness'. In view of a better understanding of the national road safety context, the interviewees were asked to give their overall assessment of the national plans, strategies and measures in relation to road safety policy in their country. The core of the interview were the arguments used by the interviewees for the support for, or opposition against, eight contentious measures, as well their perceived fairness. This is discussed in the next section.

At the end of the interview the interviewees were asked whether they had any concluding observations or questions. Almost universally respondents indicated that they found the topic and the interview very interesting and most of them insisted on being informed on the results of the research.

3.4.5 Support for policy measures and perceived fairness

The interviewees were presented with eight (potential) measures in road safety (Table 15, p.102). For each measure the interviewee was asked the following questions:

- (1) Would you personally support or oppose a law requiring this?
- (2) What is your main argument for your position?
- (3) Do you consider this to be a fair measure?
- (4) Why / Why not?

- (5) What do you think is the position of the majority of the adult population in your country?
- (6) What changes would be required in the measure so that you would reverse your position?

Sometimes the order of the questions changed, e.g. (6) came after (2). Some interviewees were reluctant to answer question (3) because they had difficulties in applying the concept of fairness to the measure. For example, one expert said that the measure was fair because she couldn't imagine how it could be unfair. Question (4) was often not asked anymore, because the answer was already clear from the reactions to questions (2) and (6). In all interviews the measures were discussed in the same sequence. In a few cases I provided additional information about the measure, about the situation in other countries and about what I would do in the dilemma survey.

Initially there were extra questions to representatives of political parties: (7) *Is there an official position of your party?*; (8) *If yes, what is the position*; (9) *What are the arguments supporting the position of your party? If there is no official position, what do you think it would be and why?* For the first three politicians to whom these questions were asked, they proved to be problematic, since there was no official position of their party. So I decided to drop these questions when interviewing other politicians or ex-politicians.

3.4.6 Processing the interview data

All interviews were recorded; none of the interviewees objected against this. For the face-two-face interviews, two different recording systems were used: a dedicated audio recorder and a smartphone app (as a backup). Although a few interviews took place in relatively noisy places all recordings could be used as a basis for transcription, even if occasionally some words were inaudible.

I also took some notes, especially on the support for measures and the main argument given. The purpose was to have a backup if the recording would fail, and to be able to make a first high level analysis before transcribing, translating and coding the interviews. In March 2020 I made a short report based on these notes, with information on the profile of the interviewees, what they understood by fairness and fairness in policy, their level of support for, and the perceived fairness of, the measures, and the main argument used for justifying their position towards the measure.

The transcription of the interviews was done in two steps. First, an automatic audio-to-text transcription was made by using the software programmes Temi (www.temi.com) and Sonic (sonix.ai). This first step was typically conducted right after the interview. In a second step, the automatic transcripts were reviewed sentence by sentence and corrected. I was assisted in this review by Priyanka Van den Berghe (an Austrian national) for the interviews in German, and by Yue Teng (an interpreter for French and English) for the interviews in French and some in English. All these transcripts were checked by me, in particular the answers given by the interviewees. To allow for inspection of transcripts by my PhD supervisor, I used the DeepL software (www.deepl.com/translator) for an automatic English translation of the French and German texts. The transcription process lasted from February to August 2020.

For the coding and analysis of the transcripts I used the software 'QDA Miner Lite' (provalisresearch.com). This software was chosen after comparing reviews about several programmes. In a first step the following data was uploaded to QDA Miner Lite:

- the transcripts (in Word)
- information on the profile of the interviewees and meta-data on the interviews
- an initial version of a classification scheme for arguments that I had developed in the initial high level report based on my handwritten notes.

3.4.7 Coding the transcripts

Coding the transcripts is a crucial stage in qualitative research. *"Codes [...] serve as shorthand devices to label, separate, compile and organize data"* (Charmaz, 1983, p.186). Coding should not be confused with analysis; it is a mechanism to grasp the meaning of the data and for reducing the vast amount of data (Huberman & Miles, 1994). Coding is a necessary step to quantify and analyse the findings, and in the generation of theory (Bryman, 2012). Strauss & Corbin (1998) distinguish between three types of coding practice: open coding, axial coding and selective coding. The process of open coding leads to concepts that can later be grouped into categories. This was also the approach that I used in my research for identifying the meaning of fairness and the arguments used by the interviewees. My approach was mainly data-driven (Boyatzis, 1998), with codes being drawn inductively from the data itself.

The coding of the transcripts required assigning labels to particular words, sentences or group of sentences. I used three types of labels:

- (1) labels referring to the topic being discussed such as 'Fairness meaning', 'Examples of unfairness', and 'ZER'

- (2) labels codifying the meaning of the text, such as 'Oppose', 'Effective', 'Wrong message' and 'Discrimination of road users'
- (3) labels specifying whether it concerned the own opinion of the interviewee or the expected opinion and arguments of the general public.

The labels of the first category referred to one or more paragraphs in the transcript. The second and third group of labels were typically assigned to a sentence or part of a sentence. Often several labels were assigned to the same text chunk. For instance, if an interviewee stated that the ISA measure would be effective, this phrase got the labels 'ISA', 'Personal opinion' and 'Effective'. For interviews conducted in French and German, the text in the original language was coded. During the coding process I also updated the variables that had been uploaded with the data in the transcript. In case of doubt I went back to the audio files.

The codification of these arguments used by the interviews was a crucial activity, because it was the basis for many analyses. The initial plan was to first ask the interviewees whether they supported or opposed the measure, and why. This was to be followed by the question whether they considered the measure to be fair or unfair, and why. However, the arguments for the perceived (un)fairness were often already given by the respondent when justifying the support for or opposition against the measure. For that reason, in many interviews I didn't ask again why the interviewee considered the measure to be (un)fair. Moreover, later on I asked the interviewees under which conditions they would be willing to change their position on the measure. In many cases this question reopened the discussion, previous arguments were often reinforced but also some new arguments were put forward. Some of these were related to fairness, some not directly. Given this situation I decided to group all the arguments used by the interviewees, whether they related to support for measures or to perceived fairness. This required the development of a classification scheme that could incorporate both fairness related arguments and other arguments for supporting or opposing policy measures.

A first set of codes for the arguments had been developed on the basis of the notes taken during the interviews. This scheme was further developed in an iterative way. First, labels were assigned to the arguments and meanings used by three interviewees. These labels were then used for the other interviews. When the existing set of labels was not adequate, new labels were added. The initial argument classification scheme was modified many times as the coding of the transcripts progressed: some of the labels were renamed, others were split into two labels and some were merged when

progressing with the coding. This approach is in line with the two key stages in coding identified by Charmaz (2006): initial coding which is quite detailed and where codes are assigned to provide initial impressions of data, followed by a more focused coding stage, in which some of the initial codes are dropped, modified or merged. My approach reflects also the observations by Bryman (2012) that coding in qualitative data analysis is often in a constant state of revision, because the data (in my case, the phrases in the interviews) needs to be constantly compared with the existing set of codes to see which concepts they best fit with.

The formulation of the supportive arguments was made in such a way that they could also be used for a categorisation of the meaning of fairness and the meaning of fairness in policy. The final version of the classification scheme is an important result of the research undertaken and could become part of a more elaborated theory resulting from the analysis. The scheme is presented and discussed in Chapter 5 (Table 44, p.179). It contains ten argument areas, five positive and five negative ones, each including several more specific arguments.

3.4.8 Datasets used for quantitative data analyses

To facilitate the analysis, several databases were created in Excel, based on extracts from the files in QDA Miner Lite. The main steps for creating these databases were:

- (1) The values of the variables of the QDA file were exported into an Excel sheet. This file was the nucleus of the forthcoming interview database.
- (2) Within QDA Miner Lite all text strings corresponding with particular argument codes were retrieved and linked to other variables (e.g. interviewee ID, country, ...). These extracts were added to an intermediary database 'Arguments based on coding'.
- (3) Several pivot tables were created from this intermediary database. Parts of these pivot tables were combined with the exported variables (see (1)) in order to create the main database for quantitative data analyses.
- (4) Some variables in the database were recoded to facilitate further analysis:
 - a dichotomized version of some variables (interview mode, age, gender, education level, degree, employer) was created
 - additional variables with predefined categories were inserted for "degree", "employer" and "position"
 - several variables were included with counts on the number of arguments.

- (5) An alternative arrangement of the data in the main database was made, with one record per policy measure discussed. Both databases were included as separate tabs in a single Excel file called 'Master Interview database'. Database 1, called 'Interview table', contains 40 records (one for each interviewee) and includes the exported variables, the codifications on fairness, fairness in policy and examples of unfairness, the codification of the arguments and some summary variables – 262 variables in total. Database 2, called "Measures table", contains 319 records and 141 variables, each record corresponding with an interviewee and a specific measure. These two versions of the master database were also exported into SPSS files.
- (6) There were two types of literal quotes. The first type consisted of the text chunks that were used as a basis for labelling the meanings of fairness (e.g. *"Non-discrimination"*), the arguments used in relation to measures (e.g. *"You cannot bypass this"*) and for the formulation of their level of support (e.g. *"I fully agree"*). These quotes were put into a new table 'Quotes linked to coding', which included almost 1400 cases. The second type of quote refers to statements of interviewees that I considered interesting in one way or another. All such quotes; over 600 in total, were put into a table 'All special quotes from the interviews'. Some of these have been used at the beginning of each chapter of this thesis.

When undertaking the data analysis I found some errors in the coding, most often text strings which had been labeled twice with the same code or the omission of the main argument code in the argument counts. In a few cases I found that the main argument had not been coded properly. These errors were corrected in the datasets (Excel and SPSS), in the original table "Arguments based on coding" and in the QDA file, in order to maintain consistency overall.

3.4.9 Analyses conducted

The qualitative analyses concerned the following topics:

- the semantic meaning of the arguments used by the interviewees relating to equity/discrimination, human liberties, (ir)relevance and (in)effectiveness, feasibility, and political/ideological aspects
- different perspectives on fairness, depending on the topic being discussed
- examples of unfairness in road safety
- the association between perceived fairness and the level of support.

An important result of the qualitative analyses was the creation of the scheme with a typology of arguments on fairness and support for policy measures (Table 44, p.179). The items in this scheme were also the basis for most of the quantitative analyses. The main quantitative methods used were cross-tabulations and descriptive statistics.

Both the qualitative and quantitative analyses are illustrated and supported by quotes from the interviews. I translated myself French and German quotes into English. Quotes from the interviews also appear at the beginning of each chapter.

3.5 Design and analysis of the dilemma survey

3.5.1 Approach chosen

The dilemma survey was a web-based questionnaire survey using internet panels. There are a number of benefits of using questionnaires. According to Lajunen & Özkan (2011) questionnaires make it possible to measure things that cannot be observed objectively; this is particularly the case for attitudes, beliefs or past behaviour. When studying sensitive topics self-administered questionnaires are less prone to social desirability in responses compared to interviewer-administered surveys (face-to-face or telephone) (Baker et al., 2010; De Leeuw, Hox, & Dilman, 2008; Goldenbeld & De Craen, 2013; Sudman & Bradburn, 1982; Tourangeau & Smith, 1996). Self-administered questionnaires do not suffer from the variability across interviewers asking questions in different ways or in a different order (Bryman, 2012). Lajunen & Özkan (2011) also point out that questionnaires can keep costs down, that a larger number of participants can be reached and that is easier to achieve a representative sample of respondents.

These advantages apply even more for online surveys using access panels. An access panel is a rich database of respondents (often over 100,000 people per country), which is used as a sampling frame for web surveys. Given the international context of the study, web surveys using access panels clearly have practical advantages compared to other survey modes such as the length of the survey, timing and costs. The quality of on online panel relies primarily on how the panel is composed: based on a probability sample or a convenience sample (De Leeuw et al., 2008). Like in ESRA, a probability sample was used for the dilemma survey.

The overall approach of the dilemma survey was very similar to the one used for ESRA. For the selection of the elements of the survey I used the insights gained from

the literature reviews, the initial country analyses and the first outcomes of the interviews. The survey was called the 'dilemma survey' because it was built around ten contentious measures, each incorporating one or more dilemmas or trade-offs.

In designing the survey, good practice has been followed to increase the validity and relevance of the data (Bryman, 2012; Bryman & Cramer, 2011; De Leeuw et al., 2008; Lajunen & Özkan, 2011):

- questions should be easy to understand
- questions should be short
- questions should ask about one issue at a time
- it should be obvious how to respond to the question
- the lists of response items to a question should not be too long
- appropriate filters should be used so that respondents only need to answer questions relevant to them
- open questions should be avoided (there were none in the dilemma survey)
- the sequence of response items should be randomized to avoid order effects
- the list of items used for closed questions should be complete and the items should not overlap
- where possible, questions and their scales should have been validated in international, multilingual surveys
- the 'length of interview' (LOI) should not be longer than 20 minutes (to avoid 'respondent fatigue').

Other boundary conditions needed to be respected for the design of the survey:

- the survey should include a range of policy measures and be undertaken in a sufficient number of countries, to allow for some generalisation of findings
- the survey should not require any special preparation by the respondents
- the survey should be in the mother tongue of the respondent
- the survey design should take into account the technical limitations of the survey software used (KeySurvey).

3.5.2 Selection of countries to be included

From the country-level analyses I had learned that cultural characteristics and road safety performance do not differ considerably between Western European countries. I was concerned that my initial plan of including only European countries in the dilemma survey might not yield enough insights in the contribution of national and cultural

factors to perceived fairness and support for policy measures. I therefore included some non-European countries as well (USA, China, Argentina and Nigeria).

In an attempt to increase the statistical variation between the national samples, I decided to select particular regions within the UK, France, the USA and Belgium:

- For the UK, the survey sample was limited to “Greater London” (people living within the M25 ring road). The idea was to have people from an urban, densely populated area with a well-developed public transport network.
- For France, the selection was made in the opposite direction: only respondents from the rural regions of the West of France were included (Normandie, Bretagne, Pays de la Loire, Nouvelle Aquitaine). This selection was made because the recent French measures to reduce the maximum speed on non-urban roads from 90 to 80 km/h had been more heavily resisted in rural regions.
- Two states of the USA were chosen with a somewhat different culture and tradition in terms of governmental intervention, which is also reflected in road safety regulations: California, which is more open to state intervention, and Texas, which has characteristics going in the other direction.
- In Belgium, the Flemish and Walloon region were analysed separately. On average, road safety performance in Flanders is better than in Wallonia, and enforcement is stronger in Flanders than in Wallonia.

Since the sample includes a mixture of countries and parts of countries, I will refer to the twelve sample sets as ‘regions’ rather than as countries.

3.5.3 Sampling approach

For costs reasons, the intended total sample needed to be restricted to 6000 completed surveys. The initial aim was to have approximately 480 valid cases per region, with an equal number of respondents in three age groups — 18–25, 36–47, and 58–69 — and within each age group, an equal number of men and women. This would give 80 respondents for each of the six age–gender combinations. This sampling approach would not generate a fully representative set of the adult population in each region, but the classification was made in order to have sufficiently large samples when comparing age and gender groups.

It was expected that the restriction to these three age groups and the oversampling of the youngest group would not alter much the national/regional average. This assumption was supported by an analysis of ESRA2 data, which had shown that for almost all variables in ESRA2 the difference between the average value for the full

sample (six age categories) and the average value for a subset with only three age categories was less than one percent; only in rare cases such as using a mobile phone it exceeded two percent. Thus, averaging the values for the three age groups used in the dilemma survey was expected to be a good proxy for the regional value. At the same time, each of the six age-gender group would include sufficient respondents in each country to make comparisons between these groups meaningful.

3.5.4 Support for policy measures

The survey included a question block on the level of support for these policy measures (Question P1 in Appendix A4). The introductory question for the first block was:

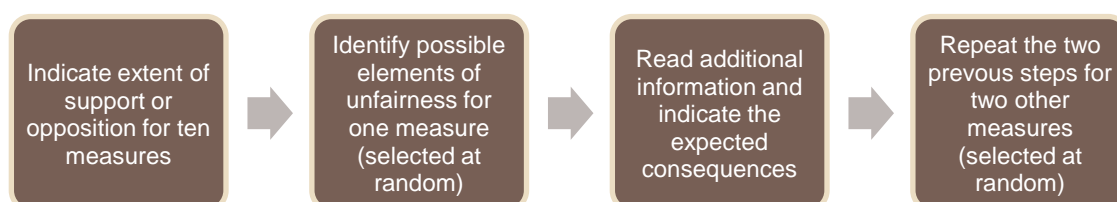
“The following questions are about a number of measures that could be taken in order to prevent traffic accidents and injuries. You will be asked your opinion about these possible measures.

In an effort to reduce the number of people injured in road traffic accidents, one could consider the following measures. Please indicate to what extent you would oppose or rather support these measures to become legally required.”

How the policy measures were selected has been described in Section 3.2; their exact formulation can be found in Table 53 (p.210). A 5-point Likert scale was used for the questions, ranging between ‘oppose’ and ‘support’.

After answering this question for each of the ten measures, the respondents were required to zoom in on three of them, assigned at random, with questions on unfairness (Section 3.5.5), provision of additional information, and on the expected consequences of the measure for themselves (Section 3.5.6). Figure 4 shows the sequence of questions on support for policy measures.

Figure 4. Sequence of questions in relation to the ten policy measures



3.5.5 Operationalisation of (un)fairness

It proved difficult to operationalise the concept of fairness. The initial idea was to ask whether the measures were perceived to be fair. However, the literature review, the interviews and the feedback from road safety experts had revealed that people may

have quite different views on what fairness actually means. Moreover, the term ‘fairness’ is difficult to translate (Section 2.3.2). Thus, simply asking respondents whether they consider a measure to be fair would lead to meaningless data.

Different alternatives were considered, including first explaining to respondents what fairness actually meant and then asking them to what extent they considered a measure to be fair. However, reviewers indicated that some respondents might still ignore this explanation and use their own gut feeling about the term fairness. Again this would make a correct interpretation of the data problematic. I eventually found a solution by not mentioning the term fairness at all but operationalise it through a number of statements – and then ask respondents whether they agreed with these statements.

Table 19 shows how these ideas were implemented in the survey (cf. Question P3 in Appendix A4⁴). Respondents had to indicate whether they agreed or not with the statements. From the discussions with road safety experts and the interviews it had also emerged that it is more easy for people to state why something is unfair rather than to state why it is fair; this had also been observed in the literature (see e.g. Xia et al. (2012)). The agreement with these statements can therefore be interpreted as arguments for opposing a measure or considering it to be unfair. I will often use the term ‘counterarguments’ or ‘unfairness arguments’ for the agreements with these statements. To avoid an excessive length of the survey, respondents were only asked to answer these questions for three policy measures out of ten (assigned at random).

Table 19. Operationalization of unfairness in the dilemma survey

Please consider the policy measure: *[Here the full statement on a measure was included]*. Please indicate if you agree with the following statements about it (tick the boxes for all the statements with which you agree). This policy measure would ...

- ☐ not reduce road traffic injuries
- ☐ limit people's individual freedom or privacy
- ☐ reduce people's enjoyment in life
- ☐ restrict people's mobility
- ☐ lead to discrimination
- ☐ require a lot of public money
- ☐ imply high costs for the people concerned
- ☐ be easy to evade
- ☐ be difficult to implement correctly
- ☐ be an unjustifiable intervention of the state

⁴ Question P3 also included an item on the social norm.

3.5.6 Expected consequences for the respondents

Factors that are likely to influence the support of respondents for policy measures are the expected consequences for themselves. The respondents of the dilemma survey needed to indicate which consequences they thought the measure would have for themselves. Lists of possible consequences and effects were developed on the basis of the literature, suggestions from the focus groups, and the interviews. A few items were added or dropped, following remarks by people reviewing the survey. The personal consequences could be both positive and negative. The number and nature of the consequences differed between the measures, as was the relative part of the positive and negative consequences. The lists of consequences can be found in Appendix A4 (Questions P5a, P5b, P5c, etc.).

Like for the question on perceived unfairness (Section 3.5.5), this question on the consequences was only asked for three measures, chosen at random. Moreover, in order to avoid meaningless answers the consequences were filtered so that respondents only saw answers that were relevant for the transport modes they used. For example, respondents who had declared not to ride a bike, were not presented with consequences that can only apply to cyclists (e.g. 'make me cycle less').

Before being asked on the perceived consequences for themselves, respondents had been provided with a short text on the size of the problem that the measure was supposed to address, the expected benefits and the possible disadvantages. These texts can be found in Questions P4a, P4b, P4c etc. in Appendix A4. These texts were customised for the different countries whenever this was relevant. For example, for the UK "20 mph" and "£" were used instead of "30 km/h" or "€". For non-European countries, figures on fatalities were from the country or the continent of the respondent.

3.5.7 Factors that can influence support for policy measures

There are hundreds of factors that can influence someone's willingness to support a policy measure. Given the maximum length of the survey, not all of these could be incorporated in the survey design. First a longlist was made, based on the review of the literature, analysis of ESRA data, feedback from the focus groups and the country-level analyses already undertaken. This longlist was structured and subsequently reduced to a manageable number of factors. Most of these factors could be captured with just one question, but others required a number of questions in order to capture the desired construct (e.g. risk propensity and trust). The factors eventually retained in the survey can be grouped as follows:

- demographic, social and economic characteristics of the respondent
- mobility and road safety experience
- values, opinions and attitudes.

Questions in the survey covered the following **demographic, social and economic** characteristics: gender; age; highest education level (for students it was asked which level they thought they would obtain); current professional occupation; and economic situation – asked in the form of how easy it was to cope with current income. Questions in the survey in relation to **mobility and road safety** were inspired by ESRA and covered: having a car driving licence; regular use (a few days a month) of particular transport modes during the last 12 months; risky behaviour on the road; subjective safety feeling when using particular transport modes; experience with and involvement in road traffic crashes; opinion on current respect for and enforcement of traffic rules; and agreement with statements related to some of the policy measures proposed, e.g. ‘Older car drivers are often a danger to themselves and other road users in traffic’. Only when respondents had indicated that they had been using a particular transport mode regularly, they were asked the corresponding questions on risky behaviour and subjective safety.

The survey also included questions in relation to **values, attitudes and personality characteristics**. Questions in relation to personal values were selected from questions used for the creating the new Hofstede cultural dimensions; questions taken from the WVS/EVS survey covered trust in people, confidence in authorities, role of the state, interest in politics, and evidence based decision-making. Within the question block with unfairness arguments (Question P3 in Appendix A4) a question was included on whether friends would approve the policy measure (used as a proxy for social norm).

I drafted some original questions/variables on how **familiar** the respondent was with certain topics related to the policy measure. Such questions were added because the literature review had shown that being familiar with a topic was a key factor in predicting the support for measures. For example, a question was included for car drivers on low visibility of pedestrians and for cyclists on whether they wore a helmet.

3.5.8 Finalisation and launch of the survey

A first version of the English version of the survey was produced in July 2019. This draft went through multiple revisions and iterations over the next months, following

reviews by myself and road safety experts from my international network. The most important adaptations were:

- a clearer formulation of some questions
- transformation of some questions because they were too difficult to understand or to respond to
- removal of some questions and response items to reduce the LOI
- adaptation of the routing of questions so that respondents got additional questions on only three policy measures (selected at random)
- replacement of some Likert scale by 'yes/no' answer options
- The final English 'Master version' of the survey is included in Appendix A4.

In September 2019 I started programming the draft version of the survey in KeySurvey (<https://www.keysurvey.com/>). The translation into the different national languages started in October 2019. Draft versions of the translations into French, Dutch, German and Spanish were generated with the automatic translation software DeepL Pro (<https://www.deepl.com/translator>); the draft translations in Greek, Swedish and Chinese were first created by Google Translate (<https://translate.google.com/?hl=en>). Subsequently, these draft translations were reviewed and adapted by professional translators and road safety experts. Every language version was tested online by two to five native speakers from the countries concerned (for Nigeria, they were from other African countries). Overall, 29 people from 12 countries checked versions of the survey.

In October 2019 three international market survey agencies were sent the terms of reference for the implementation of the survey. Early November the firm Dynata (<https://www.dynata.com/> - previously called SSI) was selected, based on the best price-quality ratio. The final Master version of the survey was finalised early November 2019. Data collection started on the 14th of November 2019. Because Dynata could not reach sufficient respondents in Nigeria in the age group [58-69] I agreed to abandon this age group for Nigeria and compensate this by higher numbers of respondents in the other age groups. The survey was closed on the 14th of December 2019.

3.5.9 Cleaning, enrichment and recoding of the data

I undertook the data cleaning, recoding and enrichment processes between mid-December 2019 and mid-February 2020. When the survey was closed the database consisted of 7862 records. Dynata provided an encrypted file with some additional data on the respondents; however, not all variables were available for all records. The firm

also provided age and gender values, which I used for checking. All data provided by Dynata was merged with the survey data into an Excel file.

The cleaning process involved removing records that met one or more criteria commonly used within Vias institute for identifying and removing 'suspect' records, such as incomplete records, records with a very short LOI, records with 'straightlining' (straightlining is a response strategy where respondents fill in the same response on a scale on all items of a question) and records with impossible or incredible answers. The cleaned database eventually included 5587 records (for more information on the sample, see Table 52, p.209).

Several variables were recoded into numerical values, in view of facilitating further analyses. Some values for Likert scales were recoded on a scale from 0 to 100. Some additional or recoded variables were created and added to the database, such as the degree of urbanisation for European countries, based on a classification of the European Commission at NUTS3 level (Dijkstra & Poelman, 2014), education level and crash involvement (based on three other questions on crash involvement). I also undertook a factor analysis of all variables which were related to values, attitudes and norms. This process yielded five additional constructs which I labelled as follows: Self-centred; Trustful; Libertarian; Prosocial and Low profile. I will refer to these constructs as 'Socio-political attitudes'; these were also added to the database.

A weighted version of the dataset was created in which every country had an identical number of female and male respondents in each of the three age groups (80). For this weighting, the respondents with 'other gender' and those outside the three prescribed age groups were ignored. For Nigeria, the age group [58-69] was put to zero. This operation yielded a weighted dataset of 5600 records for analysis. I checked for a range of different variables how this weighting affected the average values for the total sample; the differences appeared to be (very) small.

It appeared that 259 respondents had an age that did not fit into the three predefined age groups. This was caused by an age filter that hadn't been set up properly for some countries in the beginning of the survey. These records were not considered in the analyses based on the weighted dataset.

3.5.10 Type of analyses conducted

Data analysis started in February 2020. Analyses were undertaken in the following areas:

- the characteristics of the sample and how these characteristics differed between regions
- the level of support for the measures and how this support varied between measures
- the unfairness arguments for the measures and how they were associated with the level of opposition against the measures
- the expected consequences of the policy measures for the individual respondents and how these consequences were related to the level of support to the measure
- the association between the level of support for measures and possible predictor variables (socioeconomic characteristics, use of transport modes, road safety, behaviour in traffic, social norm and opinion on statements, socio-political attitudes).

For these areas, I also examined differences by gender, age group and region. The results of these analyses were documented in four working documents; the key results are presented in Chapters 6. In Chapter 7 I also show how the results of the dilemma survey are related to the findings of the country analyses and the interviews.

The main quantitative methods used were descriptive statistical analyses, cross-tabulations and correlation analyses. As mentioned in Section 3.5.9, a factor analysis was conducted on attitudinal variables in order to create some meaningful constructs for further analysis. I used the weighted set for most analyses, in particular the country comparisons and the correlation analyses.

I conducted a range of ordinary least square linear regression analyses in which the dependent variables were the level of support for each of the measures, and the predictors the variables that had the highest correlations with the level of support. The regression models were made for each of the ten measures, for each of the countries separately, for the 6 European countries together and for the whole sample. The adjusted R^2 values for the total sample were low, in the range of 0.1 to 0.2; they were a bit higher when considering individual countries. In all cases the models were highly statistically significant ($p < 0.001$). The regression models for the whole sample typically included some 10 to 15 predictors; for the country samples the number of retained predictors ranged typically between 5 and 8. Like for the analyses based on national indicators (Section 3.3.7), extreme care was needed for interpreting the

findings, mainly due to the collinearity of the variables and the observation that the collinearity patterns differed between countries. The net result was that the types of variables retained in the models differed strongly between measures, as well as, for each measure, between the country based regression models. For example, for ZER, the three most important predictors in Belgium were the perceived restriction of freedom or privacy, the disbelief in the effectiveness of the measure and the self-reported drunk driving. However, none of these variables appeared in the regression models for the USA and China. For those countries, 'similar' variables explained better the variation, such as the perceived unjustifiability of state intervention and the perceived social norm. Overall, nothing that came out of these regression analyses contradicted the findings obtained through the mono- or bivariate analyses. The regression models often hid useful associations between a variable and the level of support (e.g. social norm), because another variable (e.g. risky behaviour) explained slightly more statistical variation. Since no new insights were generated, the results of the regression analyses have not been incorporated in this thesis.

Analyses were undertaken on both the Excel and the SPSS data files. Some analyses were both undertaken in Excel and SPSS as a means of verification that both databases contained exactly the same data. Excel was mainly used for:

- a quick inspection of particular records or variables
- descriptive statistics that can easily be generated with pivot tables
- bar charts
- comparisons with data from other sources.

SPSS was mainly used for:

- descriptive statistics and breakdowns based on weighted variables
- certain descriptive statistics such as medians
- correlation analyses
- regression analyses
- factor analyses.

*“I have at least two friends, that would not be alive today
if they wouldn't have been wearing a helmet.”*

4. Results from the country-level analyses

This chapter discusses the association between public support for road safety measures at national level and a range of other national indicators. I provide first some background results which are important for understanding the associations found: Section 4.1 shows how certain national indicators are associated with road safety performance, and Section 4.2 discusses how national culture is related with social and economic indicators and with road safety performance.

4.1 Road safety performance at national level

4.1.1 Road crash fatality rates

Several indicators can be used for analysing and comparing road safety performance. The road crash fatality rate most used in international comparisons is the **crash fatality rate per capita**, and more specifically the fatality rate per 100 000 population. I will refer to this as the ‘crash fatality rate’ or ‘fatality rate’.

From a road safety policy perspective it is interesting to relate crash fatalities to exposure to traffic. Unfortunately, reliable and comparable data on exposure to traffic is missing in many countries, even in high income countries. Rough proxies for the exposure to traffic are the length of the road network, as suggested by the European Commission (2019), the annual gasoline consumption and the number of vehicles. Table 20 shows the correlations between the fatality rate per capita and these indicators (sources for the data in this table and other tables and graphs in this chapter can be found in Appendix A1).

Table 20. Correlations between fatality rate per capita and other fatality rates

	N	Correlation with fatality rate per capita
Fatality rate per road length	168	0.513 ($p < 0.001$)
Fatality rate per gasoline consumption	169	0.365 ($p < 0.001$)
Fatality rate per vehicle	169	0.521 ($p < 0.001$)

Data sources: WHO (Fatality rate per capita / vehicles), CIA (roads), EIA (gasoline)

The correlations are moderate to strong, but in any case not very strong. This means that the ranking of countries in terms of road safety performance may change considerably when replacing one type of fatality rate with another. For example, these

are the three best performing countries for road safety performance, depending on the indicator chosen:

- fatality rate per capita⁵: Switzerland, Norway, Sweden
- fatality rate per road length: Sweden, Finland, Estonia
- fatality rate per gasoline consumption: Canada, Switzerland, Australia
- fatality rate per number of motor vehicles: Norway, Switzerland, Sweden.

In this thesis I will mainly use the crash fatality rate per capita.

4.1.2 Geographical and cultural differences in road safety performance

Table 21 includes average fatality rates across cultural clusters of countries (the countries included in each cluster are given in Table 69 of Appendix A1). Best performance is achieved in Nordic, Germanic and Latin Europe, while Sub-Saharan Africa scores worst. This is also clearly visible from the world map (Figure 5). The poor road safety performance of LMICs is not a new phenomenon; it has been observed and documented in the past (Onywera & Blanchard, 2013; Wegman, 2017).

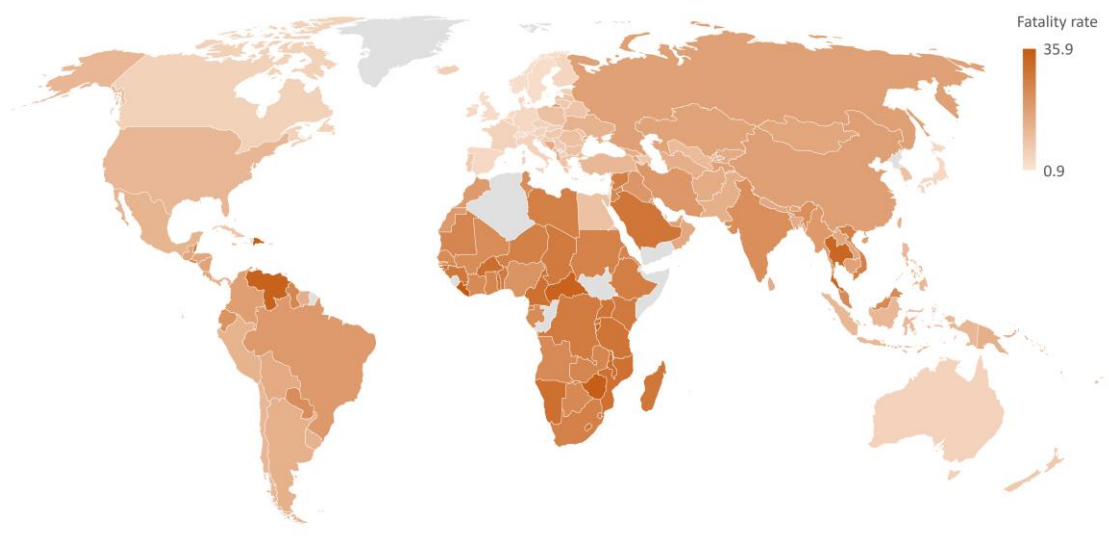
Table 21. Fatality rate by cultural cluster of countries

Cultural cluster	N	Fatality rate
Anglo	6	6.5
Nordic Europe	5	4.2
Germanic Europe	6	4.7
Latin Europe	5	5.4
Eastern Europe	24	10.1
Central Asia	8	16.2
Confucian Asia	8	17.9
Southern Asia	13	15.2
Middle East	19	16.5
Sub-Saharan Africa	44	27.5
Latin America	26	17.4
Other	9	12.6
Average	173	16.9

Data source: WHO

⁵ Ignoring the small island states Micronesia and Maldives.

Figure 5. World map of fatality rate per capita

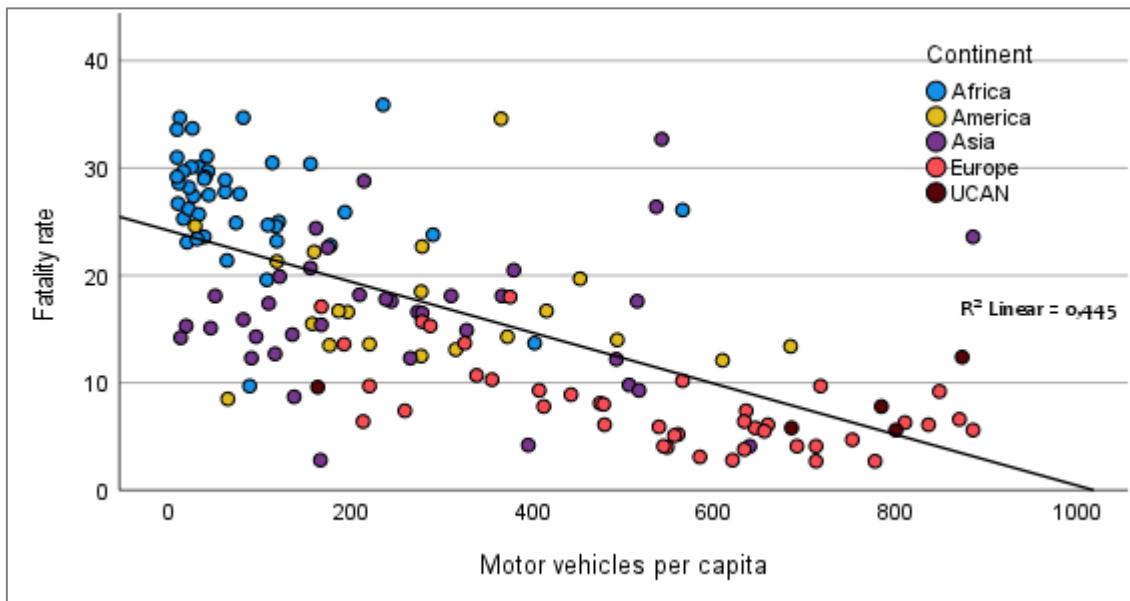


Data source: WHO

It is well known that higher exposure to traffic increases the crash risk (Hesjevoll & Elvik, 2016). Interestingly, that relationship does not apply always to differences in traffic volume between countries. The correlations of proxies for traffic exposure with the fatality rate per capita are negative: $r = -0.312$ for gasoline consumption per capita, $r = -0.382$ for road length per capita, and $r = -0.667$ for motor vehicles per capita (all $p < 0.001$). In other words, and surprisingly maybe, the higher the traffic volume in a country, the lower the fatality rate tends to be. The association with motor vehicles per capita is shown in Figure 6. This phenomenon can be explained by the fact that the highest traffic volumes are found in high income countries (HICs), with much more effective road safety policies that eventually result in fewer road deaths despite the much higher traffic volume.

When limiting the analysis to Europe, the correlation between gasoline consumption and fatality rate, controlled for GNI, is positive ($r = 0.318$, $p = 0.045$). This illustrates that within an economic and cultural homogeneous cluster of countries, higher traffic volume in a country is indeed associated with higher fatality rates. But the relationship does not apply when a global perspective is taken.

Figure 6. Crash fatality rate by number of motor vehicles per capita



Data sources: WHO (fatalities) and World Bank (vehicles)
UCAN = United States, Canada, Australia, New Zealand

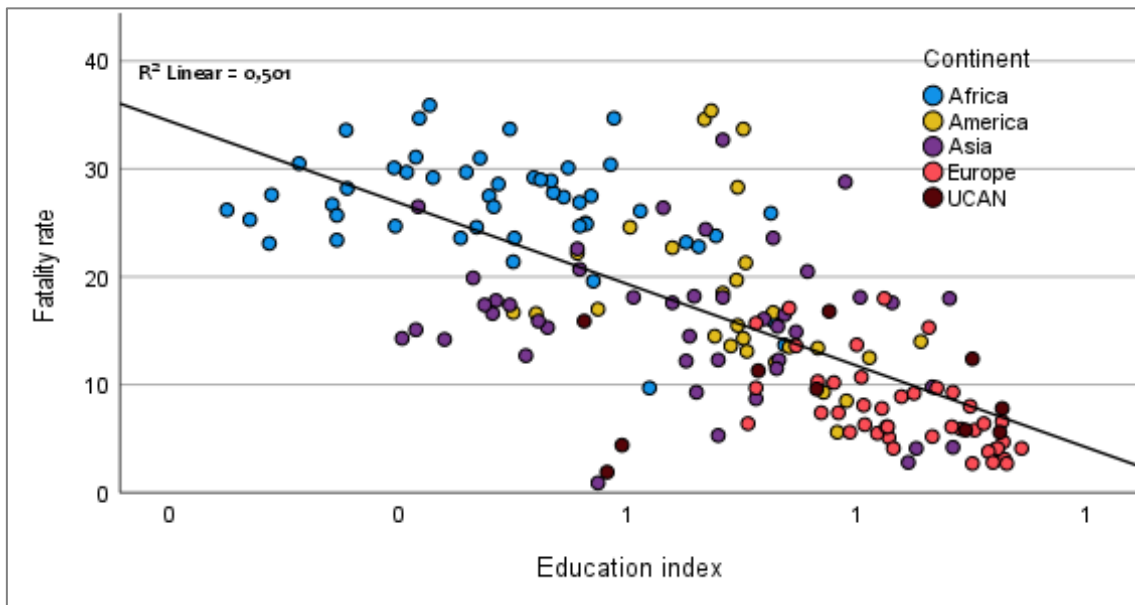
4.1.3 Association of the fatality rate with socioeconomic indicators

I analysed how demographic, educational, social and economic differences between countries are associated with differences in the fatality rate. The most important associations found were the following (all correlations are significant at $p < 0.01$ level):

- The **younger** the population, the higher the fatality rate (correlation of -0.717 with median age).
- The more **qualified and skilled** the population, the lower the fatality rate: a correlation of -0.708 with Education Index of UNESCO, of -0.684 with Skilled Labour Index of ILO, of -0.682 with % people without higher education in ESRA and of -0.556 with Mathematics Performance at age 15 (PISA).
- The higher the **economic and human development** of a country, the lower the fatality rate: a correlation of -0.749 with the Human Development Index (UN) and -0.618 with Gross National Income per GNI (UN).
- Higher **inequality** within a country is associated with higher fatality rates: a correlation of 0.716 with the Inequality Index (UN), of 0.552 with the Gini index, and of 0.774 with the Gender Inequality Index (UN).
- Within Europe there is also a negative relationship between relative **wealth**: a correlation of 0.524 with relative wealth in the EVS survey.

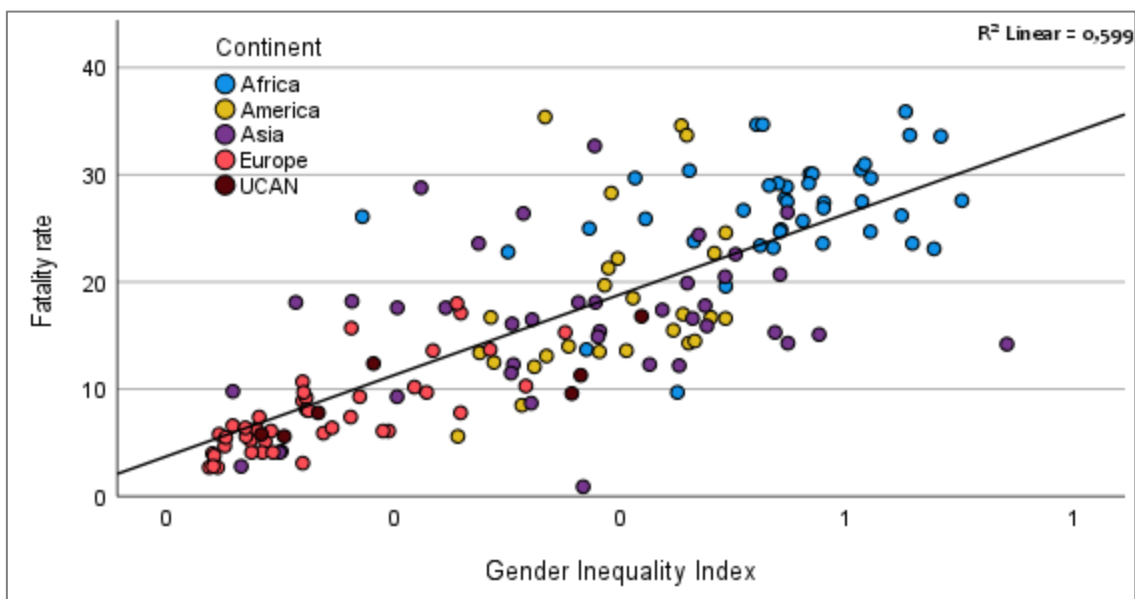
Two examples of strong associations are given in Figure 7 and Figure 8 below.

Figure 7. Crash fatality rate by Education Index



Data sources: UNESCO (education) and WHO (fatality rate)

Figure 8. Crash fatality rate by Gender Inequality index



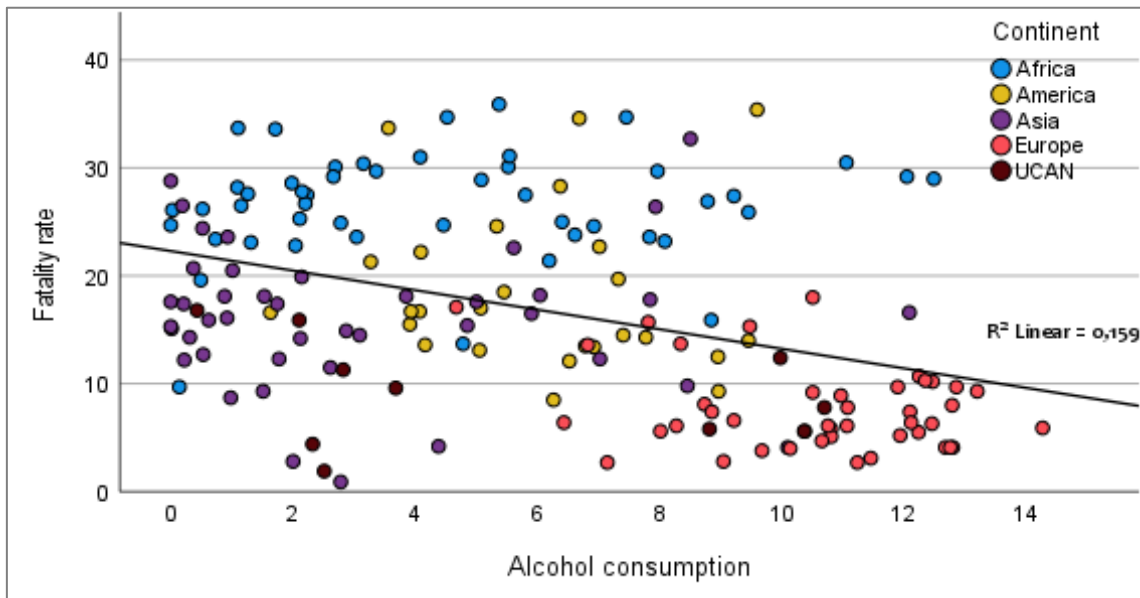
Data sources: UN (gender inequality) and WHO (fatality rate)

Most indicators mentioned so far are correlated with each other. For instance, when controlling for GNI, the correlations of the fatality rate with demographic and educational indicators become much weaker and statistically insignificant, when calculated at global level. But analyses of European data reveal that the correlations with education indicators remain negative and statistically significant, even after controlling for GNI. An example is the partial correlation between the fatality rate and “highest level of education” (ESS), controlled for GNI, which is -0.483 ($p = 0.049$). This

finding illustrates again that an association in relation to road safety found within a highly developed area like Europe, cannot always be generalised to the global level.

Another interesting finding is that alcohol consumption, at global level, is not correlated with the percentage of fatal crashes related to alcohol and is even negatively correlated with the overall crash fatality rate ($r = -0.399$, $p < 0.001$). In other words, higher alcohol consumption in a country tends to be associated with lower fatal crashes on the road. The relationship is displayed in Figure 9. Inspection of the distribution of countries provides part of the explanation for this somewhat surprising result: alcohol consumption is much higher in HICs but in such countries the fatality rate is often much lower than in LMICs.

Figure 9. Fatality rate by alcohol consumption



Data source: WHO

4.1.4 Association of the fatality rate with risky behaviour and subjective safety

The relationship between **risky behaviour** of road users and crash risk is well known (see e.g. the synthesis documents of the SafetyCube Road Safety Decision Support System - <https://www.roadsafety-dss.eu/#/risk-factor-search>). To what extent does this logic also apply when comparing countries? Table 22 includes correlations between the fatality rate and risky behaviour. The figures on risky behaviour are self-reported figures from ESRA, on engagement in that behaviour at least once during the last 30 days.

Table 22. Correlation of fatality rate with national average of self-reported risky behaviour of car drivers

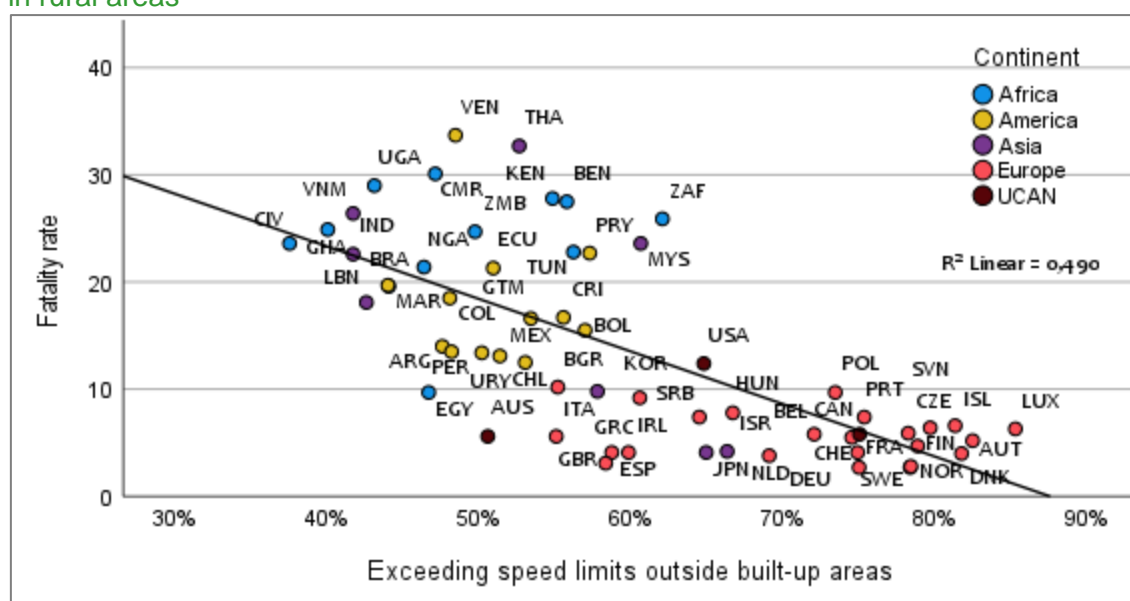
	Correlation with fatality rate (N=60)
Driving over the BAC limit	0.329*
Read a text message/email	0.542**
Exceeding the speed limit in built-up areas	-0.630**
Exceeding the speed limit outside built-up areas (except on motorways)	-0.699**
Exceeding the speed limit on motorways	-0.632**

Data sources: ESRA (self-reported behaviour) and WHO (fatality rates)

Countries with higher numbers of people drinking and driving, or using a mobile device to read messages, tend to have higher road crash fatality rates. However, this relationship does not hold for speeding: the more speeding in a country, the lower the fatality rate. This result looks very odd at first sight, since the relationship between speeding and crash risks is well established (European Commission, 2020b). The explanation is that in many LMICs, which have the highest fatality rates, speed limits are higher than in HICs. Moreover, the quality of the road infrastructure, the amount of traffic on the roads and the technical state of the vehicle fleet make it often difficult to exceed the speed limit. The 'risky speeding behaviour' that causes higher numbers of crashes in LMICs consists much more of driving at inappropriate speed than of exceeding the speed limits. Figure 10 shows the association between the fatality rate and the self-reported exceeding of the speed limit in rural areas (at least once during the last 30 days) for the 60 countries concerned.

The ESRA surveys include questions on the subjective safety feeling of road users in traffic. Table 23 shows the correlations with the overall fatality crash rate and the fatality rates for car drivers and pedestrians. As can be seen, all these correlations are negative; most are moderate. Thus overall, higher crash fatality rates of countries are associated somewhat with lower feelings of safety. This is illustrated in Figure 11 for pedestrians.

Figure 10. Crash fatality rate by % of car drivers self-reporting to exceed the speed limit in rural areas



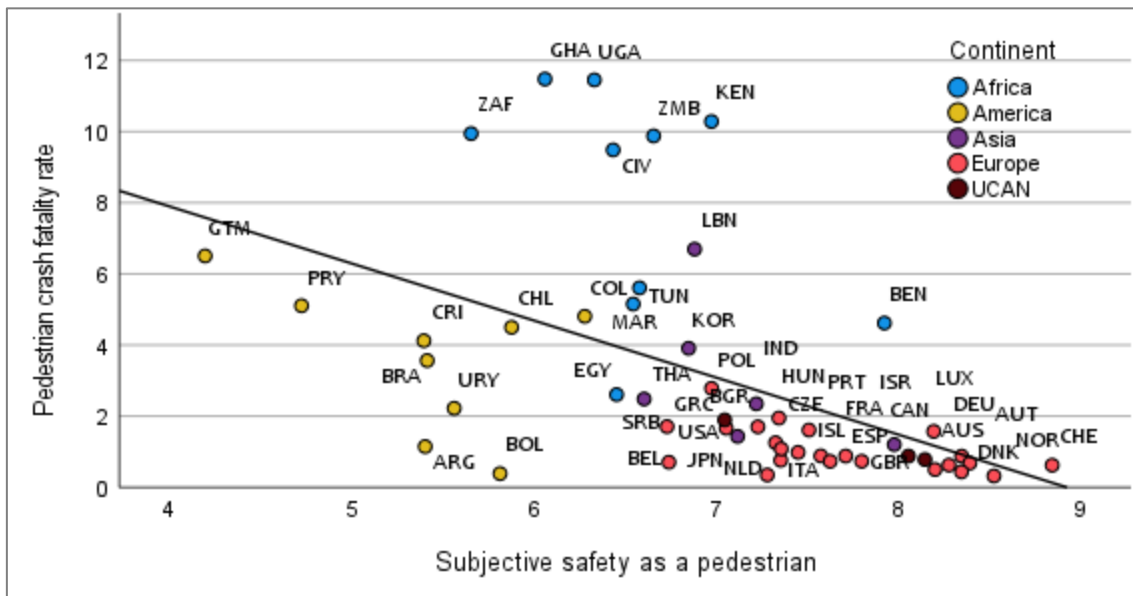
Data sources: ESRA (speeding) and WHO (Fatality rate)

Table 23. Correlation of fatality rates with subjective safety of road users

	Total fatality rate (N=59)	Car crash fatality rate (N=47)	Pedestrian crash fatality rate (N=52)
Subjective safety as a pedestrian	-0.531**	-0.472**	-0.518**
Subjective safety as a cyclist	-0.327*	-0.463**	-0.383**
Subjective safety as a moped rider	-0.315*	-0.070	-0.521**
Subjective safety as a motorcyclist	-0.322*	-0.388**	-0.402**
Subjective safety as a car driver	-0.423**	-0.384**	-0.407**
Subjective safety as a car passenger	-0.257*	-0.532**	-0.126
Subjective safety as a bus passenger	-0.384**	-0.376**	-0.297*

Data sources: ESRA (subjective safety) and WHO (fatality rates)

Figure 11. Scatterplot of the crash fatality rate by subjective safety of pedestrians



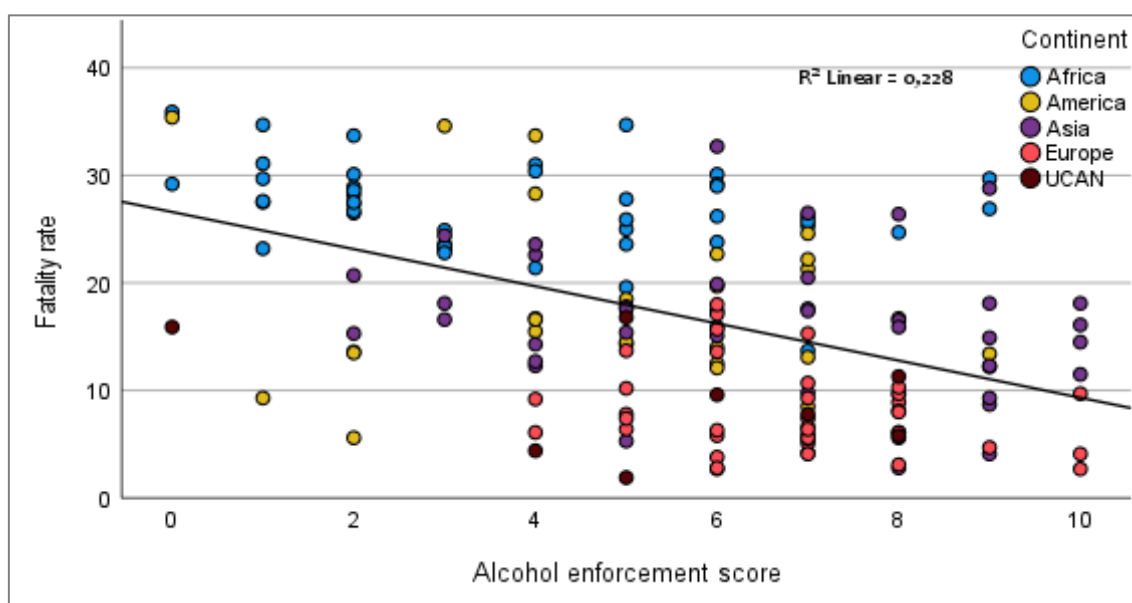
Data sources: ESRA (subjective safety) and WHO (fatality rate)

4.1.5 Association of the fatality rate with regulation, enforcement and the political system

Globally the correlations between fatality rate and both the BAC limit and the speed limit on rural roads are not statistically significant. This illustrates that setting stricter speeding and alcohol limits is not sufficient to improve road safety performance. **Traffic law enforcement**, however, appears to be key. The fatality rate is negatively correlated ($p < 0.001$) with the national self-assessed enforcement scores collected by the WHO: enforcement of speed, alcohol, seat belt, child restraint, and PTW helmet regulations (WHO, 2018). For alcohol enforcement the correlation is -0.478; for speed enforcement it is -0.412. This supports the claim that better enforcement of traffic laws leads to lower fatality rates. The relationship between fatality rate and alcohol enforcement is shown in Figure 12. One can observe that the alcohol enforcement scores are higher in HICs. Other findings are:

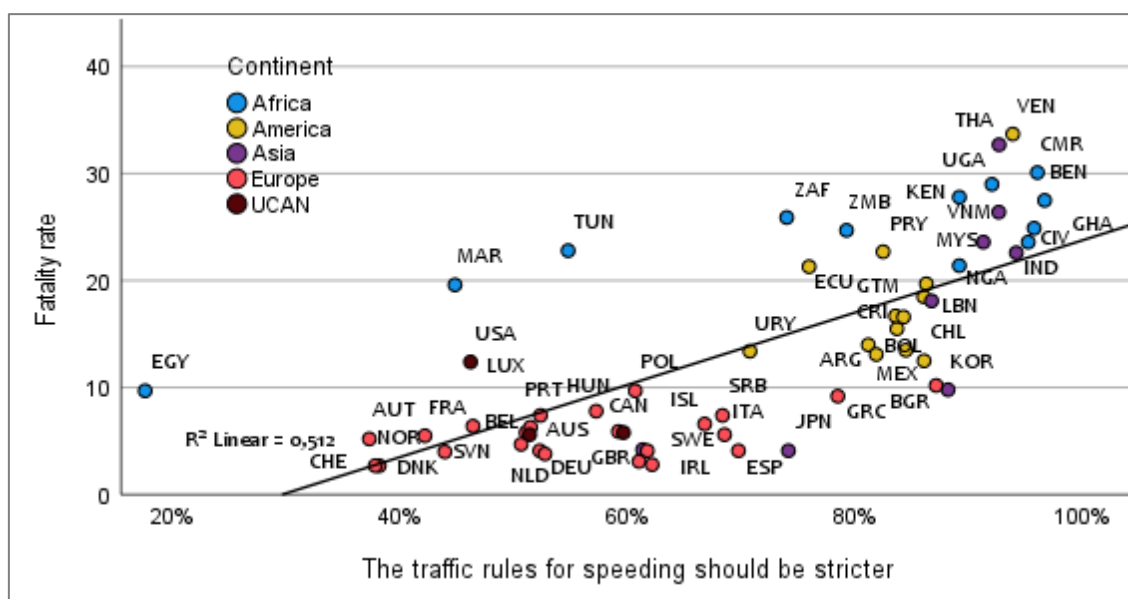
- In a country with a high fatality rate, a high percentage of the population feels that traffic rules should be stricter. This is illustrated for speeding in Figure 13.
- Lower levels of corruption in a country (as measured by the Corruption Index) are correlated with lower crash fatality rates ($r = 0.625^{**}$). Government effectiveness is also strongly related to low fatality rates ($r = -0.671^{**}$).
- Higher scores on democracy indices are strongly correlated with lower fatality rates ($r = -0.538^{**}$ for the V-Dem Index and $r = -0.610^{**}$ for the Democracy Index), consistent with findings in a recent article by Elvik (2021).

Figure 12. Crash fatality rate by alcohol enforcement score



Data source: WHO

Figure 13. Crash fatality rate by % of people stating that traffic rules for speeding should be stricter



Data source: ESRA (opinion on traffic rules) and WHO (fatality rate)

- Within Europe, confidence of the population in their police, government, legal system, etc. is highly correlated with lower fatality rates (correlations around 0.7); however such strong relationships are not found at global level.
- The more people consider that “Government should take more responsibility to ensure that everyone is provided for”, the higher the fatality rate ($r = 0.360$). This view of the role of government is typical for collectivist societies which are mostly LMICs, with on average higher fatality rates.

4.2 National culture and its relation with other indicators

4.2.1 Association between the different constructs of national culture

Table 24 shows the correlation between the two new Hofstede cultural dimensions (renamed as 'Independent' and 'Confucianist') and the other cultural constructs. Because the number of countries for which indicators are available differs between the sets, comparisons of the correlation coefficients may lead to wrong interpretations. Therefore, two types of coefficients are given: (1) the correlations for the 41 countries for which there are national values available in the four sets (Hofstede new, Hofstede old, Schwartz, GLOBE); and (2) the correlations for the countries with values available in both the set considered and the new Hofstede set (50 Hofstede old, 47 Schwartz and 44 GLOBE). Significant correlations at the $p < 0.01$ level are denoted with ** and marked in light gold.

This table shows that the Independent dimension correlates strongly (positively or negatively) with several other cultural dimensions and values:

- Power Distance, Individualism (old Hofstede)
- Embeddedness, Affective Autonomy, Intellectual Autonomy, Hierarchy and Egalitarianism (Schwartz)
- In-Group Collectivism Social Practices, Humane Orientation Social Practices, Uncertainty avoidance Societal Values, Future Orientation Societal Values, Institutional Collectivism Social Values, Gender Egalitarian Societal Values.

The Independent dimension can be seen as an updated version of both Power Distance and Individualism, as initially defined by Hofstede (Table 7, p.75). Figure 14 illustrates how Embeddedness, one of the seven cultural values of Schwartz, is also strongly associated with Independent. The Confucianist dimension is only correlated with Long Term Orientation and Indulgence (old Hofstede) and Institutional Collectivism (GLOBE). It appears justified to consider "Confucianist" as an update of the Hofstede dimension "Long term orientation" – see also Figure 15.

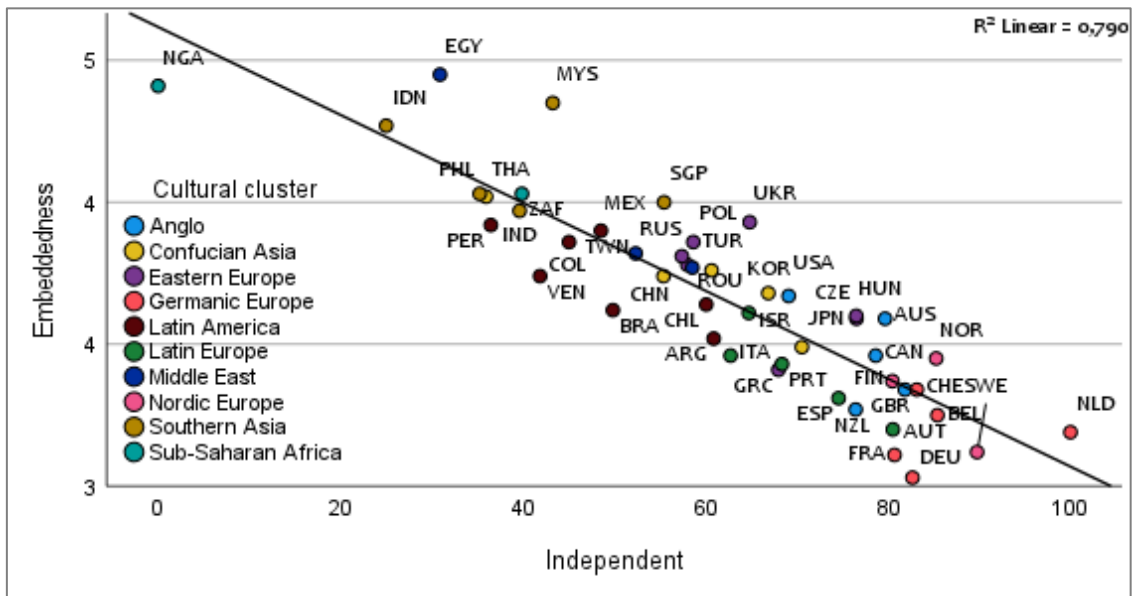
Table 24. Correlation between Independent, Confucianist and other cultural constructs

	Independent		Confucianist	
	41	All	41	All
Power Distance (Hofstede old)	-0,684**	-0,651**	-0.182	-0.208
Individualism (Hofstede old)	0,676**	0,700**	0.132	0.233
Masculinity (Hofstede old)	-0.130	-0.182	-0.114	-0.048
Uncertainty Avoidance (Hofstede old)	0.059	0.003	-0.141	-0.184
Long term orientation (Hofstede old)	0,380*	0,346*	0,713**	0,687**
Indulgence (Hofstede old)	0.055	0.106	-0,438**	-0,357*
Harmony (Schwartz)	0,354*	0,400**	-0.012	0.011
Embeddedness (Schwartz)	-0,897**	-0,889**	-0,325*	-0,341*
Hierarchy (Schwartz)	-0,505**	-0,546**	0.181	0.112
Mastery (Schwartz)	0.022	-0.037	0.249	0.208
Affective Autonomy (Schwartz)	0,811**	0,800**	0.288	0,362*
Intellectual Autonomy (Schwartz)	0,826**	0,804**	0.281	0.282
Egalitarianism (Schwartz)	0,477**	0,471**	-0.244	-0.220
Uncertainty Avoidance Societal Practices ⁶	0,321*	0,374*	0.203	0.208
Future Orientation Societal Practices	0.135	0.181	0.192	0.197
Power Distance Societal Practices	-0,387*	-0,438**	-0.127	-0.143
Institutional Collectivism Societal Practices	-0.012	0.032	0,437**	0,437**
Humane Orientation Societal Practices	-0,501**	-0,409**	-0.104	-0.091
Performance Orientation Societal Practices	0.021	0.063	0.290	0.281
In-Group Collectivism Societal Practices	-0,736**	-0,746**	-0.218	-0.227
Gender Egalitarianism Societal Practices	0.156	0.158	-0.100	-0.076
Assertiveness Societal Practices	-0.003	-0.060	-0.226	-0.227
Uncertainty Avoidance Societal Values	-0,835**	-0,823**	-0.276	-0.281
Future Orientation Societal Values	-0,548**	-0,553**	-0.269	-0.277
Power Distance Societal Values	-0.098	-0.117	0.186	0.186
Institutional Collectivism Societal Values	-0,415**	-0,388**	-0,512**	-0,508**
Human Orientation Societal Values	-0.049	-0.054	-0.012	-0.010
Performance Orientation Societal Values	-0.185	-0.169	-0.251	-0.253
In-group Collectivism Societal Values	-0.179	-0.167	-0.296	-0.297
Gender Egalitarianism Societal Values	0,473**	0,475**	-0.134	-0.117
Assertiveness Societal Values	-0.181	-0.192	0,335*	0,327*

Data sources: Hofstede Insights, Schwartz and GLOBE

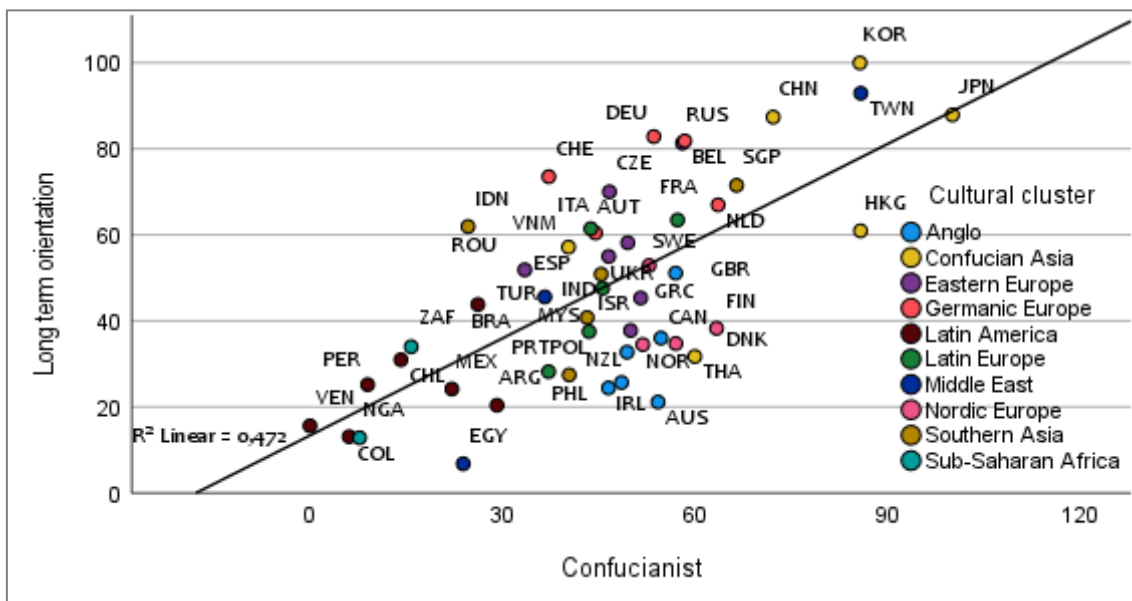
⁶ This construct and all the following ones are from the GLOBE project.

Figure 14. Embeddedness (Schwartz) by Independent (new Hofstede)



Data sources: Hofstede Insights, Schwartz

Figure 15. Long term orientation by Confucianist



Data source: Hofstede Insights

4.2.2 Association of culture with socioeconomic indicators

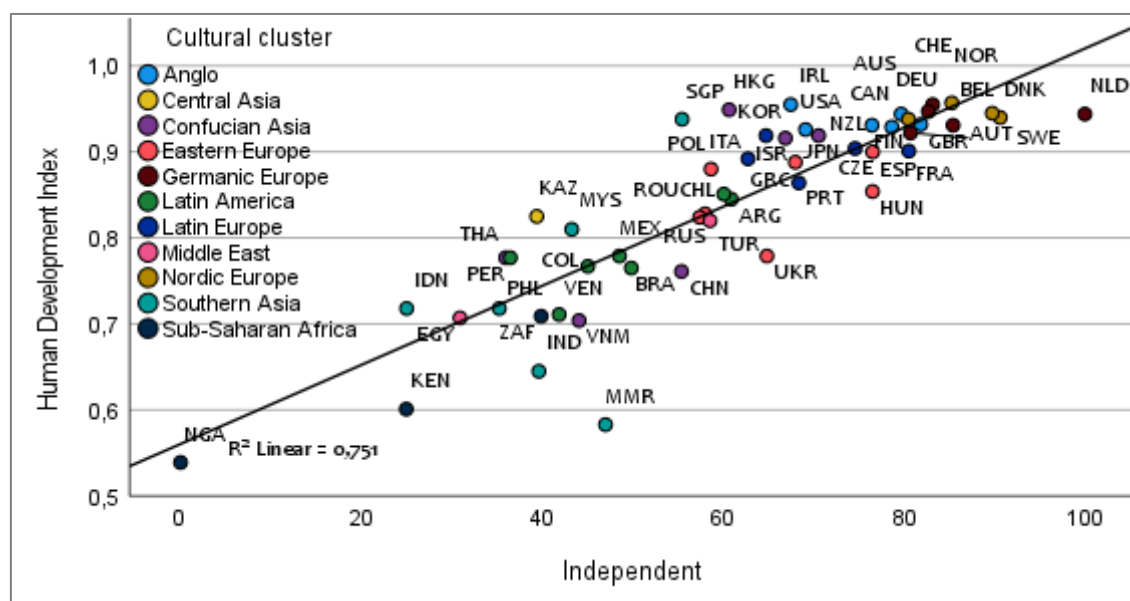
Table 25 shows the correlation between the Independent and Confucianist dimensions and some economic, social and educational indicators. All these correlations, except between Gender Gap and Confucianist, are (very) strong and statistically significant at the 0.01 level. The Independent and, somewhat less, the Confucianist dimension are strongly associated with higher levels of economic, human and social development.

Table 25. Correlation between culture and economic, social and education indicators

	Independent	Confucianist
Gross National Income per capita (WHO)	0.756**	0.546**
Human Development Index (HDR-UNDP)	0.867**	0.614**
Gini index (World Bank)	-0.461**	-0.356**
Inequality Index (HDR-UNDP)	-0.834**	-0.621**
Gender Gap (WEF)	0.567**	0.110
Gender Inequality Index (HDR-UNDP)	-0.861**	-0.682**
Education index (UNESCO)	0.844**	0.539**
Skilled labour force (ILO)	0.726**	0.575**

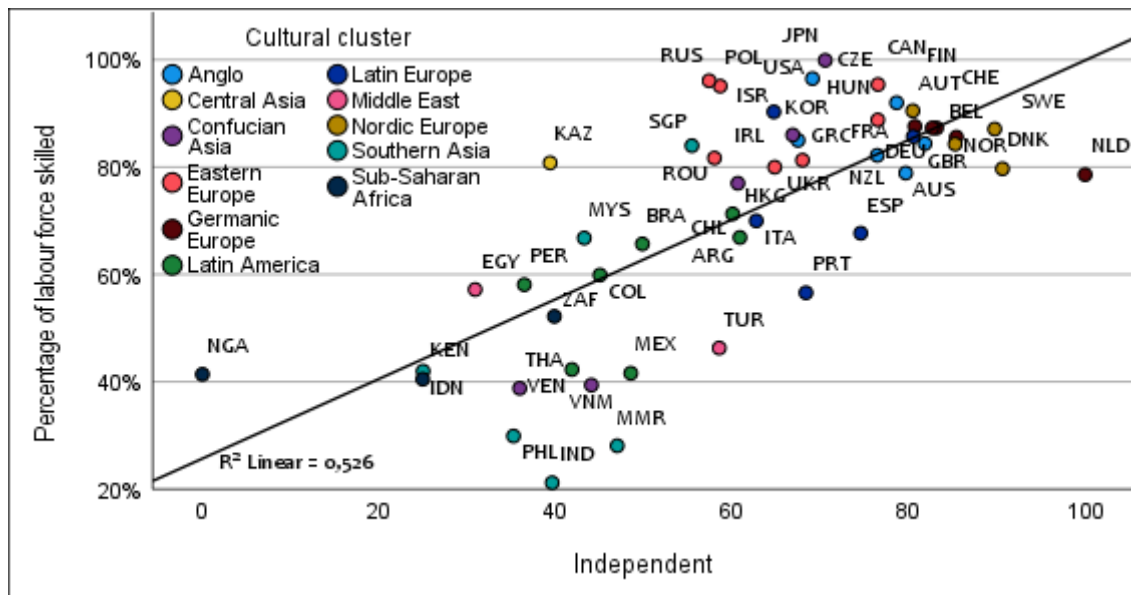
Given the very high correlation one can even consider the Independent dimension to be a good proxy for human development, equality and gender equality. The strength of these correlations is striking; they are also stronger than those found in earlier analyses based on the old Hofstede values. This result is even more surprising because the data sources for these indicators are very different: the Independent dimension is based on questions to people about their values, attitudes to people and society, behaviour, etc., while HDI, the Inequality Index and the Gender Inequality Index are derived from national social and economic statistics. For example, HDI is based on life expectancy, education level and income (<http://hdr.undp.org/en/content/human-development-index-hdi>). Figure 16 illustrates the association between Independent and HDI and Figure 17 between Independent and the percentage of the labour force skilled for their job.

Figure 16. Human Development Index by Independent



Data source: Hofstede Insights (culture) and UN (human development)

Figure 17. Percentage of the labour force skilled for their job by Independent



Data source: Hofstede Insights (culture) and ILO (labour force)

As Table 25 shows, the correlations between Confucianist and the socioeconomic indicators are also high, except with Gender Gap. The findings in relation to education are consistent with those of Minkov, Bond, et al. (2018) who observed the strong association between Long-Term Orientation and educational performance. To expand on this I calculated correlations between Confucianist and PISA performance scores. The correlations are strong: $r = 0.743^{**}$ for Mathematics performance, $r = 0.667^{**}$ for Science performance and $r = 0.607^{**}$ for Reading performance. For Mathematics and Science performance, these correlations are higher than those for Independent. Also, the correlation between Confucianist and the percentage of children that never skipped a whole day at school (another PISA indicator) is 0.583^{**} .

Not surprisingly, the other cultural constructs that are correlated with the Independent dimension are also correlated with the socioeconomic indicators, although the correlations are weaker than with the new Hofstede dimensions (Table 26). There is just one exception to this: the GLOBE dimension "Uncertainty Avoidance Societal Values" has a correlation of -0.777^{**} with GNI per capita, which is slightly higher than the value for Independent (when signs are reversed).

Table 26. Correlations between some cultural dimensions and economic, social and educational indicators (41 countries)

	GNI per capita	Human Development Index (HDI)	Inequality Index	Gender Inequality Index	Education index
Independent ⁷	0,729**	0,900**	-0,865**	-0,857**	0,888**
Power Distance	-0.542**	-0.637**	0.521**	0.562**	-0.690**
Individualism	0.460**	0.543**	-0.484**	-0.507**	0.636**
Embeddedness	-0.588**	-0.752**	0.756**	0.727**	-0.756**
Affective Autonomy	0.556**	0.695**	-0.692**	-0.605**	0.720**
Intellectual Autonomy	0.505**	0.691**	-0.715**	-0.683**	0.659**
Uncertainty Avoidance Societal Practices	0.531**	0.328*	-0.188	-0.437**	0.295
In-Group Collectivism Societal Practices	-0.593**	-0.651**	0.594**	0.624**	-0.726**
Uncertainty Avoidance Societal Values	-0.777**	-0.772**	0.691**	0.714**	-0.789**
Future Orientation Societal Values	-0.369*	-0.446**	0.496**	0.478**	-0.499**
Institutional Collectivism Societal Values	-0.416**	-0.441**	0.437**	0.440**	-0.529**

Data sources: Hofstede Insights, Schwartz, GLOBE, UN, WHO, UNESCO

4.2.3 Association of culture with sociological and political indicators

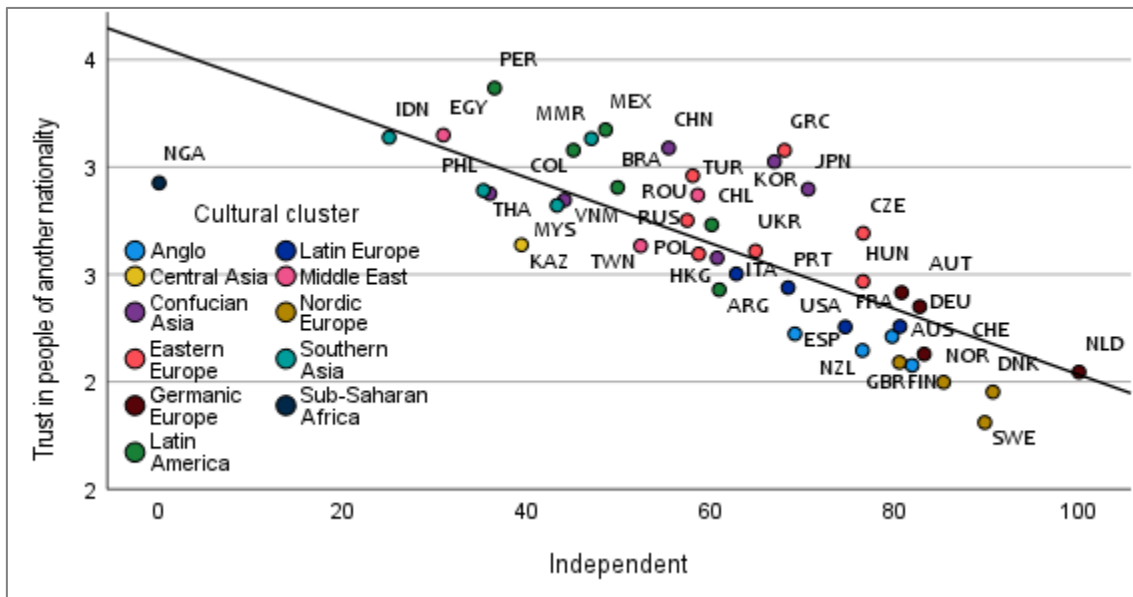
My database includes a range of indicators of **happiness**, stemming from four different sources (World Happiness Report, WVS/EVS survey, ESS survey and PISA). Most of these variables point to a strong correlation between Independent and happiness. For example, $r = 0.756$ ($p < 0.001$) between Independent and the variable 'Happiness' of the Word Happiness Report. When controlling for GNI, the correlation decreases, but it is still moderate and statistically significant ($r = 0.378$, $p = 0.006$). The correlations with the Confucianist dimension are weaker, inexistent or even negative. Confucianist appears to be negatively correlated with people's feelings on their **freedom of choice and control** ($r = -0.366$, $p = 0.015$).

In more Independent societies, **trust** between people is higher. The correlations between the Independent dimension and trust in people known personally, people met for the first time, people of another nationality and people from another religion are all lower than -0.6 (a low value means higher trust in the scale used by WVS/EVS for

⁷ The correlations reported for the Independent dimension in this table differ slightly with those in Table 25. This is due to the fact that the correlations in Table 26 are based on the 41 countries for which values are available for all these cultural constructs..

these variables); the correlations are even stronger when only Europe is considered (correlations lower than -0.8). In more Confucianist societies there is also more trust between people, but the association is weaker than for Independent. Figure 18 shows the association between Independent and the level of trust in people of another nationality (a high value meaning low trust).

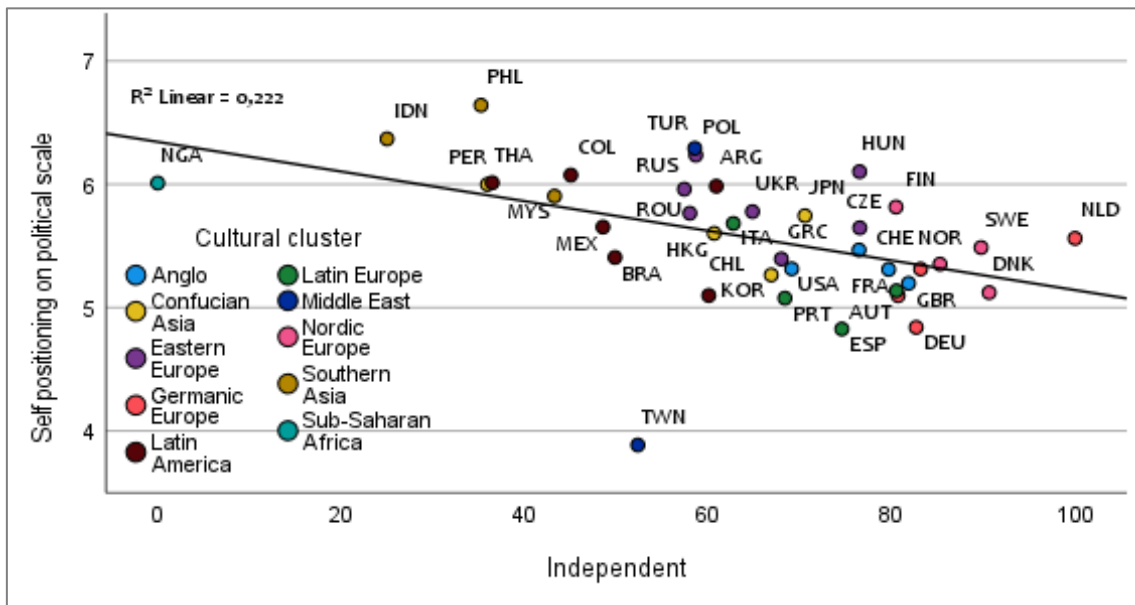
Figure 18. Trust in people of another nationality by Independent



Data sources: Hofstede Insights (culture), WVS/EVS (trust)

Some indicators provide information on the percentage of people with certain **ideological or political** views. One would expect some association with cultural dimensions. I found moderate correlations between the position on the left-right scale and Independent ($r = -0.471$, $p = 0.002$) and Confucianist ($r = -0.351$, $p = 0.28$). The negative sign means that in societies that are more Independent or Confucianist, a higher percentage of the population see themselves as somewhat left of the political centre. Figure 19 shows the association of Independent with the political self-positioning (scale is 1-10 with 1 = Left and 10 = Right). The figure illustrates that in most countries the mean value for the political positioning is around the centre (Taiwan being an exception).

Figure 19. Self-positioning on a left-right scale by Independent



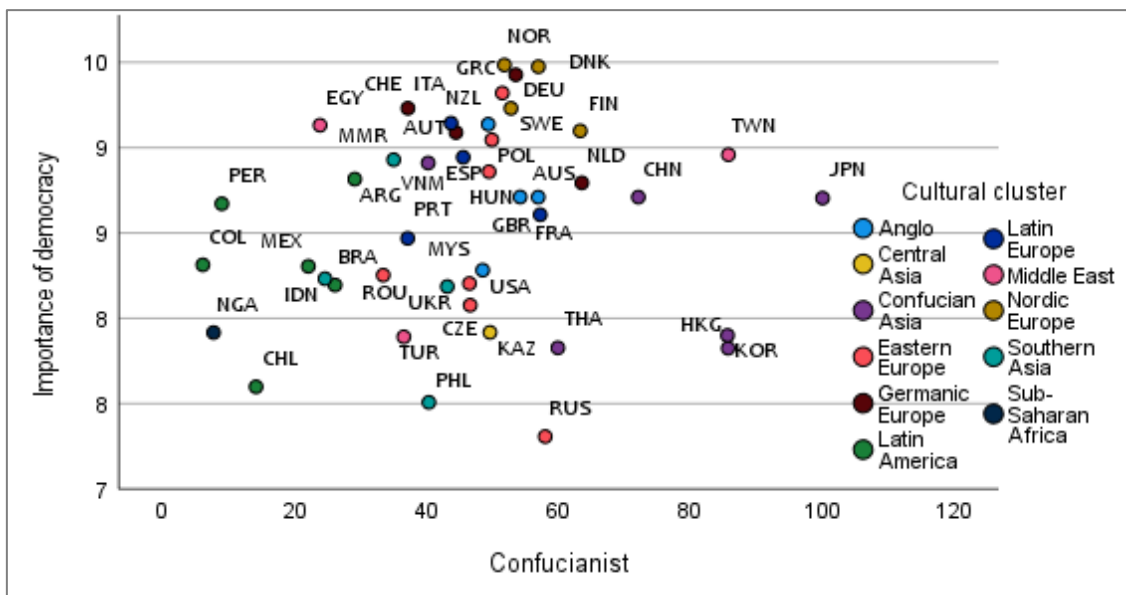
Data sources: Hofstede Insights (culture), WVS/EVS (political scale)

Confucianist is moderately positively correlated with **interest in politics** ($r = 0.303$, $p = 0.046$) – a low value means high interest in politics on this scale – and negatively correlated with being **proud of one's own nationality** ($r = 0.170$, $p = 0.005$) – a high value on the scale meaning not feeling proud. Both Independent and Confucianist are negatively correlated with the number of people in a country who state to **be a religious person**; the association is particularly strong for Confucianist ($r = 0.727$, $p < 0.001$). In Confucianist and even more in Independent societies, it is seen as essential that **women have the same rights as men** ($r = 0.714$, $p < 0.001$ for Independent).

The association between the Independent and Confucianist cultural dimensions and the **confidence in institutions** is more complex. At global level, the Independent dimension is not correlated with confidence in the parliament, the civil service, the government, political parties and the justice system/courts, but strongly correlated with confidence in the police ($r = -0.515$, $p < 0.001$) – a high value of the variable meaning low confidence. On the other hand, Confucianist is moderately positively correlated with confidence in the Parliament ($r = -0.309$, $p = 0.041$), in political parties ($r = -0.307$, $p = 0.043$) and the civil service ($r = -0.450$, $p = 0.002$) and strongly correlated with confidence in the police ($r = -0.516$, $p < 0.001$) and the justice system ($r = -0.542$, $p < 0.001$). When only Europe is considered, most of these correlations decrease and become insignificant.

Satisfaction with the political system is somewhat higher in Independent ($r = 0.314$, $p = 0.038$) and Confucianist societies ($r = 0.379$, $p = 0.011$). Independent countries score low on corruption ($r = 0.791$, $p < 0.001$) and high on **democracy** ($r = 0.699$, $p < 0.001$ for the Democracy Index and $r = 0.676$, $p < 0.001$ for the V-Dem Index); this is less the case in Confucianist societies. Democracy is considered important in Independent countries ($r = 0.502$, $p = 0.001$) but this attitude is not correlated with Confucianist (Figure 20). Both Independent and Confucianist dimensions are strongly correlated with limited corruption and government effectiveness: the correlation with Independent is 0.791 for Corruption and 0.724 for government effectiveness; the figures for Confucianist are 0.556 and 0.672 respectively (all $p < 0.001$).

Figure 20. Importance of democracy by Confucianist



Data sources: Hofstede Insights (culture), WVS/EVS (importance democracy)

In line with their strong individualistic tendency, people in Independent countries feel that the people themselves rather than government should take more **responsibility** ($r = -0.557$, $p < 0.001$). Another interesting finding (for Europe only) is that the more Independent the country, the more people feel that they can **influence national policies and politics** ($r = 0.647$, $p = 0.004$).

4.2.4 Association of culture with risky driving behaviour

Both the ESRA and WHO databases include indicators on risky behaviour in traffic. In ESRA the indicator refers to the percentage of people self-reporting to have engaged in such behaviours at least once over the last month; the WHO values are estimates

given by countries based on observation studies. Table 27 lists correlations of Independent and Confucianist for a number of risky behaviours in traffic.

Table 27. Correlations between cultural dimensions and risky behaviour in traffic

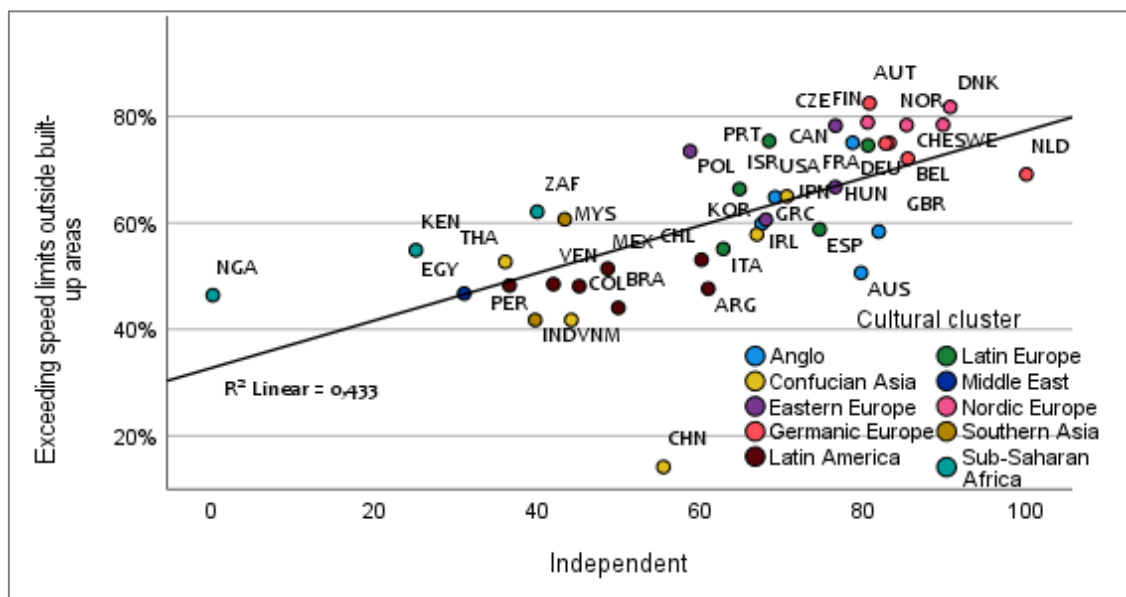
Risk indicator (% of road users)	Source (# of countries)	Correlation with	
		Independent	Confucianist
Car drivers exceeding speed limits in built-up areas	ESRA (41)	0.533 ($p < 0.001$)	0.291 ($p = 0.074$)
Car drivers exceeding speed limits outside built-up areas (except motorways)	ESRA (41)	0.658 ($p < 0.001$)	0.295 ($p = 0.062$)
Car driver exceeding speed limits on motorways	ESRA (41)	0.572 ($p < 0.001$)	0.107 ($p = 0.507$)
Car drivers driving over the BAC limit	ESRA (41)	-0.283 ($p = 0.073$)	-0.322 ($p = 0.040$)
Car drivers reading text messages while driving	ESRA (40)	-0.703 ($p < 0.001$)	-0.445 ($p = 0.004$)
Cyclists cycling without a helmet	ESRA (41)	0.203 ($p = 0.203$)	0.218 ($p = 0.171$)
Rear passengers of cars wearing seat-belt	WHO (32)	0.814 ($p < 0.001$)	0.552 ($p = 0.001$)
PTW riders wearing helmet	WHO (38)	0.620 ($p < 0.001$)	0.125 ($p = 0.453$)
PTW passengers wearing helmet	WHO (33)	0.618 ($p < 0.001$)	0.039 ($p = 0.827$)

Data from ESRA is based on self-reported behaviour, data from WHO on observed behaviour

The table shows strong associations between Independent and the risky behaviours listed, but these have different directions. In Independent societies people exceed speed limits more often than in collectivist ones, despite the more numerous speeding controls. This is not just a result of culture, however. In many collectivist countries, which are often less developed, speed limits are often higher or inexistent and the state of the roads and vehicles makes it difficult to exceed the speed limits. As regards distraction and use of protective systems, Independent societies seem to behave less risky in traffic. There is no correlation between driving with a BAC above the legal limit and Independent, neither at global nor at European level. On the other hand, Confucianist is moderately negatively correlated with driving with a BAC above the legal limit. Thus, there tends to be less drinking and driving in Confucianist societies despite the fact that the level of alcohol consumption is higher ($r = 0.368$, $p = 0.008$).

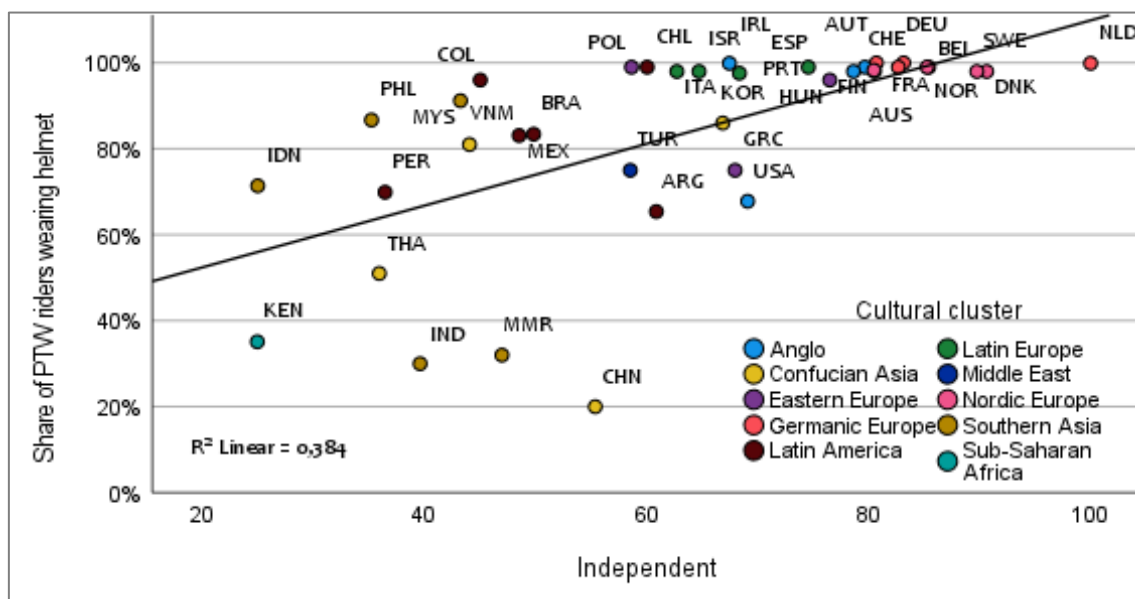
Figure 21 shows the association of Independent with speeding in rural areas and Figure 22 the association with the part of PTW riders wearing a helmet. Figure 23 shows the association between Confucianist and driving with a BAC over the legal limit.

Figure 21. Exceeding the speed limit in rural areas (self-reported) by Independent



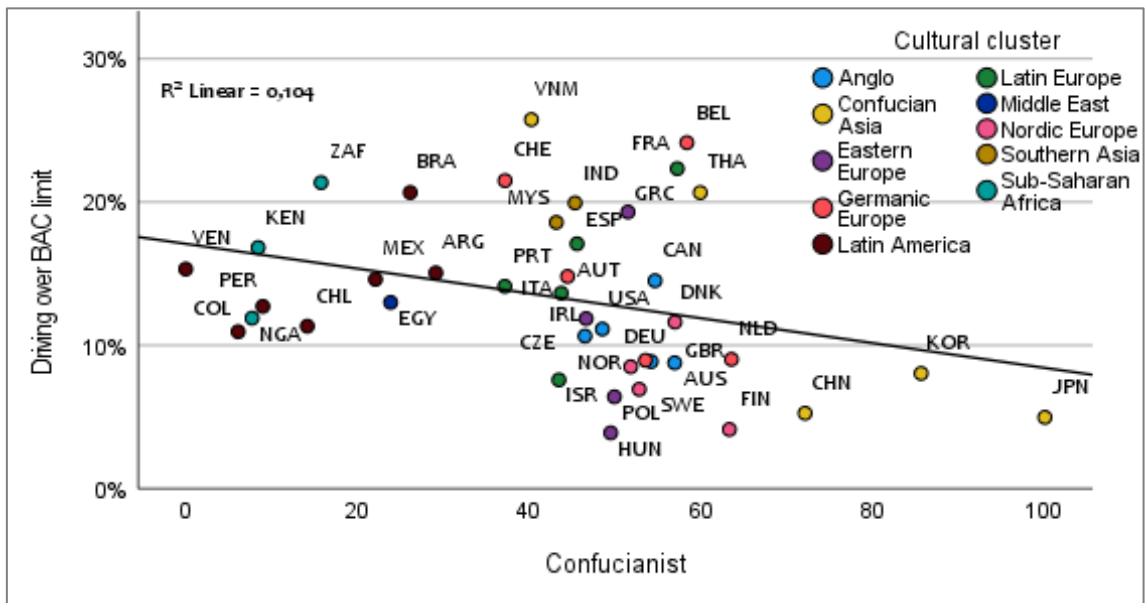
Data sources: Hofstede Insights (culture), ESRA (speeding)

Figure 22. Percentage of PTW riders wearing a helmet (observed) by Independent



Data sources: Hofstede Insights (culture), WHO (helmets)

Figure 23. Driving over the BAC limit by Confucianist



Data sources: Hofstede Insights (culture), ESRA (drink and drive)

4.2.5 Association of culture with subjective safety

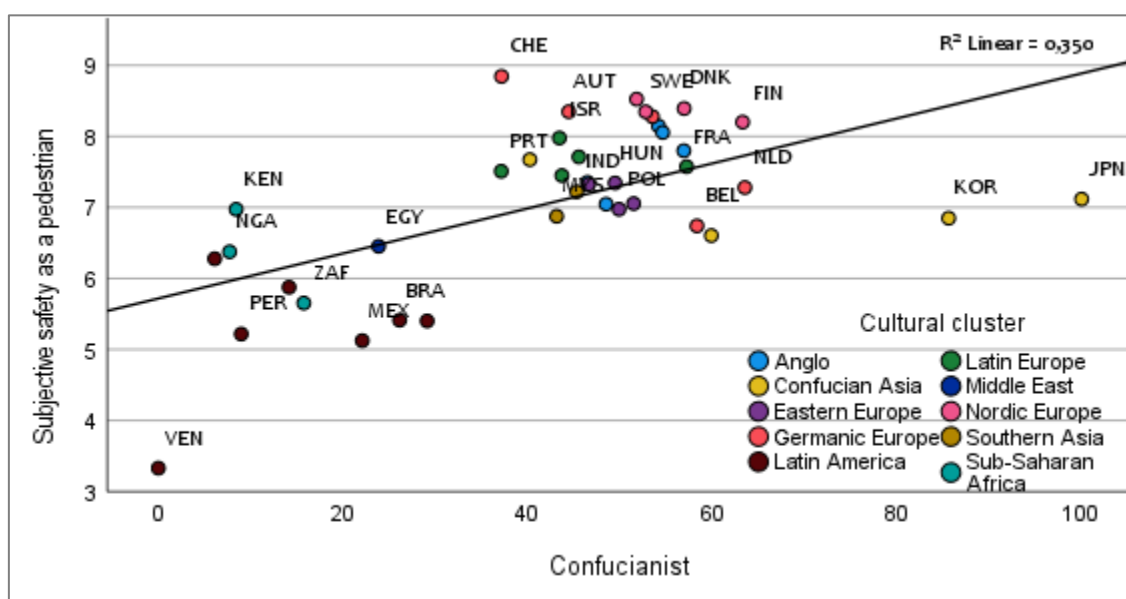
The correlations of national indicators on subjective safety with Independent and Confucianist are shown in Table 28. All correlations are positive, which means that in countries that are more Independent and Confucianist, road users feel safer. The correlations for the Confucianist and Independent dimensions do not differ much; for some road users the correlation value is even higher for Confucianist than for Independent. Figure 24 shows the association between the Confucianist dimension and the subjective safety feeling of pedestrians.

Table 28. Correlations between cultural dimensions and subjective safety (N=40)

Subjective safety (SS)	Correlation with	
	Independent	Confucianist
SS of pedestrians	0.611 ($p < 0.001$)	0.592 ($p < 0.001$)
SS of cyclists	0.411 ($p = 0.008$)	0.434 ($p = 0.005$)
SS of moped riders	0.352 ($p = 0.026$)	0.413 ($p = 0.008$)
SS of motorcycle riders	0.348 ($p = 0.028$)	0.404 ($p = 0.010$)
SS of car drivers	0.531 ($p < 0.001$)	0.366 ($p = 0.020$)
SS of car passengers	0.444 ($p = 0.004$)	0.414 ($p = 0.008$)
SS of bus passengers	0.522 ($p = 0.001$)	0.620 ($p < 0.001$)

Data sources: ESRA (subjective safety), Hofstede Insights (culture)

Figure 24. Subjective safety of pedestrians by Confucianist



Data sources: Hofstede Insights (culture), ESRA (subjective safety)

4.2.6 Association of culture with traffic law enforcement

The WHO and ESRA databases include information on traffic law enforcement practices. The enforcement assessment scores of the WHO are based on consensus assessments by key stakeholders within the country, while the ESRA data are based on surveys amongst representative samples of the adult population. Table 29 summarizes the results of my correlation analyses at national level.

Table 29. Correlations between cultural dimensions traffic law enforcement indicators

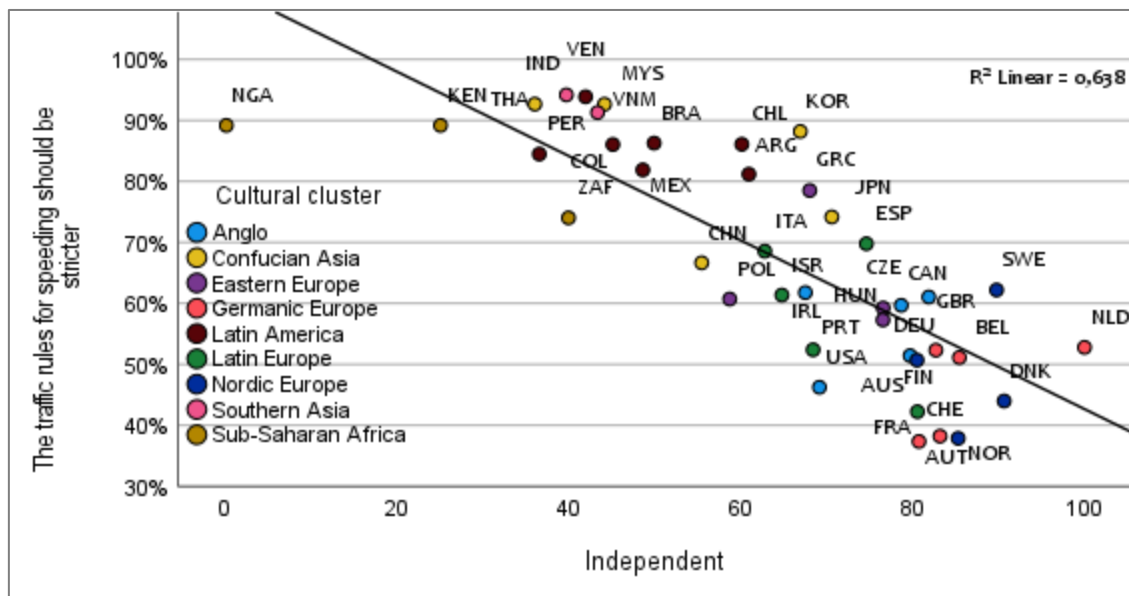
Enforcement indicator	Source (N)	Correlation with	
		Independent	Confucianist
Speed enforcement score	WHO (46)	0.304 ($p=0.040$)	0.383 ($p=0.090$)
Alcohol enforcement score	WHO (47)	0.350 ($p=0.016$)	0.458 ($p=0.001$)
Seat-belt enforcement score	WHO (47)	0.265 ($p=0.072$)	0.230 ($p=0.121$)
Child restraint enforcement score	WHO (46)	0.633 ($p< 0.001$)	0.314 ($p=0.034$)
Helmet PTW enforcement score	WHO (46)	0.511 ($p< 0.001$)	0.377 ($p=0.010$)
"The traffic rules for DUI (Driving under the influence of alcohol) should be stricter"	ESRA (41)	-0.327 ($p=0.037$)	-0.113 ($p=0.480$)
"The traffic rules for speeding should be stricter"	ESRA (41)	-0,613 ($p<0.001$)	-0,311 ($p=0.048$)
Perceived likeliness to be checked for DUI	ESRA (40)	-0.444 ($p=0.004$)	-0.280 ($p=0.071$)
Perceived likeliness to be checked for speeding	ESRA (40)	-0.104 ($p=0.523$)	0.013 ($p=0.936$)

The table shows that Independent is strongly correlated with the child restraint and PTW helmet enforcement scores and moderately with speed and alcohol enforcement.

A possible explanation for the differences is the longer tradition of alcohol and speed checks in most countries, which may reduce the impact of national culture. For child restraints and PTW helmets the legislation in lower income (hence more collectivistic) countries is less strict and more recent, leading to a bigger difference with high income (and more individualistic) countries.

The ESRA related correlations show that in more Independent countries there is more resistance to making traffic rules stricter. The opposition is higher for speeding than for alcohol. Please note that for the statement on speeding Egypt is an outlier; without Egypt the correlation becomes -0.799 ($p < 0.001$). The association between Independent and agreeing with “*traffic rules for speeding should be stricter*” is displayed in Figure 25 (leaving out Egypt). Table 29 also shows that in collectivistic societies the difference in the perceived likelihood to be checked for DUI with that for speeding is smaller than in more individualistic societies. This may be related to the higher prevalence of automatic speed cameras in HICs.

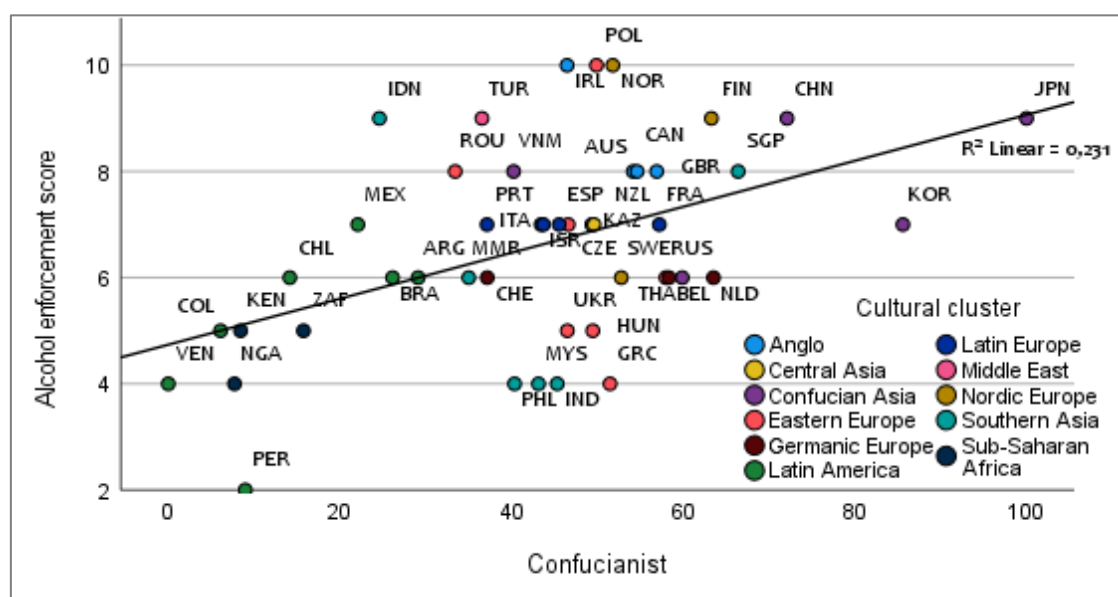
Figure 25. Level of agreement with “the traffic rules for speeding should be stricter” by Independent (leaving out Egypt).



Data sources: Hofstede Insights (culture), ESRA (view on traffic rules)

Correlations between the Confucianist dimension and the assessment scores are in general lower than those for Independent. An important exception is the alcohol enforcement score which is strongly correlated with Confucianist (Figure 26). I recall (see Section 4.2.4) that DUI is on average higher in Dionysian societies.

Figure 26. Alcohol enforcement score by Confucianist



Data sources: Hofstede Insights (culture), WHO (enforcement)

4.2.7 Association between culture and fatality rate

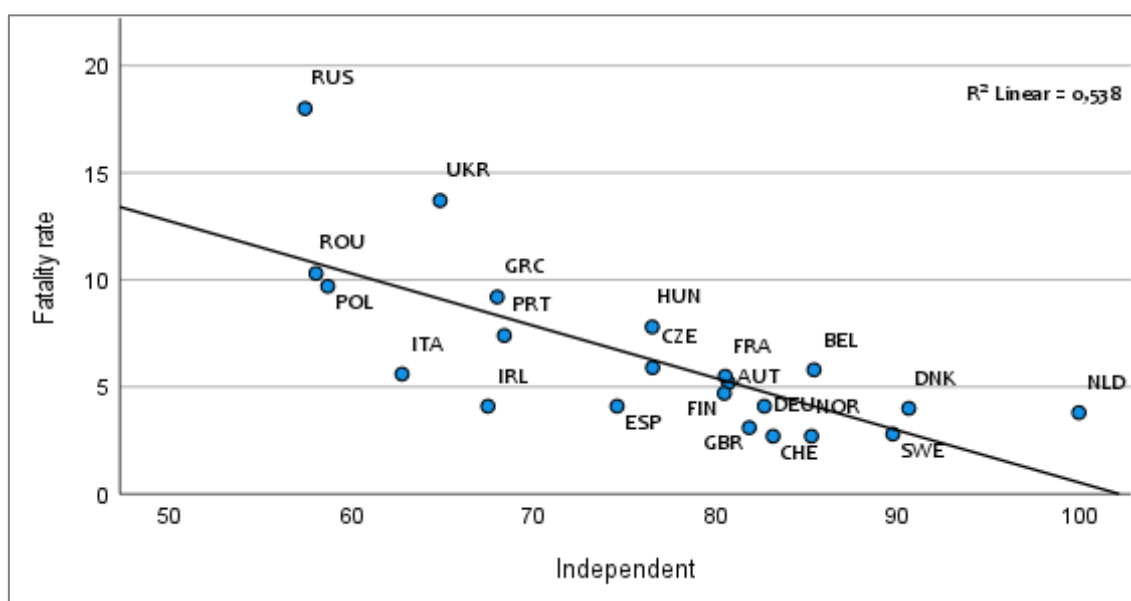
Given the association of economic indicators with both the fatality rate (see Section 4.1.3) and culture (Section 4.2.2), the cultural dimensions can be expected to be correlated with the fatality rate. Correlations between the two main cultural dimensions and different fatality rates are shown in Table 30 (for sources, see Appendix A1).

Table 30. Correlations between fatality rates and the cultural dimensions

	Correlation with	
	Independent	Confucianist
Fatality rate per capita	-0.746 ($p < 0.001$)	-0.414 ($p = 0.002$)
Fatality rate per road length	-0.369 ($p = 0.007$)	0.067 ($p = 0.632$)
Fatality rate per gasoline consumption	-0.473 ($p < 0.001$)	-0.268 ($p = 0.052$)
Fatality rate per vehicle	-0.477 ($p < 0.001$)	-0.255 ($p = 0.065$)

The correlations between Independent and the fatality rates are negative and strong, even very strong for the fatality rate per capita. The correlation is weaker with the Confucianist dimension, but still moderate. Thus, the higher a society is ranked on the Independent and Confucianist scales, the better the road safety performance. The associations still hold when only European countries are considered; this is illustrated in Figure 27. Not just globally but also in Europe over 50% of the variation in fatality rate between countries can be explained by Independent.

Figure 27. Fatality rate by Independent (Europe only)



Data sources: Hofstede Insights (culture), WHO (fatality rate)

Given the strong correlations between the cultural dimensions and socioeconomic indicators (see Section 4.2.2) one might expect that the strength of correlations would diminish when controlled for such factors. This is actually the case, as shown in Table 31. For Confucianist the correlations disappear, but for Independent the correlation with the fatality rate remains moderately negative and statistically significant ($p = 0.001$) when controlling for gross national income (GNI) per capita. Even after controlling for the Human Development Index (HDI), with which the Independent dimension is very strongly correlated, the negative correlation is still almost statistically significant ($p = 0.076$).

Table 31. Correlations of fatality rate with cultural dimensions after controlling for GNI and HDI.

	Correlations with fatality rate		
	Zero order	Controlling for GNI	Controlling for HDI
Independent	-0.747 ($p < 0.001$)	-0.448 ($p = 0.001$)	-0.251 ($p = 0.076$)
Confucianist	-0.435 ($p = 0.001$)	-0.038 ($p = 0.789$)	0.074 ($p = 0.604$)

Data sources: Hofstede Insights (culture), WHO (fatality rate), UN (development)

These results mean that in countries with a similar level of development, the fatality rate is typically not affected by the positioning of the country on the scale 'Confucianist – Dionysian'. For example, South Korea is higher on the Confucian scale than Spain but the fatality rate is more than twice as high (9.8 versus 4.1); on the other hand, South Africa is much less Confucianist than the Philippines, but its fatality rate is more

than twice as high (25.9 versus 12.3). For the Independent dimension the findings imply that in countries with a similar level of development, the more collectivist countries will tend to have higher fatality rates. An example is the difference between Denmark and the USA, with very similar levels of GNI per capita. The USA is more collectivist than Denmark and its fatality rate is more than three times as high as in Denmark (12.4 versus 4.0).

4.3 Level of public support for policy measures

4.3.1 Indicators for measuring the level of public support

The 15 policy measures that were included in the ESRA survey have been introduced in the Methodology Chapter (Table 16, p.104). Different indicators can be used to measure the level of support for these policy measures. The values in the third column of Table 32 are the means of the national support scores, which are derived from respondents 'supporting' or 'rather supporting' the measures (figures for each individual country are given in Table 70 in Appendix A1). Since the number of countries involved in the calculation of the means varies between 48 and 61, the same calculation was applied for only the 48 countries of ESRA2 (fourth column). An alternative indicator is shown in the fifth column. It was derived after first converting the level of support of respondents in ESRA2 (48 countries) to a value on a scale from 0 to 100 and then calculating the average value, using the population size as the weighting factor. Despite differences in methods, weighting and composition of countries, one can observe very similar patterns in the level of support for all 15 measures for the three indicators.

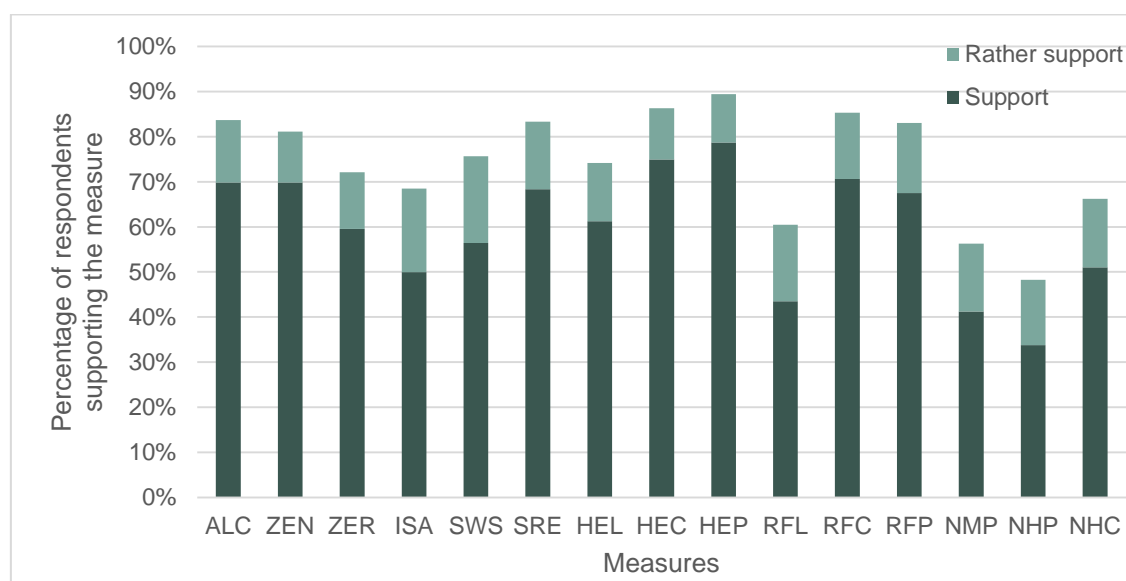
Overall, the majority of the respondents tend to support the policy measures that were included in ESRA2. For 12 of the 15 measures, over 60% of respondents are in favour. The highest level of support (9 respondents out of 10) is for the obligation for all PTW riders to wear a helmet, a measure which is already implemented in most countries. Lowest public support, slightly below 50%, is for forbidding pedestrians to wear headphones or earbuds when walking in the streets. When calculating the support indicators in Table 32, I used the conventions commonly applied in ESRA publications to consider the respondents who gave a 4 or 5 on a scale of 1 to 5 as 'supportive'. One could also take a stricter approach and only include those who gave the highest score; then the percentage of supporters would decrease. However, as illustrated in Figure 28, the overall pattern remains very similar, and most measures are still supported by over half of the sample.

Table 32. Indicators for the level of public support for policy measures

		N	Mean of support score for all countries	Mean of support score for 48 countries	Weighting of all responses (48 countries)
ALC	Alcohol interlock for recidivists	61	84.7%	83.7%	85.7
ZEN	Zero alcohol novice drivers	60	82.0%	81.2%	84.0
ZER	Zero alcohol all drivers	61	74.4%	72.1%	76.7
ISA	Install ISA system	49	68.8%	68.5%	74.4
SWS	Install speed warning signs	48	75.7%	75.7%	80.1
SRE	Seatbelt reminder all seats	48	83.3%	83.3%	85.7
HEL	All cyclists wear helmet	61	76.5%	74.2%	79.1
HEC	Children cyclists wear helmet	48	86.3%	86.3%	88.2
HEP	PTW wear helmet	48	89.5%	89.5%	90.5
RFL	Pedestrians wear reflective material	49	60.4%	60.5%	68.6
RFC	Cyclists wear reflective material	48	85.3%	85.3%	86.8
RFP	PTW wear reflective material	48	83.0%	83.0%	85.2
NMP	No use mobile phones in cars	60	58.8%	56.3%	65.6
NHP	No use headphones by pedestrians	48	48.2%	48.2%	59.0
NHC	No use headphones by cyclists	48	66.3%	66.3%	73.0

Data source: ESRA

Figure 28. Percentage of “full support” and “rather support” of the 15 ESRA2 measures

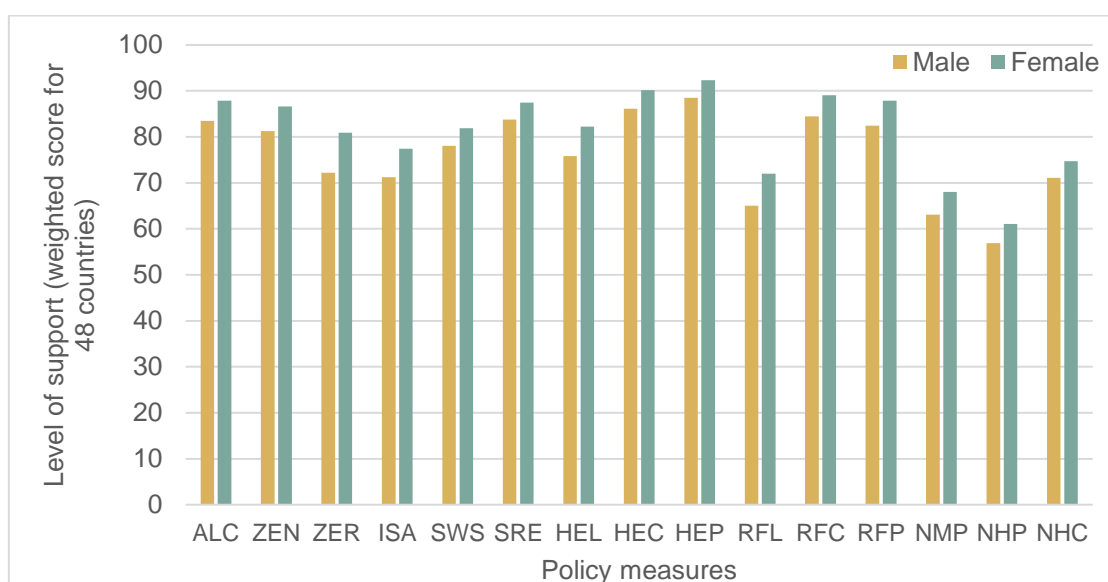


Data source: ESRA

4.3.2 Variation in public support by gender and age

I calculated the weighted mean for gender and three age categories and converted the result to fit in a scale from 0 (oppose) to 100 (support). The results are shown in Figure 29 and Figure 30. Figure 29 illustrates that women tend to be more supportive for road safety measures than men, which is consistent with earlier findings (see Sections 2.7.3 and 2.7.5). This finding applies to all 15 measures considered. This gender difference for all measures is observed in almost every country, the main exceptions being some LMICs, where some measures are slightly more supported by men than by women (e.g. in Zambia in relation to zero tolerance for DUI of novice drivers).

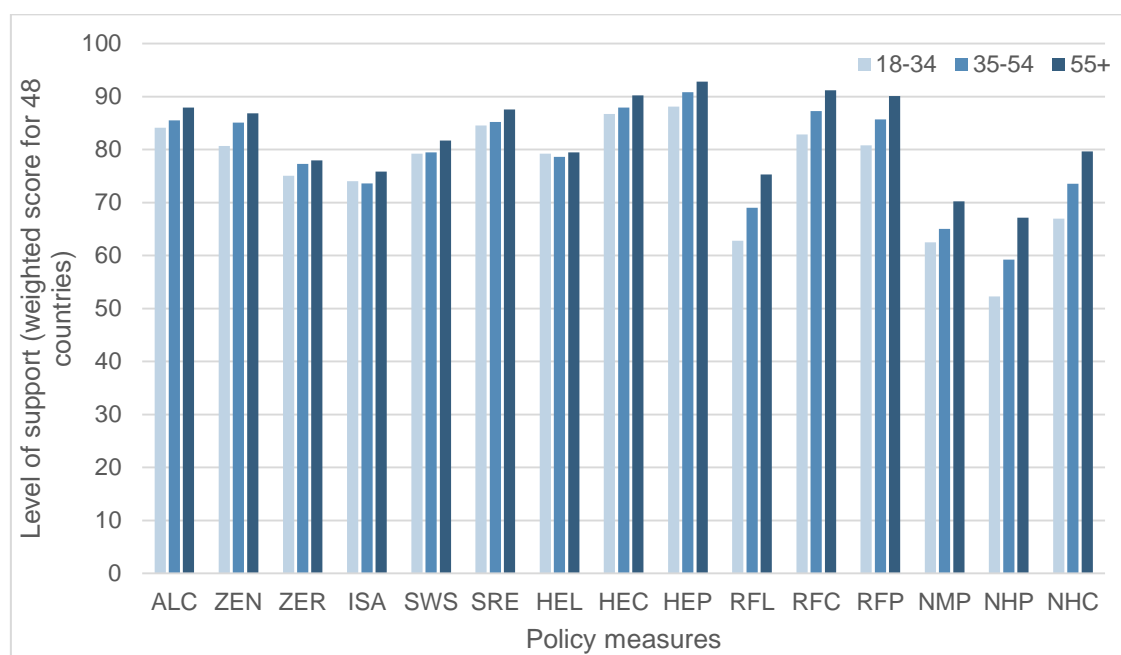
Figure 29. Level of support for policy measures by gender



Data source: ESRA

Figure 30 shows that for 13 measures, the older the people, the more they tend to be in favour. But for ISA and HEL there is not such an average age gradient globally. Again, these trends cannot be generalised to all countries: in several countries no age gradient is observed or it is even reversed for one or more measures. It should also be noted that the age pattern sometimes differs between men and women: for ZER and ISA there is no male gradient, only a female gradient of increasing support with age.

Figure 30. Level of support for policy measures by age category

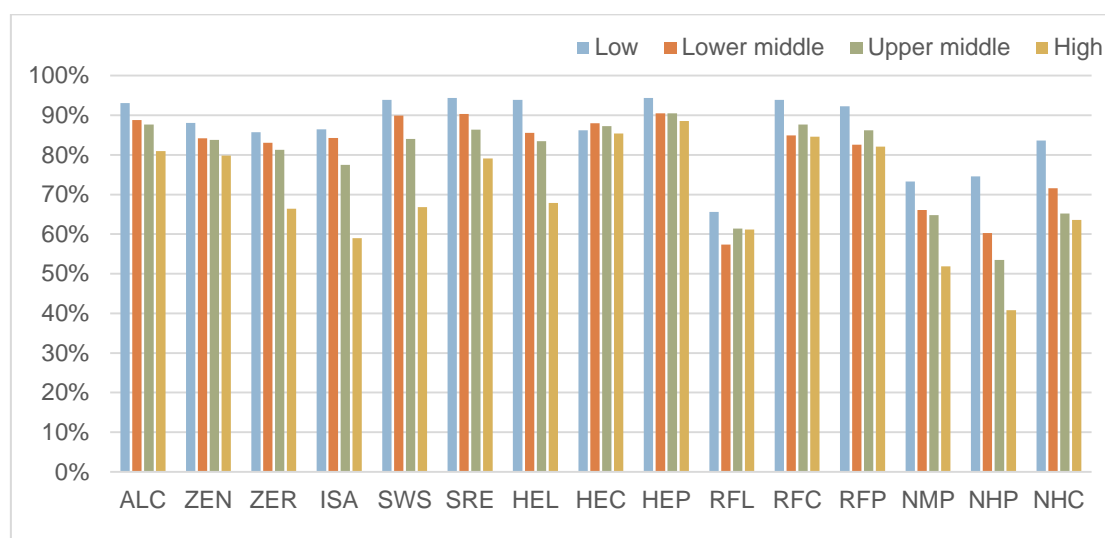


Data source: ESRA

4.3.3 Variation in public support between country clusters

Figure 31 and Table 33 show the variation in the level of public support for the 15 measures for two types of country clusters: world region and income level. The indicator used is the percentage of people supporting the measure, averaged across the countries in the cluster. As one can see, for some measures the level of public support is similar across the different parts of the world: ALC, ZEN, HEC, HEP and NHC. For the other measures there are differences across clusters, whereby in general lower income countries tend to be most supportive of the measures proposed.

Figure 31. Level of public support by income level of countries



Data source: ESRA

Table 33. Level of public support across world regions

	North America	East Asia & Pacific	Europe & Central Asia	Middle East & North Africa	South Asia	Latin America & Caribbean	Sub-Saharan Africa
ALC	82.4%	84.4%	80.5%	84.6%	83.8%	88.5%	91.4%
ZEN	82.4%	76.6%	79.5%	83.8%	80.5%	85.4%	86.4%
ZER	60.7%	71.1%	66.0%	80.8%	82.0%	83.9%	84.5%
ISA	46.4%	71.0%	61.1%	76.8%	82.0%	77.5%	85.7%
SWS	59.0%	75.0%	68.7%	82.3%	83.8%	87.9%	92.5%
SRE	75.5%	81.1%	79.8%	84.1%	87.3%	90.0%	94.3%
HEL	74.1%	64.8%	65.8%	86.3%	70.9%	88.3%	92.5%
HEC	87.2%	77.1%	85.7%	89.1%	80.3%	94.6%	92.2%
HEP	83.9%	86.7%	89.0%	88.8%	90.6%	95.2%	93.3%
RFL	55.5%	54.0%	63.8%	51.4%	59.9%	46.2%	64.1%
RFC	82.1%	76.3%	85.6%	84.4%	81.5%	92.5%	91.6%
RFP	81.2%	74.0%	83.1%	83.0%	78.9%	92.1%	88.8%
NMP	56.6%	57.7%	50.7%	54.4%	70.6%	68.6%	68.7%
NHP	42.3%	49.9%	42.4%	42.4%	71.5%	43.9%	65.2%
NHC	61.6%	65.2%	63.9%	60.3%	78.6%	63.8%	76.6%
Avg.	68.7%	71.0%	71.0%	75.5%	78.8%	79.9%	84.5%

Data source: ESRA

Table 34 lists the four top and bottom countries for the level of public support for five measures. For four of these, the general trend is confirmed; for the measure 'Pedestrians wear reflective material' however, it is interesting to observe that high

income countries appear both in the top four as in the bottom four, deviating from the general pattern.

Table 34. Top and bottom countries in terms of level of support for some measures

Policy measure	Highest support	Lowest support
Zero alcohol all drivers	Nigeria, Benin, Colombia, Peru	Austria, Australia, Switzerland, Luxembourg
Install ISA system	Benin, Cameroon, Côte d'Ivoire, Uganda	Germany, Netherlands, USA, Austria
All cyclists wear helmet	Kenya, Colombia, Ghana, Uganda	Viet Nam, Luxembourg, Japan, The Netherlands
Pedestrians wear reflective material	Slovenia, Finland, Poland, Hungary	Netherlands, Serbia, Israel, Australia
No use mobile phones in cars	Kenya, Bolivia, Ghana, Benin	Switzerland, Luxembourg, Austria, Finland

Data source: ESRA

4.4 Factors affecting public support for policy measures

4.4.1 Association with fatality rate

My initial assumption was that in general the lower the fatality rate in a country, the higher the resistance would be against new policy measures. The underlying logic was that a high level of road safety might reduce people's need to improve road safety and/or might cause apprehension that the expected additional gains would come at an excessively high burden or cost. The correlations between fatality rate and the policy measures in Table 35 tend to support the assumption (N = 48-61).

The table shows that for nine out of fifteen measures, the correlations with fatality rates are positive and (highly) statistically significant; for the six other measures the correlation is positive but not significant. In other words, in countries with fewer fatalities, the resistance against new measures is generally higher than in those with more fatalities. This holds in particular for measures that are related to speeding, distraction, drinking and driving, and use of seatbelts. The relationship does not apply to measures related to visibility of VRUs, helmets for PTWs and children, and DUI of novice drivers. It should be noted that the last three measures are already implemented in many countries and are probably seen to be self-evident, and hence there is little mental association with the fatality rate.

Table 35. Correlations between support for policy measures and the fatality rate

Measure		Correlation with fatality rate
ALC	Alcohol interlock for recidivists	0.504**
ZEN	Zero alcohol novice drivers	0.171
ZER	Zero alcohol all drivers	0.535**
ISA	Install ISA system	0.755**
SWS	Install Speed Warning signs	0.780**
SRE	Seatbelt reminder all seats	0.683**
HEL	All cyclists wear helmet	0.537**
HEC	Children cyclists wear helmet	0.140
HEP	PTW wear helmet	0.146
RFL	Pedestrians wear reflective material	0.054
RFC	Cyclists wear reflective material	0.134
RFP	PTW wear reflective material	0.124
NMP	No use mobile phones in cars	0.597**
NHP	No use headphones by pedestrians	0.726**
NHC	No use headphones by cyclists	0.356*

Data sources: ESRA (measures), WHO (fatality rate)

4.4.2 Association with economic and human development

Section 4.3.3 showed that people from LMICs tend to support policy measures more than those of HICs. Table 36 shows the correlations between ten policy measures with seven socioeconomic indicators. The correlations are quite strong and show that for these measures the following associations apply:

Higher economic development	↔	Lower public support
Higher inequality	↔	Higher public support
Higher qualifications	↔	Lower public support

Not included in this table are five measures – HEC, HEP, RFL, RFC, RFP, all linked to self-protection of vulnerable road users – for which there are no significant correlations with the socioeconomic indicators considered. I also found that despite the non-significant correlations at global level, correlations could be significant within certain geographical, cultural or economic clusters of countries. For example, in Europe the correlation between GNI and RFP is -0.450 ($p = 0.027$). I also examined the relationship between alcohol consumption in a country and the level of support for the

alcohol related measures. For ALC and ZER the correlations were strongly negative ($r = -0.487^{**}$ and $r = -0.599^{**}$ respectively). I will return to this in Section 7.5.

Table 36: Correlations between support for measures and socioeconomic indicators

	GNI per capita	HDI	Inequality Index	Gender Inequality	Skilled labour force	Education index	Mathematics performance
ALC	-0.628**	-0.607**	0.539**	0.586**	-0.518**	-0.554**	-0.268*
ZEN	-0.400**	-0.345**	0.332*	0.353**	-0.153	-0.270*	-0.247*
ZER	-0.723**	-0.664**	0.651**	0.696**	-0.532**	-0.638**	-0.513**
ISA	-0.844**	-0.856**	0.793**	0.790**	-0.759**	-0.861**	-0.454**
SWS	-0.858**	-0.866**	0.802**	0.827**	-0.760**	-0.848**	-0.659**
NMP	-0.657**	-0.624**	0.609**	0.653**	-0.633**	-0.575**	-0.533**
NHP	-0.436**	-0.470**	0.390**	0.393**	-0.368*	-0.425**	-0.010
NHC	-0.715**	-0.747**	0.641**	0.670**	-0.635**	-0.690**	-0.248*
SRE	-0.663**	-0.727**	0.703**	0.677**	-0.679**	-0.691**	-0.489**
HEL	-0.561**	-0.569**	0.632**	0.641**	-0.580**	-0.538**	-0.638**

Data sources: ESRA, WHO, UN, ILO, UNESCO, PISA

4.4.3 Association with enforcement and the political system

I expected to find some association between the level of enforcement and the support for policy measures. Such associations actually exist:

- For **speeding**, the speed enforcement score is correlated negatively with the support for the measures on ISA (-0.438**) and Speed Warning Signs (-0.466*). In other words, the stronger the current level of speed limit enforcement, the higher the opposition against new speeding related interventions. This finding is also supported by the strong positive correlation with the agreement with “*The traffic rules for speeding should be stricter*” ($r = 0.697^{**}$ with ISA and $r = 0.696^{**}$ with SWS). There is a moderate positive correlation with the likeliness to be checked for speeding ($r = 0.300^*$ with ISA and $r = 0.362^*$ with SWS).
- For **driving under the influence of alcohol** there are comparable but somewhat lower correlations between the alcohol enforcement score and ALC ($r = -0.334^*$), ZEN ($r = -0.332^*$) and ZER ($r = -0.408^{**}$). A feeling of adequate control on DUI is associated with lower support for stricter measures in that field. There is a positive correlation of the agreement with “*The traffic rules for DUI should be stricter*” with both ALC ($r = 0.500^{**}$) and ZER ($r = 0.474^{**}$) but not with ZEN ($r = 0.178$, $p > 0.05$). The correlation with ALC is even 0.623^{**} if outlier Egypt is left out. Correlations are also positive and significant between the likeliness to be checked for DUI and ALC ($r = 0.326^*$) and ZER ($r = 0.334^{**}$) but again not with ZEN ($r = 0.194$, $p > 0.05$).

- The **seatbelt** enforcement score is negatively correlated with SRE, the obligation for seatbelt reminders on all seats (-0.423**). Interestingly, the PTW **helmet** enforcement score is negatively correlated with helmet wearing for cyclists, HEL ($r = -0.443^{**}$) but not with HEC ($r = -0.138$, $p > 0.05$) or HEP ($r = -0.107$, $p > 0.05$).

For the measures ZEN (zero alcohol for novice drivers), HEC (helmets for children cycling) and HEP (helmets for PTWs) there is no strong relationship between the extent and effectiveness of traffic law enforcement and the opposition against measures in those areas. Part of the explanation is probably that it concerns measures for which the support is already (very) high amongst the large majority of the population, and/or because the measure is already implemented (and 'accepted') in several countries (HEC and HEP in particular).

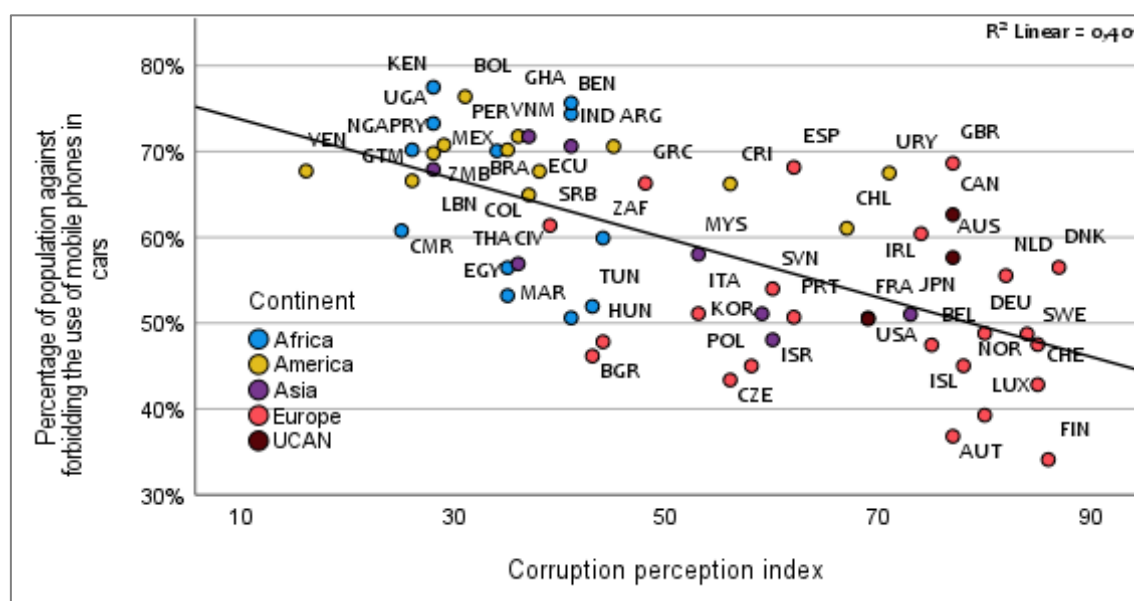
Table 37 shows how the support for policy measures is related to indicators on the political system (only significant correlations are shown). It can easily be seen that the more democratic a society, the more critical it is and the more it opposes freedom restricting measures (a high value on the corruption perception means a low level of corruption). Figure 32 illustrates this for the association between the perceived level of corruption and public support for NMP (forbidding mobile phones in cars). In European countries, which score better on corruption, the support for NMP tends to be lower.

Table 37. Correlations between support for measures and political indicators

	Democracy Index	V-Dem Index	Government effectiveness	Corruption perception
Zero alcohol novice drivers			-0,372**	-0,360**
Zero alcohol all drivers	-0,545**	-0,520**	-0,722**	-0,728**
Install ISA system	-0,785**	-0,711**	-0,880**	-0,902**
Install Speed Warning signs	-0,793**	-0,727**	-0,895**	-0,906**
Seatbelt reminder all seats	-0,536**	-0,487**	-0,690**	-0,692**
All cyclists wear helmet	-0,354**	-0,301*	-0,647**	-0,593**
Children cyclists wear helmet			-0,321*	
Cyclists wear reflective material			-0,296*	
PTW wear reflective material			-0,345*	-0,306*
No use mobile phones in cars	-0,469**	-0,415**	-0,641**	-0,633**
No use headphones by pedestrians	-0,617**	-0,589**	-0,687**	-0,726**
No use headphones by cyclists	-0,332*		-0,450**	-0,493**

Data sources: ESRA, EIA, V-DEMS, World Bank, Transparency International

Figure 32. Perception of corruption by forbidding use of mobile phones in cars



Data sources: ESRA (measure), Transparency International (corruption)

4.4.4 Association with risky behaviour

It seems plausible that drivers who do not adhere to traffic rules will tend to oppose new and stricter road safety measures; in an earlier report I have shown that this is indeed the case within countries (Van den Berghe, Sgarra, et al., 2020). But do these associations also hold when comparing countries? In other words, if the percentage of people with a particular risky behaviour (e.g. speeding) is higher in a country, will the opposition against a measure limiting that behaviour (e.g. ISA) also be stronger? For speeding and wearing a cycle helmet, this is indeed the case: the correlations at national level are very strong and negative (see Table 38).

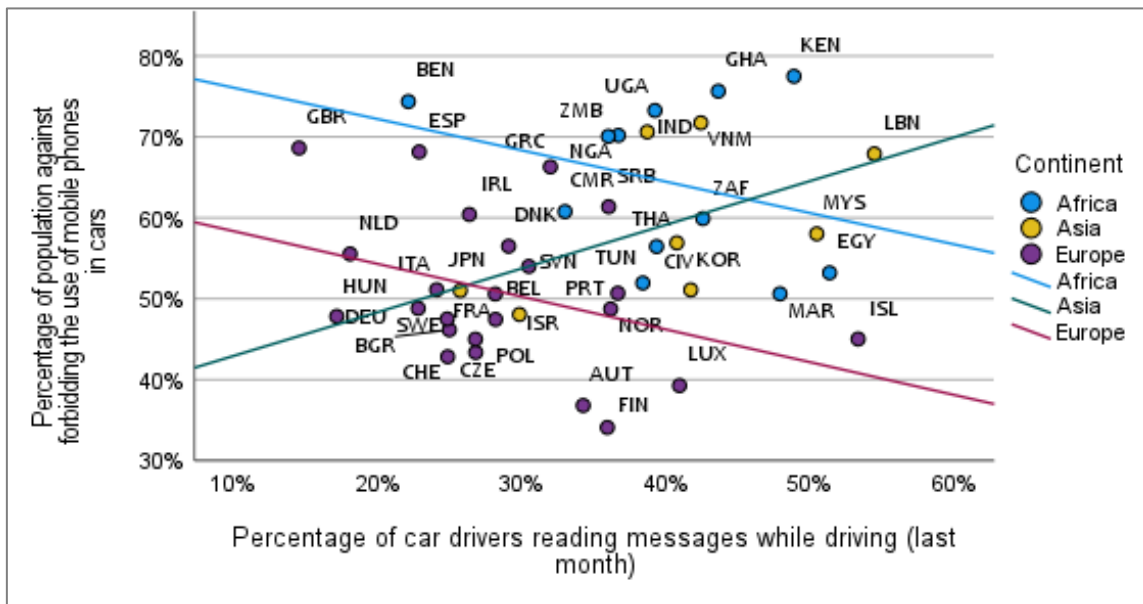
Table 38: Correlations between self-reported risky behaviour and support for measures, measured at country level (48 countries)

Self-reported risky behaviour (at least once last 30 days)	Correlation	Support for policy measure
Driving while being above the BAC limit for alcohol	-0.227	Zero alcohol for all drivers
Speeding outside built-up areas (except motorways)	-0.787**	Install an ISA system
Read a text message while driving	0.163	No use of mobile phones in cars
Ride a bicycle without a helmet	-0.635**	All cyclists wearing helmets

Data source: ESRA

For DUI and distraction the correlations at national level are not significant; the correlation is even positive for distraction. I found for Europe and Africa the ‘expected’ negative correlations with distraction ($r = -0.366$ and $r = -0.305$ respectively), but the opposite for the Asian countries within ESRA2 ($r = 0.544$). None of these correlations is significant at the $p < 0.05$ level, but at least they show that the relationship is different. The differences between the three continents is illustrated by the fit lines in Figure 33.

Figure 33. Support for forbidding use of mobile phones by reading a text message while driving



Data source: ESRA

A complementary finding is that the correlation between the percentage of rear passengers wearing a seatbelt (WHO value) and the percentage of the population supporting an obligation to have seatbelt reminders for all passengers is strongly negative ($r = -0.542$, $p = 0.002$, $N=31$).

4.4.5 Association with subjective safety

If road users feel safe on the road one may expect that they would be less supportive of additional measures to improve safety even more. Table 39 and Table 40 show the correlations between the subjective safety feeling of different road users with measures that are directly related to that travel mode. For ALC, ZEN, ZER, NMP, and HEL, 60 countries are included; but the correlations are similar when only 48 countries are used (as for the other measures). These tables illustrate the general negative association between subjective safety of road users in a country and their support for new measures. Two exceptions can be noted: the subjective safety of pedestrians is not

related to high support for RFL (wearing reflecting clothing in the dark); and the subjective safety of car occupants is not related to ZEN (zero tolerance for DUI of alcohol by novice drivers).

Table 39: Correlations between subjective safety (SS) of car drivers and car passengers, and support for particular measures (48-60 countries)

	ALC	ZEN	ZER	ISA	SWS	NMP	SRE
SS Car driver	-0,372**	-0.151	-0,495**	-0,632**	-0,594**	-0,309*	-0,355*
SS Car passenger	-0.232	-0.091	-0,403**	-0,412**	-0,326*	-0,358**	-0.200

Data source: ESRA

Table 40: Correlations between subjective safety (SS) of pedestrians, cyclists and PTW riders and support for particular measures (48-60 countries)

	No headphones or earbuds	Helmet wearing compulsory	Reflective clothing compulsory
SS as a pedestrian	-0,339*		0.011
SS as a cyclist	-0.259	-0,619** (all) -0,445** (children)	-0,449**
SS as a moped rider		-0,452**	-0,536**
SS as a motorcycle rider		-0,395**	-0,425**

Data source: ESRA

4.5 The relation between national culture, development level, fatality rate and support for measures

4.5.1 The relation between national culture and support for measures

Table 41 shows the correlation between the percentage of the population supporting the fifteen measures and the cultural dimensions Independent and Confucianist. For eight measures there is a strong negative correlation with Independent: two measures related to alcohol (ALC and ZER), the two speeding related measures (ISA and SWS), SRE, HEL and two distraction related measures (NMP, NHC). The stronger opposition in Independent countries is not unexpected, given the characteristics of this dimension that were discussed in Section 2.5.3. Thus, the more autonomous thinking in a society, the higher the opposition against measures that restrict freedom of action.

The correlations of Independent with the six other measures is negative but not statistically significant at the $p < 0.05$ level. These measures include the three ones concerning reflective clothing, zero alcohol for novice drivers and helmet wearing by

children cyclists and PTWs. At least for these measures national culture is not a good predictor for the level of support. I recall that there are no significant correlations between support for these measures and the fatality rate and economic indicators neither.

Table 41. Correlations between support for policy measures and the cultural dimensions Independent and Confucianist

	Measure	N	Corr. with Independent	Corr. with Confucianist
ALC	Alcohol interlock for recidivists	41	-0,503**	-0,321*
ZEN	Zero alcohol novice drivers	40	-0.192	-0,396*
ZER	Zero alcohol all drivers	41	-0,673**	-0,519**
ISA	Install ISA system	35	-0,801**	-0,403*
SWS	Install Speed Warning signs	34	-0,847**	-0,576**
SRE	Seatbelt reminder all seats	34	-0,612**	-0,500**
HEL	All cyclists wear helmet	41	-0,576**	-0,691**
HEC	Children cyclists wear helmet	34	-0.172	-0,524**
HEP	PTW wear helmet	34	-0.177	-0.286
RFL	Pedestrians wear reflective material	35	-0.026	-0.051
RFC	Cyclists wear reflective material	34	-0.211	-0,379*
RFP	PTW wear reflective material	34	-0.198	-0,393*
NMP	No use mobile phones in cars	40	-0,584**	-0,520**
NHP	No use headphones by pedestrians	34	-0,740**	-0,434*
NHC	No use headphones by cyclists	34	-0,362*	-0.234

Data sources: ESRA (measures), Hofstede Insights (culture)

Twelve measures are moderately or strongly negatively correlated with Confucianist. For most of these, the strength of the association is weaker than with the Independent dimension, except when it comes to measures which could be perceived as paternalistic, such as having to wear helmets or reflective clothing.

Overall, these results illustrate that for many types of governmental interventions in road safety, dimensions of national culture can be a strong predictor of the public support for these measures. In particular the Independent dimension is often a strong predictor of resistance to policy measures. Yet, for other interventions, national culture does not appear to be linked to the level of support.

4.5.2 The relation between culture, fatality rate and support for measures

Sections 4.1.3 and 4.2.2 showed that both national culture and the crash fatality rate are linked to the development level of countries. In Sections 4.4.1 and 4.5.1 it was shown that both the fatality rate and national culture were also associated with the level of public support for particular policy measures. Given these relationships, one might expect the strength of the association between national culture and support for policy measures to diminish after controlling for fatality rate. Table 42 shows the correlations of the Independent and Confucianist dimensions with support for measures, when controlled for fatality rate.

Table 42. Correlation between the cultural dimensions and support for measures, without and with controlling for fatality rate

	Correlation Independent and support for measures	Correlation after controlling for fatality rate	Correlation Confucianist and support for measures	Correlation after controlling for fatality rate
Alcohol interlock for recidivists	-0,503**	-0.221	-0,321*	-0.143
Zero alcohol novice drivers			-0,396*	-0.363*
Zero alcohol all drivers	-0,673**	-0.487**	-0,519**	-0.387*
Install ISA system	-0,801**	-0.544**	-0,403*	-0.151
Install Speed Warning signs	-0,847**	-0.636**	-0,576**	-0.444**
Seatbelt reminder all seats	-0,612**	-0.210	-0,500**	-0.327
All cyclists wear helmet	-0,576**	-0.312*	-0,691**	-0.611**
Children cyclists wear helmet			-0,524**	-0.517**
Cyclists wear reflective material			-0,379*	-0.359*
PTW wear reflective material			-0,393*	-0.378*
No use mobile phones in cars	-0,584**	-0.259	-0,520**	-0.373*
No use headphones by pedestrians	-0,740**	-0.433*	-0,434*	-0.214
No use headphones by cyclists	-0,362*	-0.155		

Data sources: ESRA (measures), Hofstede Insights (culture)

The strength of association indeed decreases, but for several measures the partial correlations are still high and statistically significant. For the Independent dimension the typical decrease is about 0.3, for Confucianist it is smaller. The findings on the partial correlations mean that when comparing countries with similar fatality rates, the opposition to policy measures, in particular those that restrain individuals' behaviours, will often be higher in the more Independent and Confucianist countries.

4.5.3 Relation between culture, development and support for measures

It can be expected that the strength of association between culture and support for measures will decrease when controlled for particular socioeconomic indicators, given the strong association of culture with economic development (Section 4.2.2). The data in Table 43 support this assumption.

Table 43. Correlation between the cultural dimensions and support for measures, without and after controlling for socioeconomic indicators

	Correlation with Independent after controlling for				
	/	GNI	HDI	Inequality	Gender Inequality
Alcohol interlock for recidivists	-0.503**	0.029	0.045	-0.108	-0.014
Zero alcohol all drivers	-0.673**	-0.218	-0.266	-0.308*	-0.213
Install ISA system	-0.801**	-0.419*	-0.238	-0.424*	-0.397*
Install Speed Warning signs	-0.847**	-0.587**	-0.392*	-0.546**	-0.480**
Seatbelt reminder all seats	-0.612**	-0.191	0.056	-0.069	-0.073
All cyclists wear helmet	-0.576**	-0.252	-0.201	-0.125	-0.062
No use mobile phones in cars	-0.584**	-0.151	-0.105	-0.182	-0.049
No use headphones by pedestrians	-0.744**	-0.422*	-0.270	-0.493**	-0.421*
No use headphones by cyclists	-0.362*	-0.017	0.100	-0.101	-0.055
	Correlation with Confucianist after controlling for				
	/	GNI	HDI	Inequality	Gender Inequality
Alcohol interlock for recidivists	-0,321*	0.085	0.076	0.025	0.122
Zero alcohol novice drivers	-0,396*	-0.237	-0.244	-0.253	-0.219
Zero alcohol all drivers	-0,519**	-0.184	-0.190	-0.191	-0.090
Install ISA system	-0,403*	0.253	0.293	0.180	0.293
Install Speed Warning signs	-0,576**	-0.226	-0.113	-0.169	-0.035
Seatbelt reminder all seats	-0,500**	-0.204	-0.098	-0.115	-0.069
All cyclists wear helmet	-0,691**	-0.547**	-0.526**	-0.494**	-0.453**
Children cyclists wear helmet	-0,524**	-0.502**	-0.485**	-0.449**	-0.497**
Cyclists wear reflective material	-0,379*	-0.328	-0.327	-0.326	-0.336
PTW wear reflective material	-0,393*	-0.323	-0.326	-0.337	-0.326
No use mobile phones in cars	-0,520**	-0.244	-0.219	-0.231	-0.130
No use headphones by pedestrians	-0,434*	-0.063	0.053	-0.065	0.051

Data sources: ESRA (measures), Hofstede Insights (culture), UN (socioeconomic indicators)

Most zero-order correlations lose their strength and are no longer statistically significant, although they stay negative. For Independent, the measures ISA, SWS and

NHP are most 'robust' for controlling for the socioeconomic indicators, with partial correlations being statistically significant. For Confucianist only for HEL and HEC the partial correlations are statistically significant. For ISA the correlation becomes positive (but not statistically significant) after controlling for socioeconomic indicators. This indicates a certain tendency, that in countries with a similar level of development, the more Confucian ones will tend to support ISA more. An example is the difference between Greece being more Confucianist than Portugal (51.5 versus 37.1) but also more supportive of ISA (79.9% versus 65.1%).

4.6 Summary

This chapter discusses the relationship between support for policy measures, national culture, road safety performance and a range of socioeconomic and mobility related indicators at national level. The analyses of the fatality rates and the operationalisation of national culture showed that these phenomena are strongly associated with human development, and, to a lesser extent, with mobility and road safety indicators. Key findings include the differences between HICs and LMICs in some associations between road safety performance and other phenomena, the lower fatality rates in more democratic and individualistic countries, and the very strong relationship between the cultural dimension 'Independent' and indicators for human development and equality.

The findings on road safety performance and national culture provided the context for an in-depth analysis of the level of support for the fifteen policy measures that were included in the ESRA2 survey. In general, people of LMICs are more supportive of policy measures in road safety than those of HICs. Low fatality rates and the feeling that using the roads are safe are factors associated with lower support for additional measures in road safety. The analyses also illustrate that for several types of road safety measures, national culture can be a good predictor of the public support for them. The Independent dimension is often a strong predictor of resistance to policy measures, in particular in the field of speeding. Yet, for some measures, national culture does not appear to be linked to the level of support.

“Fairness for me is about applying opportunities equally and ensuring that the allocation of resources or attention is distributed in such a way that allows equal opportunity and inclusivity.”

5. Results from the interviews

5.1 Profile of the interviewees and characteristics of the interviews

This chapter presents the main findings from the analysis of 40 interviews with experts in road safety in the UK, France, Austria, Sweden and Greece. In each country I interviewed eight people. The distribution and characteristics of the interviewees can be summarized as follows:

- about half of the interviewees (19/40) worked for a public authority (11) or were a politician (8); eleven worked in a research institute and five in a university
- one fourth of the interviewees (10/40) was or had been a politician
- on average, the interviewees had been 21 years involved in road safety
- about half of the interviewees (21/40) had a degree in Engineering or Transport
- one third of the interviewees was female (13/40)
- the median age of the interviewees was 55 years
- over 80% of the interviewees (34/40) had a master degree or higher; 50% had a PhD degree.

For certain analyses I used a dichotomized variable ('Public') grouping the interviewees working in ministries, local authorities and the Parliament – in total 19 out of 40. Please note that most of the 'Not Public' interviewees had been or were still involved in policy-making on road safety (e.g. contributing to new legislation). And several of the people in the 'Public' group had an academic background.

The interviews were conducted between March 2019 and April 2020. Two-thirds of the interviews (26/40) were conducted face-to-face, the other ones by telephone or video call. The lowest number of in-person interviews was in France (3 out of 8) and the highest in the UK (7 out of 8). I did not notice any substantial difference between the nature and patterns of responses of those interviewed face-to-face, by telephone or video call. This is in line with observations from Bryman (2012, p.488) stating *"There is some evidence that there are few differences in the kind of response that one gets when asking questions by telephone rather than in person."* The average length of the interviews was 43 minutes; the length was not related to the interview mode. The interviews with French, British and Swedish interviewees were on average longer (51, 48 and 45 minutes respectively) than with Austrian (36 minutes) and Greek interviewees (35 minutes). All interviews with British, Swedish and Greek interviewees were conducted in English and the eight interviews with French interviewees in French; one interview in Austria was in English and the other ones were in German.

5.2 Classification scheme developed

I developed an original scheme for classifying the arguments used by the interviewees for assessing the fairness of measures and for supporting or opposing the measures. The scheme was developed in such a way that it could also be used for categorising the opinions on the meaning of fairness and the meaning of fairness in policy. The final version of the scheme is displayed in Table 44.

The left column includes dimensions of fairness and arguments for supporting measures; the right column includes dimensions of unfairness and negative arguments. There are five 'argument areas' with 'positive/supportive' arguments and five with 'negative/opposing' arguments. Each positive argument area has a mirror area on the negative side – and this is also the case for most of the specific arguments within the argument areas. As an example, the mirror area of the argument area 'Equity' is 'Discrimination' and the mirror argument of the argument 'Strong, clear message' is 'Wrong message'. The 'Pro' and 'Contra' areas are not perfect mirrors. 'Equity' has several negative mirror arguments; this reflects the fact that when someone states that something is equitable it covers all these forms of non-discrimination. Also, some interviewees used the arguments of 'Preserving human liberties', without specifying which liberties.

In order to facilitate analysis, each argument was given a code, the first character of which was either P or C, referring to 'Pro' and 'Contra'; the second character in the code refers to the area of the argument (e.g. 'L' for 'Preserving Human liberties'). In the tables and graphs in this chapter I will not use these codes. When conducting the coding process, I did not make the distinction between P-R1 and P-R2 and labelled these together as 'Effective' (P-R0). Similarly, I have taken P-F1 and P-F2 together and labelled as 'Easy to implement/enforce' (P-F0) and 'C-P1' and 'C-P2' together as 'Complex, difficult to implement/enforce' (C-P0). I had advanced already very much in the coding when I realised that splitting these three arguments into two different ones might have been useful; but at that stage recoding the arguments would have been quite resource-intensive, so I did not pursue that recoding.

Many labels in this table may appear a bit cryptic at first. Therefore the next section briefly discusses what should be understood by each label, when referring to arguments used by interviewees. This is subsequently illustrated with verbatim quotes. In this thesis, French and German quotes were translated into English; I sometimes also corrected grammatical errors.

Table 44. Classification of arguments for supporting measures and statements about the meaning of fairness

Equity	Discrimination
P-E1. Equity (general)	C-D1. Discrimination general C-D2. Discrimination by road user C-D3. Discrimination by age C-D4. Discrimination by gender C-D5. Discrimination by wealth C-D6. Discrimination by group
P-E2. Difficult to cheat/evade/not comply	C-D7. Easy to cheat/evade/not comply
Preserving human liberties	Restricting human liberties
P-L1. Proportionate, right, just	C-H1. Disproportionate
P-L2. Preserving liberties (general)	
P-L3. Preserving freedom	C-H2. Restricting freedom
P-L4. Preserving mobility	C-H3. Restricting mobility
P-L5. Preserving joy in life	C-H4. Reducing joy in life
P-L6. Assuming responsibility	C-H5. Reducing responsibility
P-L7. Avoiding burden	C-H6. Increasing burden
P-L8. Protecting privacy	C-H7. Reducing privacy
P-L9. Limited costs for people	C-H8. Expensive for people
Relevance	Limited added value
P-R1. Reducing/avoiding harm	C-V1. Ineffective
P-R2. Effective in meeting its purpose	
P-R3. Addresses an important problem	C-V2. Other problems are more important
P-R4. Good solution to the problem	C-V3. Other measures are better
P-R5. Gives the right message	C-V4. Gives the wrong message
P-R6. Positive side effects	C-V5. Negative side effects
Feasibility	Practical obstacles
P-F1. Easy to implement	C-P1. Complex, difficult to implement
P-F2. Easy to enforce	C-P2. Complex, difficult to enforce
P-F3. Efficient for society	C-P3. High costs for society
Political arguments	Political considerations
P-P1. Public support	C-C1. Public opposition
P-P2. Regulation is useful	C-C2. Regulation is not the right approach
P-P3. Transparency	C-C3. Lack of transparency
P-P4. In agreement with the law	C-C4. Against the law

5.3 Arguments for supporting measures and perceived fairness

5.3.1 Equity

The argument area ‘Equity’ covers two specific arguments:

- ‘Equity (general)’: people consider that the measure is equitable and not discriminatory for any person or group of people
- ‘Difficult to cheat/evade/not comply’: people believe that it will not be easy to neglect or to not comply with the measure, without being sanctioned.

Quotes in relation to ‘Equity’⁸

(PAY) *“Because the punishment will be the same for all.” (Sweden, Official, 27)*

(PAY) *“This is a fairness question. You should not be able to sort of pay yourself out when breaking the law.” (Sweden, Researcher, 21)*

(30K) *“Because it actually affects everybody. Everybody is a user of the road. There are pedestrian and especially vulnerable users.” (Greece, Academic, 10)*

(30K) *“The urban space belongs to the soft modes of travel and not to the motorised modes of travel.” (France, Researcher, 15)*

(ALC) *“It’s fair. It works for everyone.” (Greece, Parliamentarian, 39)*

(ALC) *“You cannot bypass this.” (Greece, Academic, 31)*

5.3.2 Preserving human liberties

The argument area ‘Preserving human liberties’ covers the following arguments:

- ‘Proportionate, right, just’: the measure is the right thing to do and strikes a balance between its intended benefits and likely drawbacks
- ‘Preserving liberties (general)’: the measure will not have a negative impact on the range of freedoms and rights of people
- ‘Preserving freedom’: people think that freedom will not be reduced
- ‘Preserving mobility’: the measure is seen to preserve the freedom to move
- ‘Preserving joy in life’: people don’t think that the measure would have a negative effect on their enjoyment in life
- ‘Assuming responsibility’: the measure requires that people take responsibility for their behaviour and act responsibly
- ‘Avoiding burden’: the measure is not expected to lead to more inconveniency or encumbrance for people
- ‘Protecting privacy’: people don’t feel that the measure will reduce their privacy
- ‘Limited costs for people’: the measure will have hardly any financial implications for people.

⁸ The codes between brackets (PAY, 30K, etc.) refer to the measures discussed – see Section 3.2.3.

Quotes in relation to ‘Preserving human liberties’

- (PAY) *“If you’ve committed a serious offense, it should hurt you in your pocket.” (UK, Official, 8)*
- (PAY) *“The deterrent effect only makes sense if there is a minimum ratio between the amount of the fine and the income of the individuals.” (France, Researcher, 13)*
- (30K) *“That appears to me something reasonable.” (France, Official, 26)*
- (ALC) *“If you buy a car it is expensive anyway. So you can take away other things in the car and you put this instead.” (Sweden, Manager, 25)*
- (HEL) *“It is indeed irresponsible [not to wear a helmet].” (France, Researcher, 15)*
- (RFL) *“You are obligated to make your situation and others’ situations safe.” (Sweden, Manager, 28)*

5.3.3 Relevance

The argument area ‘Relevance’ covers the following arguments:

- *‘Reducing/avoiding harm’*: the measure is believed to lead to a (strong) reduction in the number of injuries and fatalities caused by road crashes
- *‘Effective in meeting its purpose’*: the measure is believed to have the intended impact (e.g. change in behaviour)
- *‘Addresses an important problem’*: given the size of the problem (e.g. drunk driving) people support any measure that is believed to reduce this problem
- *‘Good solution to the problem’*: compared to other measures that can address a problem (e.g. speeding), this particular measure (e.g. ISA) is seen as an appropriate / easy / cheap way of solving it or mitigating its consequences
- *‘Gives the right message’*: by implementing the measure (e.g. ZER) you give a clear message about a risky behaviour (e.g. drinking and driving don’t go together) or situation
- *‘Positive side effects’*: in addition to the prime intended effect (e.g. reducing injuries) the measure has positive effects (e.g. making cities more liveable).

Quotes in relation to ‘Relevance’

- (HEL) *“It would reduce injuries.” (Austria, Researcher, 23)*
- (HEL) *“I had a cycling injury. I had the concussion with memory loss, but because I had a helmet, I didn’t have a skull fracture. And, if it didn’t save my life and it definitely reduced my rehabilitation time.” (Sweden, Academic, 35)*
- (30K) *“If you share the space with 30 kilometres per hour, you can actually be sure that even in an accident, no one will be seriously injured or even killed.” (Sweden, Manager, 28)*
- (30K) *“It would improve the environment for cyclists and pedestrians.” (UK, Official, 8)*
- (ALC) *“We should assist these people who have weaknesses to stop driving when drunk.” (Greece, Academic, 18)*
- (ALC) *“This is fair because it reflects the fact that there is very dangerous and that we want to prevent it in the future.” (France, Researcher, 13)*
- (ISA) *“It would significantly reduce fatal injuries on the road.” (UK, Official, 37)*

(PAY) *"Because you make rich people behave better."* (Greece, Academic, 18)

(PAY) *"Because traffic fines can only be effective if they are perceived as such. Not as pocket money."* (Austria, Official, 1)

(RFL) *"Because it works"* (UK, Researcher, 20)

(SCR) *"I don't want people driving on the road who can't see what [happens]."*
(UK, Parliamentarian, 5)

(ZER) *"Driving and alcohol just don't fit."* (Austria, Consultant, 16)

(ZER) *"It would send a strong message in terms of the level of risk that is produced from use of alcohol."* (UK, Official, 37)

5.3.4 Feasibility

The argument area 'Feasibility' covers three arguments:

- *'Easy to implement'*: it is quite straightforward and does not take a lot of time or resources to implement the measure
- *'Easy to enforce'*: it will be straightforward and not resource-intensive to check compliance with the measure and sanction people in case of non-compliance
- *'Efficient for society'*: the measure would not require a lot of (public) resources, in particular in relation to the expected benefits.

Quotes in relation to 'Feasibility'

(30K) *"Because it is already practised in some cities in Austria and it works."* (Austria, Official, 1)

(HEL) *"It is such an easy thing to do."* (Sweden, Official, 29)

(HEL) *"It is very good for the community, because when you have a fatality, it's mainly on the head and it raises a lot of problems for the community."* (Greece, Academic, 31)

(RFL) *"It's not a difficult exercise."* (Austria, Consultant, 34)

5.3.5 Political arguments

The argument area 'Political arguments' covers the following arguments:

- *'Public support'*: limited adverse reactions are to be expected, because there is strong public support for the measure
- *'Regulation is useful'*: without regulation, the situation would not change (e.g. people will continue to engage in risky behaviour)
- *'Transparency'*: it is clear what the measure will do, why it is needed, how it came about and why it is formulated the way it is
- *'In agreement with the law'*: the measure (e.g. ISA) would help to respect existing laws or rules (e.g. speed limits).

Quotes in relation to 'Political arguments'

(RFL) "Only when it becomes a law does it become a [political] issue." (Austria, Official, 1)

(HEL) "It would oblige myself to actually always wear a helmet." (Austria, Consultant, 16)

(ISA) "It's essentially sort of a way of enforcing a law" (Sweden, Academic, 35)

(SCR) "Because I think it's ridiculous not to have some kind of law." (Sweden, Researcher, 21)

5.4 Arguments for opposing measures and perceived unfairness

5.4.1 Discrimination

The argument area 'Discrimination' covers the following arguments:

- 'Discrimination (general)': people feel that the measure would discriminate particular people or several groups of people, without specifying which one(s)
- 'Discrimination by road user': one or more road users types (e.g. pedestrians) is felt to be treated less favourable than other road users (e.g. car drivers)
- 'Discrimination by age': the fact that the effects of the measure differ between age groups is seen as unfair
- 'Discrimination by gender': the difference in treatment of, or effects for, men and women is not seen to be justifiable
- 'Discrimination by wealth': it is not considered acceptable that richer people benefit more than poor people from the measure (or vice-versa)
- 'Discrimination by group': a group of people (not covered by the previous groups, e.g. ethnic minority, people in rural areas) is seen to benefit less or even have only negative effects if the measure is implemented
- 'Easy to cheat/evade/not comply': many people will find ways to avoid to have to abide by the rules or to avoid sanctions when non-complying with the regulation.

Quotes in relation to 'Discrimination'

(PAY) "If only rich people are receiving fines, then it can be an extreme implementation. Totally unfair." (Greece, Academic, 18)

(SCR) "If you assess risk on age basis, you would restrict the young drivers, not old drivers." (UK, Manager, 11)

(SCR) "It singles out a group." (Sweden, Researcher, 4)

(ALC) "It's not fair because the expense is going to be high for those on low incomes." (France, Researcher, 13)

(ZER) "A norm would be created that would be violated on a massive scale." (France, Official, 14)

5.4.2 Restricting human liberties

The argument area 'Restricting human liberties' covers the following arguments:

- 'Disproportionate': the expected drawbacks and restrictions imposed by the measure are seen as excessive and not in proportion to the expected benefits
- 'Restricting freedom': the measure is perceived as a (strong) restriction of individuals' freedom of decision on how to act or think
- 'Restricting mobility': the measure is perceived as a (strong) restriction of how, where and/or when to move around
- 'Reducing joy in life': it is felt that the measure would make certain activities (e.g. driving) less enjoyable or even stop them (e.g. riding a bike)
- 'Reducing responsibility': the measure is expected to move away control and responsibility away from the individual
- 'Increasing burden': the implementation of the measure is seen to create annoyance, practical problems, bureaucracy, inconveniency, etc.
- 'Reducing privacy': the measure is seen as an unacceptable invasion in people's private sphere
- 'Expensive for people': the measure will be expensive for people (e.g. ALC), leading to reducing resources needed for other purposes; this may also create discrimination towards poorer people.

Quotes in relation to 'Restricting human liberties'

(30K) "This should be vocalized where it makes sense and not on every day of the week."
(Sweden, Researcher, 21)

(RFL) "It's unfair to require pedestrians to dress up like a traffic warden when they're just out doing their normal or walking." (UK, Manager, 11)

(RFL) "Obliging people to wear any signs is highly problematic in Austria." (Austria, Official, 33)

(ALC) "It seems a bit nanny state." (UK, Official, 8)

(ALC) "In order for a sanction to be effective, it must be gradual, and the severity of the gradation must be in line with the seriousness of the act." (France, Researcher, 24)

(ZER) "To have an unrealistic demand like 0.0, sooner or later you will get into areas where you lose the sense of proportion." (Austria, Researcher, 9)

(HEL) "There is a personal interference with my personal rights." (Austria, Consultant, 34)

(ISA) "People would feel that their personal rights are being infringed." (Austria, Researcher, 9)

(ISA) "I would be against it because we don't need to know where people are driving."
(France, Researcher, 24)

5.4.3 Limited added value

The argument area 'Limited added value' covers the following arguments:

- 'Ineffective': people don't believe that the measure will reduce road crashes or other intended benefits
- 'Other problems are more important': people think that addressing this particular problem (e.g. visibility of pedestrians in the dark) should have low priority compared to other problems (e.g. dangerous footpaths)
- 'Other measures are better': to address a problem (e.g. cyclist injuries) other measures are felt to be more appropriate (e.g. separate cycle lanes)
- 'Gives the wrong message': implementing the measure would make certain views more acceptable (e.g. that traffic infractions can be traded in for money), or could be interpreted as blaming the victim
- 'Negative side effects': (strong) negative effects might be expected such as changing behaviour, cheating or reduced use of active travel modes.

Quotes in relation to 'Limited added value'

- (30K) "Just changing the speed limit doesn't change the speed." (UK, Manager, 11)
- (30K) "Because I think you can hinder a lot of this stuff anyway by making roundabouts." (Sweden, Parliamentarian, 19)
- (HEL) "There's no evidence that it improves safety because it also reduces the numbers of cycling cyclists." (UK, Official, 8)
- (HEL) "The helmet is practically useless when you are at 80-90 km/h" (France, Researcher, 6)
- (PAY) "The level of the fine is probably less important than all the other things like the immediacy and the certainty of being caught". (UK, Researcher, 20)
- (PAY) "There are other solutions and the demerit points system is a proven solution." (France, Researcher, 15)
- (SCR) "Basically the evidence on this is that actually it doesn't increase safety." (UK, Official, 8)
- (ZER) "The alcohol issue is not about 0.4 or 0.3; the alcohol issue is about doses beyond 0.5." (France, Researcher, 13)
- (ALC) "You achieve more effect with awareness raising than with an alcohol interlock system." (Austria, Official, 1)
- (RFL) "There are ways of doing things other than by law. And this is one example of that." (Sweden, Researcher, 4)
- (RFL) "Because, this is anti the Safe System." (Austria, Consultant, 16)
- (ISA) "I think that is a measure of yesterday. Now we can do geofencing." (Sweden, Parliamentarian, 19)
- (ISA) "But it is a problem that the maximum speed is also not appropriate in certain circumstances." (Austria, Official, 33)

5.4.4 Practical obstacles

The argument area 'Practical obstacles' covers the following arguments:

- 'Complex, difficult to implement': serious technical, financial and/or practical obstacles need to be overcome to implement the measure
- 'Complex, difficult to enforce': it is hardly possible to enforce the measure because of its scale, the required resources or the equipment needed for enforcement
- 'High costs for society': the measure would require considerable (public) resources that would be detrimental for investing in other societal needs.

Quotes in relation to 'Practical obstacles'

(30K) *"It's unrealistic."* (Greece, Academic, 17)

(30K) *"The only issue that I see that is the way and the attitude of the police officers who have to actually deal with this kind of enforcement."* (Greece, Academic, 38)

(ALC) *"There are a lot of technical problems and we have to be in a world that this always works."* (Sweden, Manager, 25)

(HEL) *"We have many shared bikes. That was an obstacle to making it compulsory to wear a helmet, because you would have to imagine that the helmet would have to be worn as much on the electric scooter as on the bikes."* (France, Official, 14)

(ISA) *"One thing is to have the right speed limits. Another one is that the speed limits are on the digital map, and the third one is the GPS communication. So technically it is still quite difficult."* (Greece, Academic, 18)

(PAY) *"The complexity of it is very great, especially when foreign drivers [make a traffic offence]"* (France, Official, 14)

(RFL) *"Appropriate sanctioning and monitoring would be very difficult to implement."* (Austria, Official, 1)

(SCR) *"In many parts of the territory, which is very vast, there is a lack of doctors."* (France, Official, 14)

(ZER) *"It is an unrealistic measure. Something like this could only be introduced gradually over a long period of time."* (Austria, Official, 33)

5.4.5 Political considerations

The argument area 'Political considerations' covers the following arguments:

- 'Public opposition': strong and broad resistance from the population is expected if politicians intend to implement the measure
- 'Regulation is not the right approach': there are better ways to change a situation than through regulation (e.g. nudging)
- 'Lack of transparency': it is uncertain what the measure will do, why it is needed and why it is formulated the way it is
- 'Against the law': this measure would violate or be inconsistent with other laws, the subsidiarity principle or the constitution.

Quotes in relation to 'Political considerations'

(30K) "Public opposition would be quite high." (Greece, Researcher, 3)

(30K) "I don't like laws and legislation when you don't need them. The 20 mile limit is spreading like wildfire. I don't think we're going to need any legislation on it."
(UK, Parliamentarian, 5)

(HEL) "So it's really coming up a long way anyhow." (Sweden, Official, 27)

(ZER) "It is so culturally interconnected in our country that it wouldn't work."
(Austria, Parliamentarian, 2)

(RFL) "I don't think that a law should regulate this." (Sweden, Researcher, 4)

5.5 The fairness concept in the eyes of the interviewees

5.5.1 Perception of the meaning of fairness

Table 45 shows the distribution of the meanings of fairness given by the interviewees, grouped by the five areas of the classification scheme. The total is 39 because one interviewee did not answer the question. As some interviewees gave more than one perspective on fairness, two figures are given: (1) 'Initial view', based on the first, spontaneous reaction of the interview; and (2) 'All perspectives', based on all the areas interviewees had referred to. Table 45 shows that two-third of the interviewees spontaneously ('initial view') associated fairness with equity. When also additional meanings are accounted for, almost 80% of the interviewees (31/40) referred to the area 'Equity'; over one third (15/40) referred to the area 'Preserving human liberties'. The three other areas account together for less than 15% of the meanings. Thus, in the minds of the interviewees fairness is very close to equity (or the absence of discrimination) complemented somewhat with the preservation of human liberties.

Table 45. Distribution of the meanings of fairness

	Initial view	All perspectives
Equity	26	31
Preserving human liberties	9	15
Relevance	2	3
Feasibility	1	2
Political arguments	1	3
Number of interviewees	39	39

Figure 34 shows the more specific meanings on fairness given by the interviewees and Table 46 gives examples of what interviewees actually said in response to the question on how they would define 'fairness'. The table only includes the meanings that were

mentioned by at least three interviewees: ‘Equity (general)’, ‘Proportionate, right, just’, ‘Preserving human liberties (general)’, and ‘Effective’.

Figure 34. Perspectives of the interviewees (39) on ‘fairness’

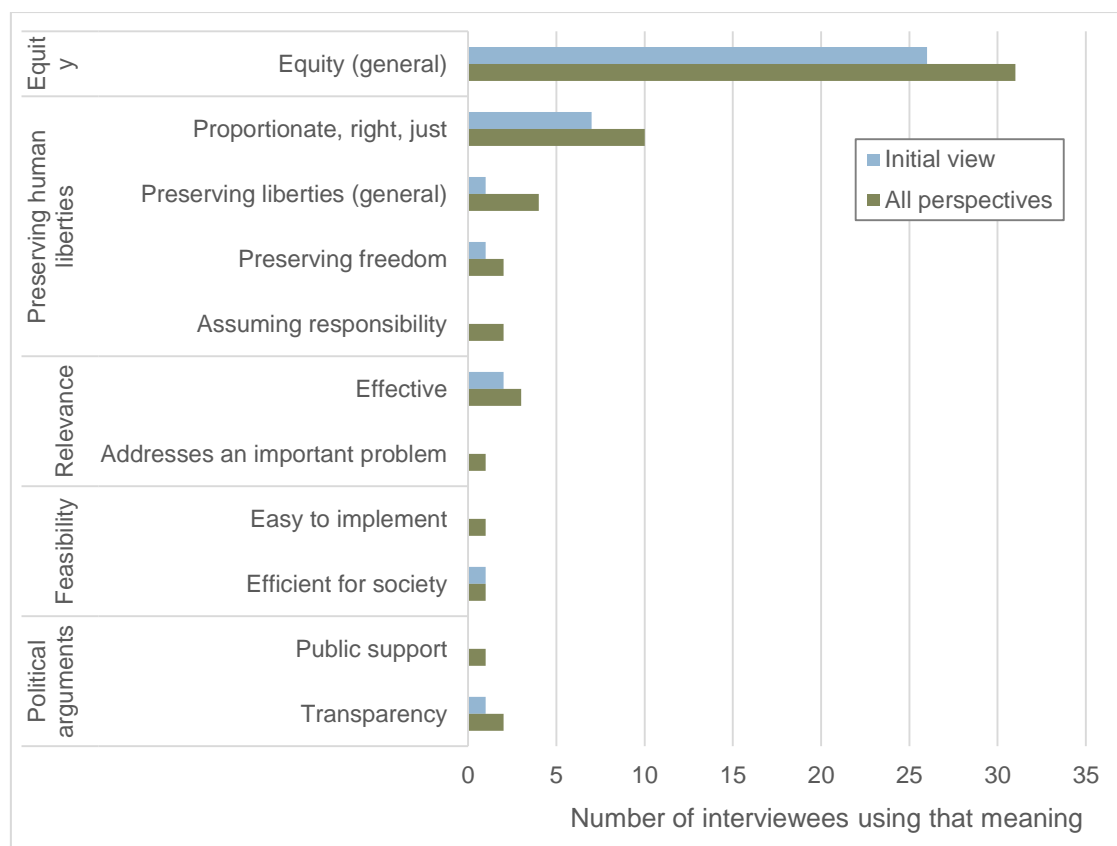


Table 46. Examples of responses to the question on the meaning of fairness

Meaning	Response to the question ‘What is fairness?’
Equity (general)	“When everyone has the same opportunities and access.” (Austria,Parliamentarian,2)
	“That you are not discriminated for any reason.” (Greece, Researcher, 3)
	“There shouldn’t be any have all the profits, and then others bear all the losses” (France, Researcher, 6)
	“That the obligations, the burdens and also the benefits are actually distributed among everyone.” (Austria, Researcher, 9)
	“Equitableness and reasonableness amongst people.” (UK, Manager, 11)
	“Not to let personal opinions influence my decisions and positions” (France, Official, 14)
	“Respecting the needs of other people without neglecting my own needs” (Austria, Consultant, 16)
	“To take into account different aspects so that nobody should be especially hindered or somebody will be able to take great advantage of something.” (Sweden, Parliamentarian, 19)
	“It is about applying opportunities equally and ensuring that the allocation of resources or time or attention is distributed in such a way that allows the equal opportunity and inclusivity. (UK, Official, 37)
	“No discrimination.” (Greece, Academic, 38)

Meaning	Response to the question 'What is fairness?'
Proportionate, right, just	"We need to get as many people as possible to feel part of the benefits and the losses should not be huge compared to the benefits." (France, Researcher, 6)
	"It depends a bit on the neediness." (Austria, Researcher, 9)
	"It's more the question of justice, of equitable measure, being just for everybody." (France, Researcher, 13)
	"Being fair is being right" (Greece, Academic, 17)
	"To be just in relation to inspection, decisions, law enforcement, etc." (France, Researcher, 13)
	"Something is fair if it's reasonable." (Sweden, Official, 27)
Preserving human liberties (general) and freedom	"Sometimes you will have a restriction on your freedom." (UK, Official, 8)
	"To behave in a way that is always decent." (France, Official, 14)
	"The integrity of the person, that the person is sacred and therefore has rights over him/her." (France, Researcher, 24)
	"The [human] attitude." (Austria, Official, 33)
Effective	"If there is a very sensitive issue, it can be attractive and politically and socially acceptable to dedicate too many resources to it. It would make us to neglect something that is also very important." (Greece, Academic, 10)
	"Actions should be based on their proven effectiveness." (France, Researcher, 15)
	"It is good for the community." (Greece, Academic, 31)
	"The extent to which the benefit to society is considered positive." (France, Researcher, 15)
	"It has results." (Greece, Academic, 31)

5.5.2 Perception of the meaning of fairness in policy

I asked the interviewees what "fairness in policy" meant to them, or what a "fair policy" was in their eyes. For the interviews in French, I used both the French terms *politique / mesure équitable* as well as the English term "fair policy". For the interviews in German I used the term *faire Maßnahme*, but sometimes in the discussion I used *angemessene Maßnahme*, which can be translated as 'appropriate measure'. Some interviewees did not make a distinction between 'fairness' and 'fairness in policy'; others interpreted 'fairness in policy' as 'fairness in road safety policy'.

Table 47 shows the distribution of the meanings of 'fairness in policy' as given by the interviewees, grouped by the five areas of the classification scheme. The logic behind the column headings 'Initial view' and 'All perspectives' is the same as in the previous section. Figure 35 shows the distribution of the specific fairness perspectives on 'fairness in policy' given by the interviewees.

Table 47. Distribution of the meanings of fairness in policy

	Initial view	All perspectives
Equity	20	30
Preserving human liberties	3	11
Relevance	12	18
Feasibility	1	2
Political arguments	3	6
<i>Number of interviewees</i>	<i>39</i>	<i>39</i>

Figure 35. Perspectives of the interviewees (39) on 'fairness in policy'

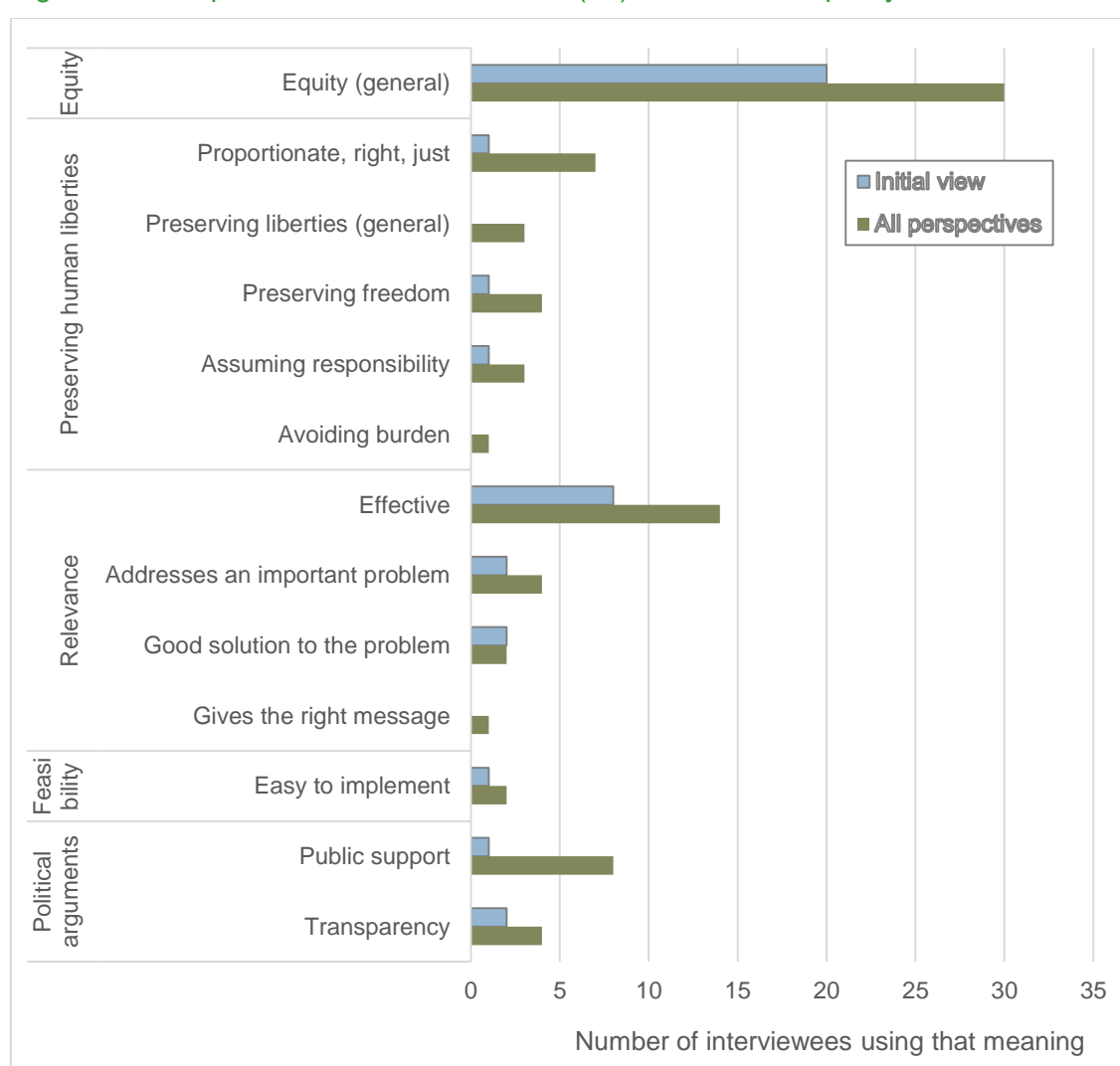


Table 48 gives examples of how interviewees formulated the concept of fairness in policy. I did not include examples for 'Equity' because the answers were similar as those in Table 46.

Table 48. Examples of responses to the question on the meaning of fairness in policy

Meaning	Response to the question 'What means fairness in policy to you?'
Proportionate, right, just	<i>"I drive 121 [km/h] and I get a thousand euro fine. This is not fair. But if drive 150 and I get a thousand, yes, it is fair." (Greece, Manager, 7)</i>
	<i>"You have to work out whether that it is reasonable, fair justice, proportionate." (UK, Manager, 11)</i>
	<i>"The counterarguments we hear are arguments like 'yes, but it is still a cost to society'." (France, Researcher, 15)</i>
	<i>"It's also that the constraint imposed on me is justified." (France, Official, 26)</i>
Preserving human liberties	<i>"Comprising, of course, values in our society" (Greece, Parliamentarian, 39)</i>
	<i>"Stop annoying people and all that." (France, Official, 14)</i>
Preserving freedom	<i>"It's Paris that decides against the countryside" (France, Official, 14)</i>
	<i>"This means that it takes away some of the freedom to dispose of one's own life. This is an argument that can be made." (France, Researcher, 15)</i>
	<i>"The argument of some states is that if there is no cost to society, you have the freedom to do what you want and in particular have the freedom to end your life." (France, Researcher, 15)</i>
	<i>"It's to make sure that my children don't have an accident, even if there's a very low probability that they will, I'll accept a constraint." (France, Official, 26)</i>
	<i>"The rights or freedom of the weaker groups." (Austria, Official, 33)</i>
Assuming responsibility	<i>"You can have a conflict as a public servant because you can think it is not right, but you can't say so because you represent the government." (France, Official, 14)</i>
	<i>"For example, when I hit a motorcyclist when I drive, and even if it is the motorcyclist who is responsible, I will have significant psychological damage from having had to witness this. Therefore, we cannot consider them as a category of road users who live in a separate world." (France, Researcher, 15)</i>
	<i>"A risk where you have a responsibility to act on." (Sweden, Official, 27)</i>
	<i>"It's more of a responsibility you have when you conceive the system." (Sweden, Official, 27)</i>
Effective	<i>"When we want to judge fairness, we should go to the level of a general interest and not to the level of the individual." (France, Researcher, 6)</i>
	<i>"Good sort of social benefit." (UK, Manager, 11)</i>
	<i>"My only argument is a technical one. It has to be done because it is good for road safety." (France, Official, 14)</i>
	<i>"It should apply to everyone and preferably that the bias should be that everyone should get it better." (Sweden, Researcher, 21)</i>
	<i>"That you can see that it has an effect." (Sweden, Official, 27)</i>
Addresses an important problem	<i>"In policy it means also the right allocation of resources to serve different goals and to find a balance [...] I see also this dimension." (Greece, Academic, 10)</i>
	<i>"The state has multiple interests to defend at the same time" (France, Official, 14)</i>
	<i>"My test: is the policy measure necessary?" (UK, Parliamentarian, 32)</i>
Public support	<i>"The way it has become a political topic has an impact on its acceptance." (France, Official, 14)</i>
	<i>"Politicians are elected by the people, i.e. when a political group represents a certain programme." (Austria, Researcher, 9)</i>
	<i>"There are these problems of acceptability, so in road safety, we can't ignore the fact that there is a political dimension to the rejection of the measure." (France, Official, 14)</i>

Meaning	Response to the question ‘What means fairness in policy to you?’
Transparency	<i>“That we give the chance for everybody to first of all express their views.” (Greece, Researcher, 3)</i>
	<i>“When people, when one political party, or a discussion partner does not deceive the other or conceals arguments.” (Austria, Researcher, 23)</i>
	<i>“The police just wants big money from the drivers.” (Greece, Academic, 31)</i>
	<i>“Transparency.” (Sweden, Academic, 35)</i>

It can be observed from Table 47 that half of the interviewees spontaneously associate ‘fairness in policy’ with equity, which is a bit lower than for fairness as such. When more than one meaning is accounted for, three quarters of the interviewees (30/39) mentioned at least the area ‘Equity’, almost half (18/39) mentioned ‘Relevance’ and about a fourth (11/39) mentioned at least the area ‘Preserving human liberties’. Thus, in the minds of the interviewees there is a strong mental association between fairness in policy with both equity and relevance. ‘Preserving human liberties’ is less spontaneously associated with fairness in policy, maybe because the interviewees considered it to be self-evident. Interestingly, ‘relevance’ is a more important dimension for ‘fairness in policy’ than for fairness in general – where it might have been so self-evident that it was not explicitly mentioned.

5.5.3 Examples of unfairness in road safety

37 interviewees were asked to give one or more examples of unfairness in the current road safety system and regulation in their country. All could come up with at least one example; one interviewee even gave five. 70 examples were given in total, which means that on average an interviewee mentioned about two examples.

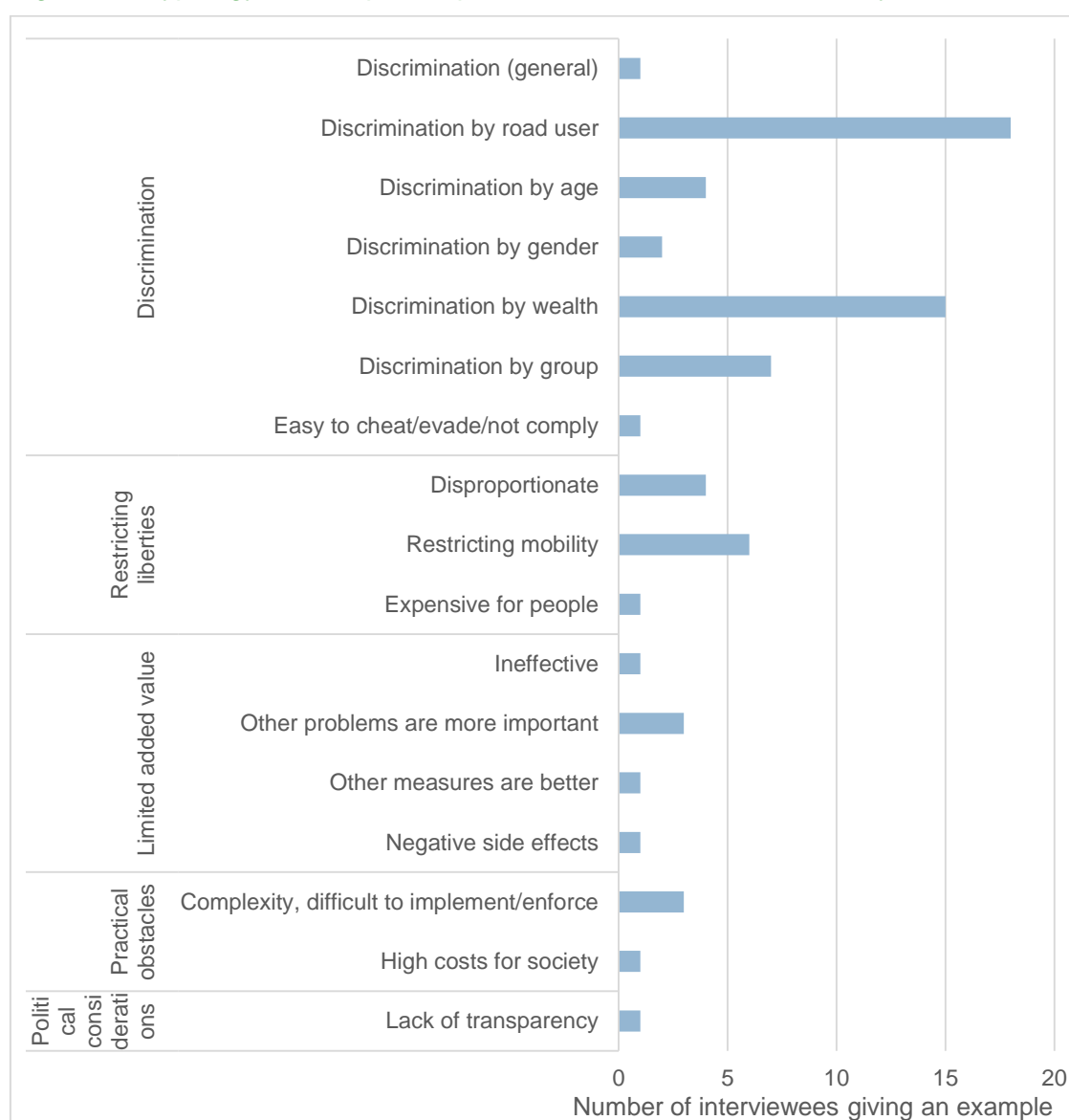
Most of the examples of unfairness concerned discrimination between different road users or between different income groups. Road users perceived as being discriminated were mainly VRUs (Vulnerable Road Users) such as pedestrians and cyclists. Interviewees were of the opinion that insufficient priority was given in road safety policies to VRUs compared to motorists. Several interviewees also gave examples of discrimination in enforcement practices (unequal treatment by the police) and mentioned that fines can more easily be paid by rich than by poor people. Some of the examples given were about limitations in access to mobility rather than about unfairness in road safety. Details on the distribution are provided in Table 49. It can be seen that almost three quarters (27/37) of interviewees quoted one or more examples on discrimination and one quarter (10/37) an example of restricting liberties.

Table 49. Distribution of examples of unfair situations in road safety given by the interviewees

	Number of interviewees giving at least one example	Number of examples given
Discrimination	27	48
Restricting liberties	10	11
Limited added value	5	6
Practical obstacles	4	4
Political considerations	1	1
All	37	70

Figure 36 shows the specific unfairness perspectives that I assigned to the examples of unfairness given by the 37 interviewees.

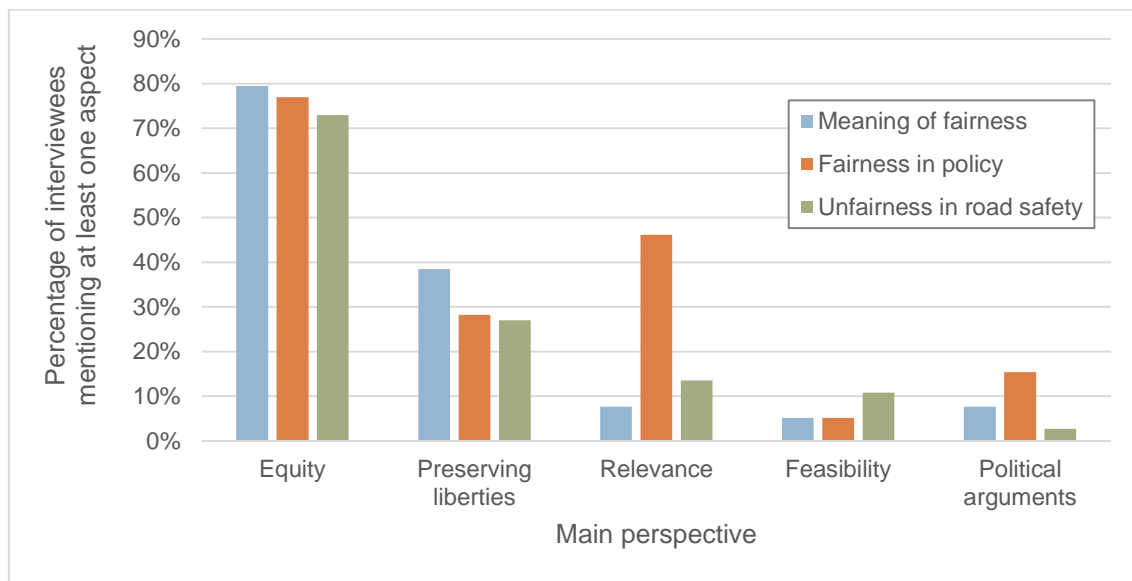
Figure 36. Typology of examples of perceived unfairness in road safety



5.5.4 Similarities and differences across different fairness perspectives

In the previous sections I showed the prevalence of different (un)fairness areas for the meaning of fairness, the meaning of fairness in policy and examples of unfairness in road safety. The distribution of areas differs somewhat among these three topics. This is illustrated in Figure 37, showing, for each of the three questions, the percentage of interviewees referring to each area at least once.

Figure 37. Percentage of interviewees who mentioned particular perspectives on fairness, fairness in policy and examples of unfairness



One can observe that ‘Equity’ is by far the most important area for the three topics; ‘Human liberties’ comes second. ‘Relevance’ is only of high concern for fairness in policy measures, with over 40% of interviewees mentioning it. Political considerations and feasibility are not considered as important fairness perspectives for the topics concerned.

Almost no significant differences were found between the views on fairness between subgroups of interviewees, with the following exceptions:

- female interviewees did not associate “Relevance” with “Fairness” at all, but they mentioned more “Preserving liberties”
- interviewees who were female or aged 60+ did not associate ‘political arguments’ with “Fairness in policy”.

In order to identify differences between responses from different countries I looked at patterns in one country that were quite different from those in other countries. I found only a few of such differences:

- Six Austrian and five Swedish interviewees mentioned 'Equity' as the prime meaning of 'Fairness in policy'; in the other countries only three interviewees did so.
- Four of the seven UK interviewees mentioned 'Relevance' as the prime meaning of 'Fairness in policy'.
- The French interviewees gave twice as many meanings for 'Fairness in policy' than the participants from other countries (41 versus 16-20). In particular the French used much more meanings in relation to Relevance and Political arguments, and were the only country to include Feasibility.

Despite these differences, it cannot be stated that the perspectives on fairness differed in a systematic way across the countries of the interviewees. Overall, I conclude from this analysis that the (spontaneous) perception of fairness was hardly linked with the profile of the interviewees and not at all with the characteristics of the interviews.

5.6 Level of support and perceived fairness of eight policy measures

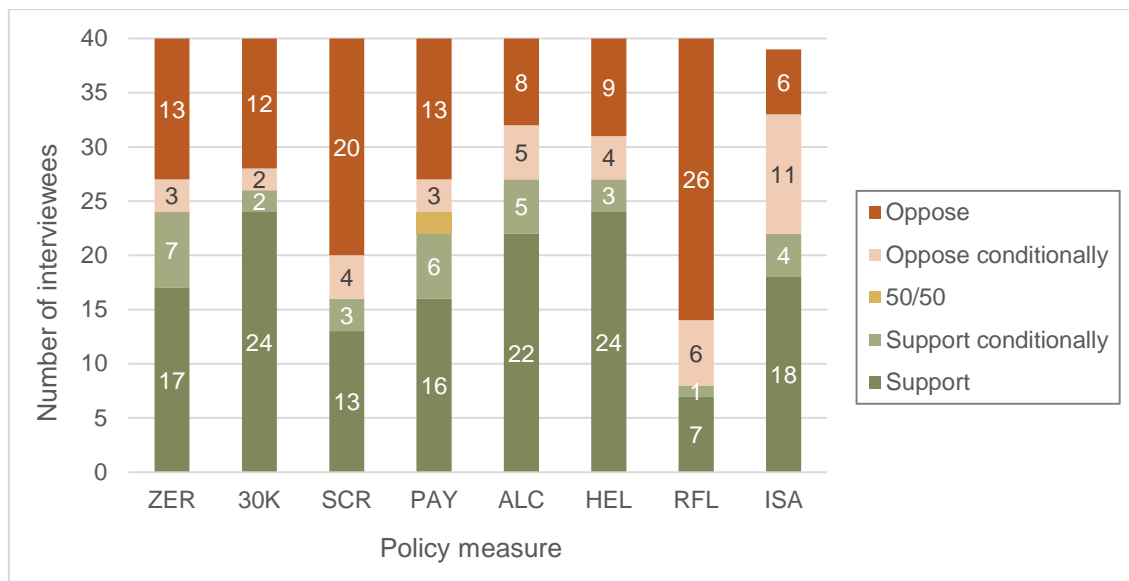
5.6.1 Level of support for measures

Interviewees were asked whether they would support or oppose a particular policy measure, whether they considered the measure was fair and why they took this position (see Sections 3.4.3 and 3.4.5); the eight questions used are listed in Table 15 (p.102). Based on the response to the question on support and the discussion that followed, I assigned the code "Support" or "Oppose". However, in some cases the answers were not so straight, and I used the codes "Support conditionally" or "Oppose conditionally". "Support conditionally" means that the interviewee was in favour of the measure provided the measure would be adapted somewhat, for instance increasing the proposed age limit a bit for the measure on screening elderly. "Oppose conditionally" means that the interviewee opposed the measure but could accept the measure in some specific circumstances, for instance making a alcohol interlock system compulsory for heavy drinkers. For one measure (payment of fines proportional to income) two interviewees did not want to take a position; I coded this as "50/50".

The distribution of the level of support of the interviewees for the eight measures is shown in Figure 38. The level of support varied considerably across measures:

- Highest support (60-70%) for ZER, 30K, ALC and HEL
- Slight majority (about 55%) for PAY and ISA
- Low support for SCR (40%)
- Very low support for RFL (20%)

Figure 38. Distribution of the level of support for measures



Although the average support score of male respondents was somewhat higher than for females, the difference was not statistically significant; 'older' interviewees were somewhat less supportive but again the difference was not statistically significant. There was also no significant correlation between the support score and the length of road safety experience or the length of the interview. I did find, however, some differences between countries, employer groups and type of degree. In the three figures that follow the scores for the eight measures have been combined. The category 'Indecisive' includes 'Support conditionally', '50/50' and 'Oppose conditionally'. One can observe:

- Interviewees from Austria and Greece were most supportive of the measures, those from the UK the least (Figure 39).
- Opposition to the measures is highest for the interviewees from the 'policy group': ministries, local authorities and parliamentarians (Figure 40).
- The lowest support for the measures is with people with degrees in Law and Economics (Figure 41).

Of course these overall patterns do not apply necessarily to each of the individual measures.

Figure 39. Number of times interviewees were supportive, indecisive or opposing, by country (all measures combined)

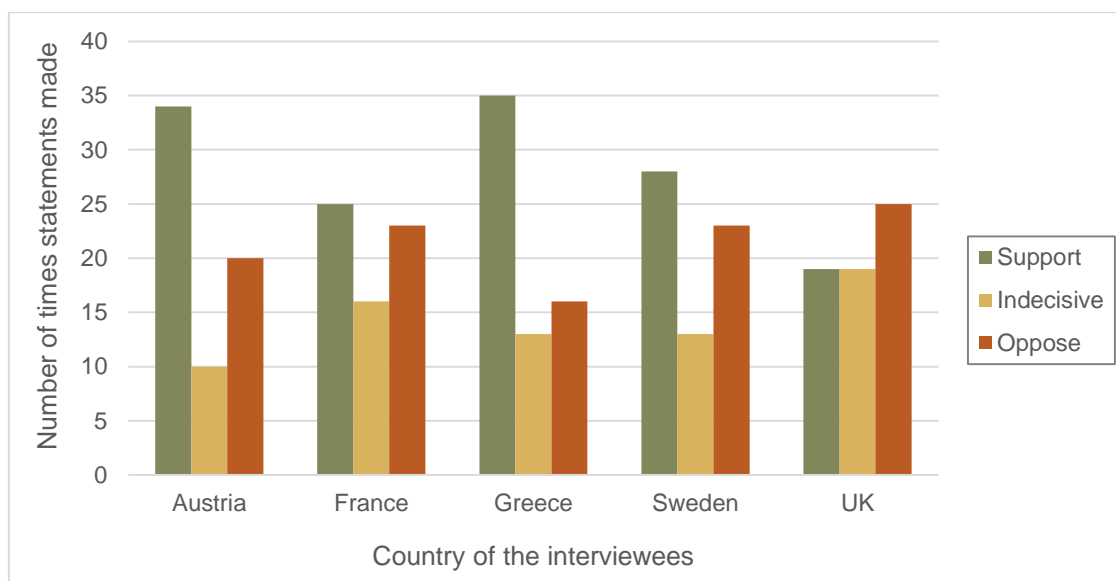


Figure 40. Percentage of supportive, indecisive or opposing statements by type of employer of interviewees (all measures combined)

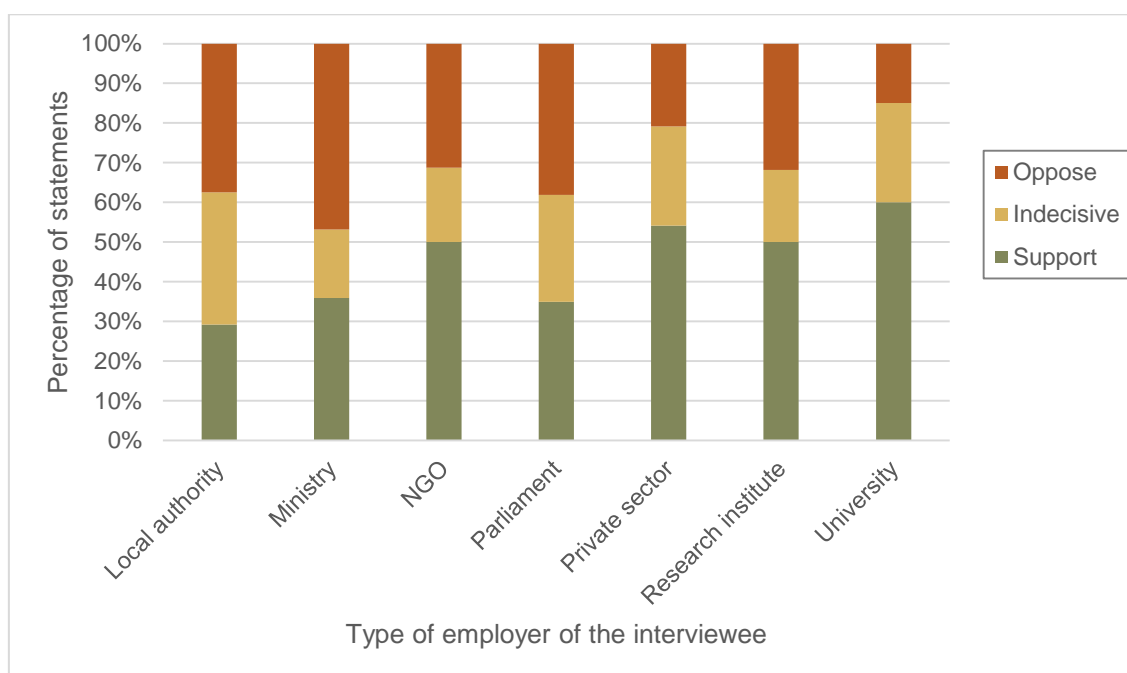
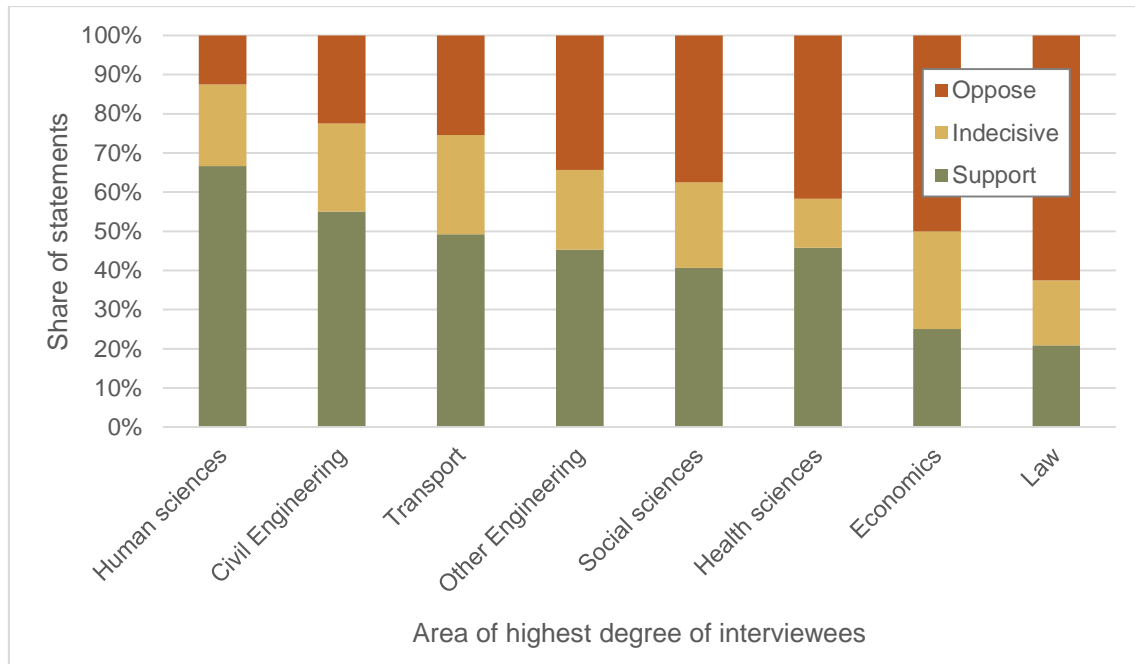


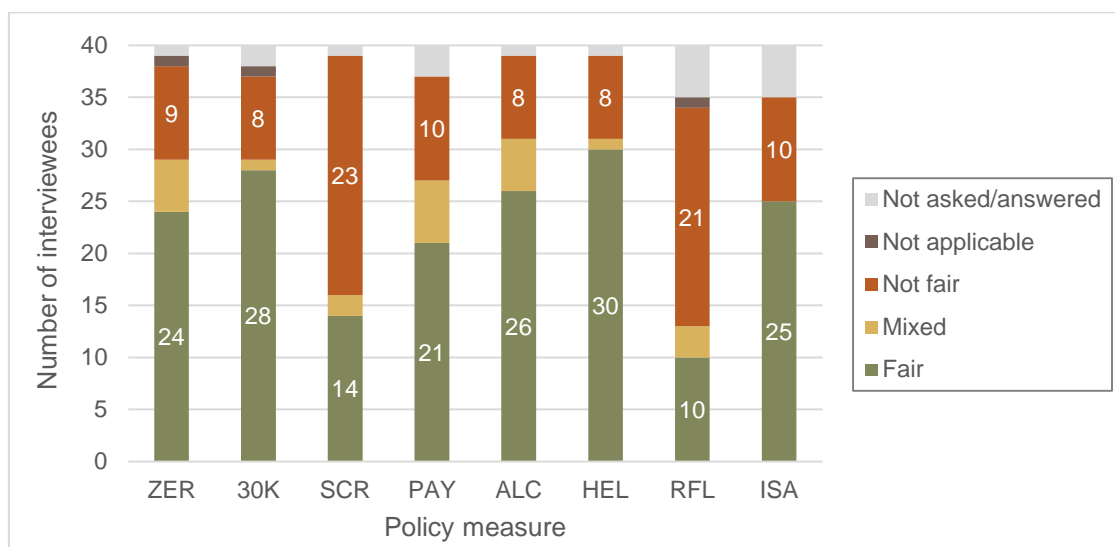
Figure 41. Percentage of supportive, indecisive or opposing statements by degree area of interviewees (all measures combined)



5.6.2 Perceived fairness of measures

Interviewees were asked for each of the eight measures whether they considered these to be fair or not. In some cases the interviewees stated that the measure was fair from one perspective but not from another. Such answers were coded as 'mixed views on fairness', which has been shortened to 'mixed' in the tables and graphs in this chapter. In a few cases, interviewees stated that the concept of fairness was not applicable. These answers have been coded as 'Not applicable'. Some other interviewees initially resisted in applying the concept of fairness to certain measures, but eventually they agreed that the measure was fair – often because they didn't see a reason why it would be unfair. In 19 cases the question on fairness was not asked or not explicitly answered. The differences in perceived fairness between measures are shown in Figure 42. It can be seen that six of the eight measures – ZER, 30K, PAY, ALC, HEL and ISA – were considered to be fair by at least half of the interviewees. The measures on cycle helmets (HEL) and 30 km/h in built-up areas (30K) were even considered to be fair by about three quarters of interviewees. On the other hand, only a third of the interviewees considered the measure on screening elderly (SCR) to be fair and only a quarter the measure on reflective clothing for pedestrians (RFL).

Figure 42. Perceived fairness of the eight measures

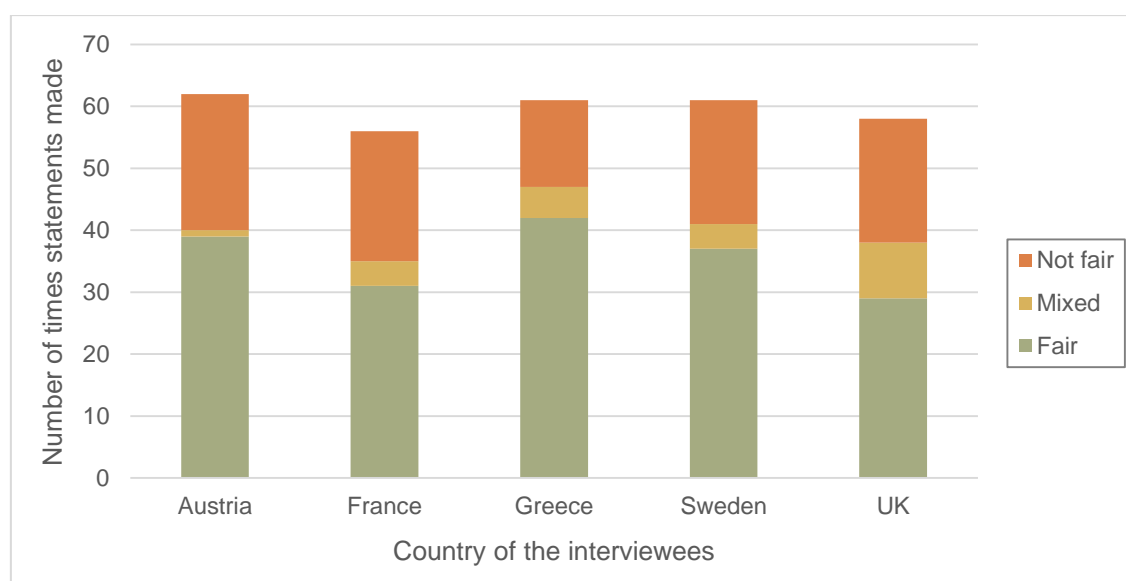


5.6.3 Differences in the perception of fairness

Figure 43 shows how the opinion on the fairness of measures (all considered together) varies between the countries of the interviewee. The pattern is very similar to that for the level of support for measures (see Figure 39) with interviewees from Greece being most positive about fairness and those from the UK the least. But even the interviewees from the UK considered half of the measures to be fair. Other analyses showed that differences between subgroups were in general small and, when they occurred, similar to those for support for measures:

- University and private sector people considered more measures to be fair than those of other organisations, in particular from the public group.
- People with degrees in Law and Economics considered less measures to be fair than those with other degrees, in particular in Human sciences and Civil Engineering. It should be mentioned that these people were often employed in universities and the private sector.

Figure 43. Number of times interviewees considered measures to be fair, not fair or partially fair, by country (all measures combined)



5.6.4 Level of support versus perceived fairness

When interviewees stated they considered a measure to be fair, they were likely to support it – and vice versa. Table 50 shows the cross-tabulation of the level of support and the perceived fairness.

Table 50. Level of support by perceived fairness (all measures combined)

	Support	Support conditionally	50/50	Oppose conditionally	Oppose
Fair	133	27		10	8
Mixed	6	2	2	2	11
Not fair		2		18	77
Not applicable					3
	139	31	2	30	99

This table illustrates that no interviewee supported a measure fully if it was considered to be unfair; in only two cases there was conditional support once (ZER and SCR). When a measure was considered fair, the (strong) association with supporting the measure was somewhat weaker: in ten cases a measure was seen to be fair but yet the measure was opposed and in 18 other cases there was conditional opposition. This implies that although interviewees did not consider the measure to be unfair, there were other arguments why they opposed it. In summary, when a measure is considered fair by experts it is very likely (but not always the case) that they will support it. But they would not support a measure perceived as unfair.

5.7 Argument patterns

5.7.1 Overall distribution of arguments used by interviewees

In total, the interviewees used 880 arguments to support their position towards the measure, which comes down to 2.8 arguments on average for each measure. The average number of arguments in favour was 1.2 and the average number of arguments against was 1.5. Given that the number of measures supported was higher than those opposed, one can conclude that interviewees tended to use relatively more (negative) arguments to explain their opposition than (positive) arguments to explain their support for a measure. For example, one Austrian interviewee opposing compulsory wearing of cycle helmets (HEL) used six different counterarguments within four argument areas.

In about one-quarter of cases interviewees used both one or more supportive arguments and one or more opposing arguments. This happened most for ZER (40% of interviewees), ALC and PAY (each 30%) - see Table 51. An example is a French interviewee stating that installing an alcohol ignition interlock (ALC) would be a good solution for reducing drinking and driving but also recognising that it was currently still expensive for people.

Table 51. Use of positive and negative arguments per measure

	Percentage of interviewees using both positive and negative arguments	Average number of arguments in favour	Average number of arguments against
30K	23%	1.78	1.18
ALC	30%	1.70	1.20
HEL	23%	1.45	1.63
ISA	18%	1.05	1.05
PAY	30%	1.08	1.65
RFL	13%	0.58	2.48
SCR	10%	0.85	1.50
ZER	40%	1.28	1.58
All	23%	1.22	1.53

Table 51 also includes data on the average number of arguments used in favour or against each of the measures. Most arguments in favour were used for 30K (1.8 on average), followed by ALC; the lowest numbers were for RFL and SCR. By far the highest number of arguments against was for RFL (2.5 on average). The table also shows that for HEL, ISA and ZER the number of arguments used against the measures is close to the number of arguments used in favour.

5.7.2 Differences in argument patterns by level of support

Figure 44 shows the average number of supportive and opposing arguments by level of support (the group 'In-between' covers 'Support conditionally', '50/50' and 'Oppose conditionally'). It can be observed that when opposing a measure, the number of opposing arguments used is much higher than the number of supportive arguments used when supporting one (3.1 versus 2.1). Moreover, when opposing a measure interviewees rarely recognise positive arguments; those who support a measure more frequently recognise that there are counterarguments.

Figure 44. Average number of arguments in favour or against the measures, by level of support

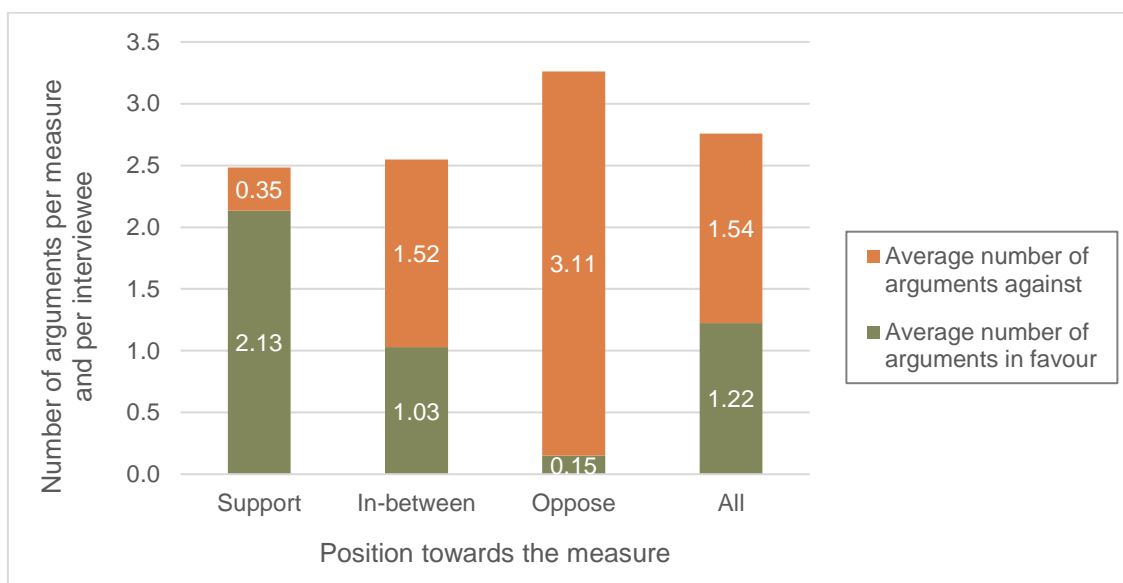
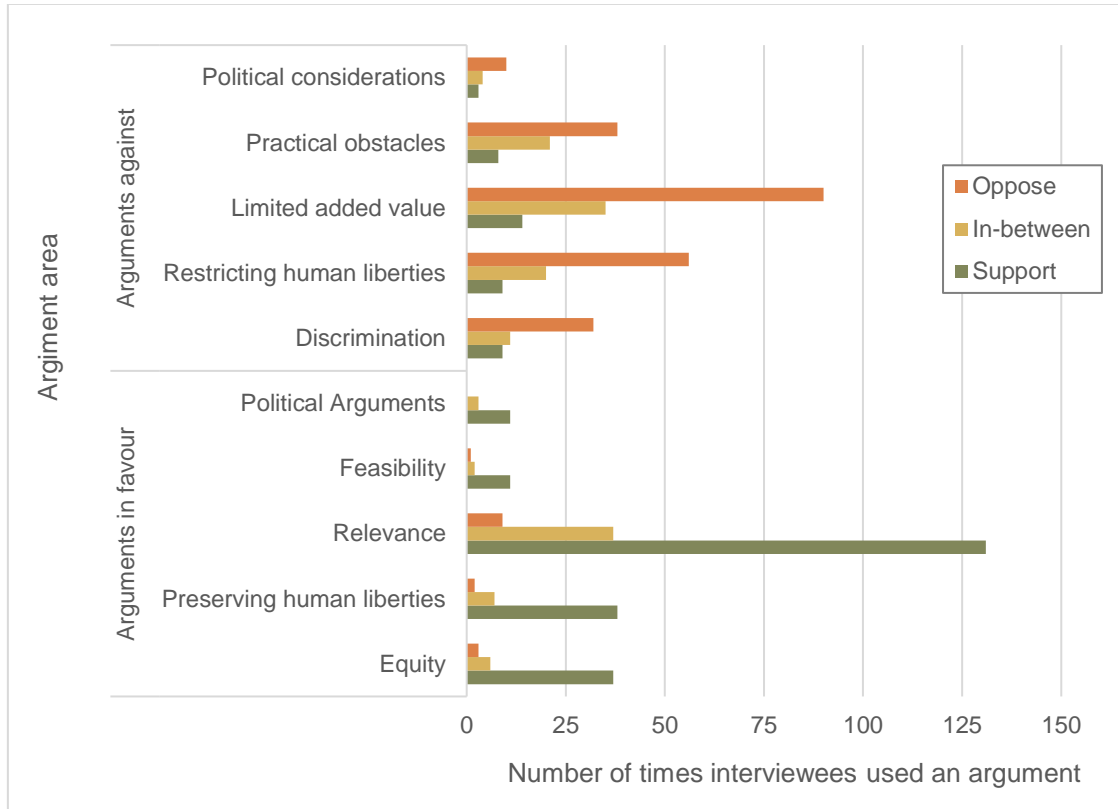


Figure 45 shows the distribution of the argument areas by level of support. The unit of measurement is whether an interviewee has used one or more arguments within that argument area. For example, if an interviewee used both the arguments 'addresses an important problem' and 'effective', which both belong to the argument area 'Relevance', then this is counted as one unit. The following can be deduced from this graph:

- about 60% of the arguments used by supporters of a measure are part of the argument area 'Relevance'; 'Equity' and 'Preserving human liberties' account together for about 20%
- about 50% of the arguments used by those opposing a measure are in the area 'Limited added value'; 'Restricting liberties' is the second group
- arguments related to 'Discrimination' and 'Equity' account for only about 15% of the arguments against and in favour.

- arguments that fall under 'Practical obstacles' are used almost four times more by opponents of a measure, than arguments in relation to 'Feasibility' by those supporting a measure.

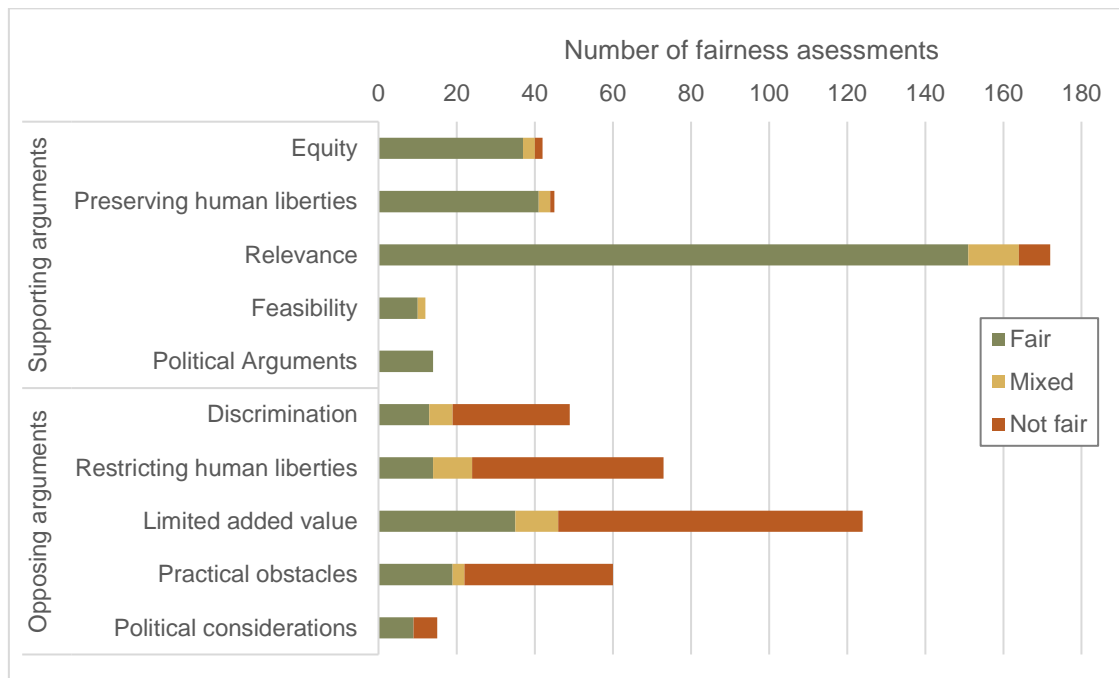
Figure 45. Number of interviewees using an argument in a particular argument area, by level of support (all measures combined)



5.7.3 Association of fairness with the arguments used

Section 5.6.4 showed the strong association between support for measures and perceived fairness. One can therefore expect that the arguments used for justifying support or opposition are also related to the perceived fairness. Such an association can indeed be observed from inspecting Figure 46. The graph shows, for all measures combined, which argument areas were used when measures had been assessed as fair, mixed or not fair (I left out 'not applicable' and 'not answered'). For example, across the eight measures, it happened 172 times that an interviewee used at least one argument in the argument area 'Relevance'. In 151 cases, that measure was perceived as fair, in 8 cases it was rated as unfair and in 13 cases the assessment was mixed. The graph illustrates the strong association between, on the one hand, supportive arguments and assessing a measure as fair, and on the other, negative arguments and assessing a measure as not fair. Furthermore, Figure 46 illustrates that the strength of association varies across argument areas.

Figure 46. Distribution of fairness assessments for each argument area



When comparing Figure 46 with my findings on different perspectives on fairness (see Figure 37, p.194) one observes a difference between the theoretical view on the concept of fairness, which is very strongly linked to equity and (to a lesser extent) human liberties, and the practical perspective when the fairness of 'real' policy measures is assessed. In practice, the dimensions of (in)effectiveness and (ir)relevance are in most cases the most important perspective of fairness in policy that is to be considered.

5.7.4 Distribution of arguments by measure

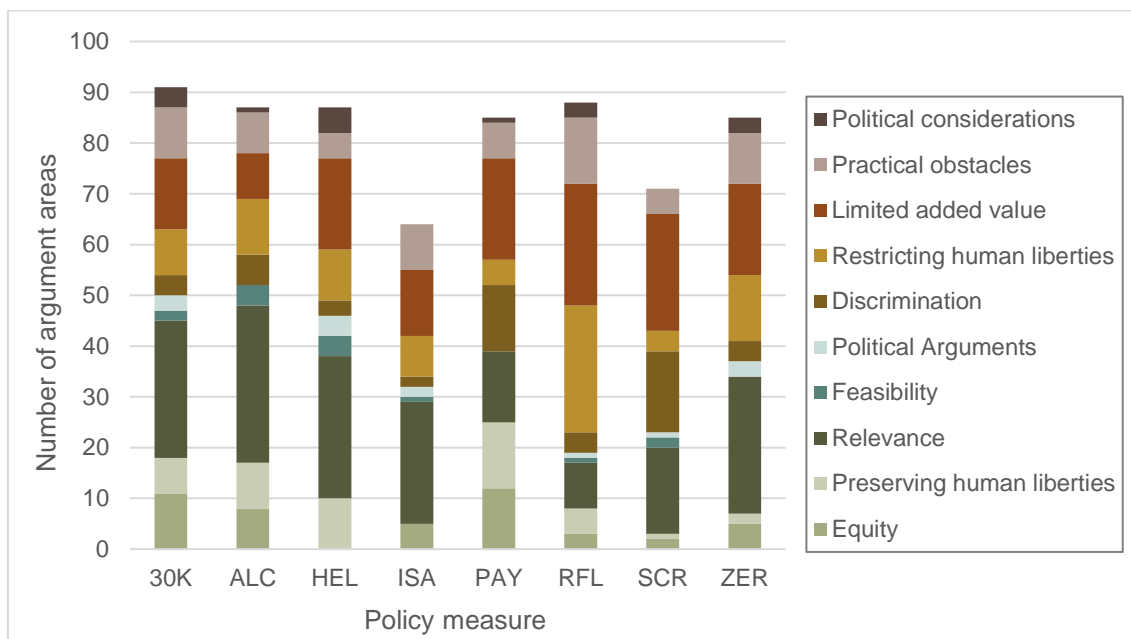
Figure 47 shows for each policy measure the distribution of the argument areas used by the interviewees. If two or more arguments were used within the same argument area, this area was only counted once. Figure 47 illustrates the following:

- Five of the eight measures have a quite similar distribution of argument areas: 30K, ALC, HEL, ISA and ZER. For all of them, 'Relevance' is the most important supportive argument area. On the opposing side, there is a more balanced presence of the argument areas 'Limited added value', 'Restricting human liberties' and 'Practical obstacles'.
- Among the arguments in favour, those under 'Relevance' are the most numerous for each of the measures.
- Negative arguments are more numerous than positive ones.

- For six measures, 'Limited added value' is the argument area with includes the highest number of opposing arguments. For RFL and ALC the arguments that are related to 'Restricting human liberties' were used slightly more.
- PAY has a more balanced distribution of the different arguments areas. Although 'Relevance' is the argument area used most, there are almost equal numbers of interviewees using arguments related to 'Equity' and 'Preserving human liberties'.

More detailed distributions are given in Appendix A5 (Table 71 and Table 72). In Chapter 7 I will discuss these arguments for six measures: ISA, HEL, RFL, ZER, SCR and PAY.

Figure 47. Distribution of arguments by argument area and measure



5.7.5 Differences in arguments patterns of different types of interviewees

Figure 48 shows the distribution of argument areas by country of the interviewees. It can readily be observed that French interviewees used the highest number of arguments, and those from Austria and Greece the least. This result is partially linked to the fact that the interviewees from Austria and Greece were more supportive for the measures (see Figure 39) and people who support a measure use less arguments (see Figure 44). I also recall from Section 5.1 that the average length of the interviews was longest in France and the UK. A correlation analysis showed that the length of the interview was correlated with the total number of arguments used ($r = 0.228^{**}$) and the total number of opposing arguments ($r = 0.221^{**}$).

Although the numbers of arguments differ between the countries, the distributions are fairly similar. French interviewees used somewhat more arguments in relation to human liberties and practical obstacles than those from other countries. British interviewees used somewhat more the arguments related to 'Restriction of human liberties' and somewhat less the arguments related to 'Relevance' than the others. Greek interviewees used the least the arguments that fall under 'Limited added value'. Greek and Austrian interviews used relatively more the arguments related to 'Relevance'. But overall, the distribution of the arguments does not differ considerably between the countries of the interviewees.

Figure 48. Distribution of arguments by argument area and country of the interviewee (all measures combined)

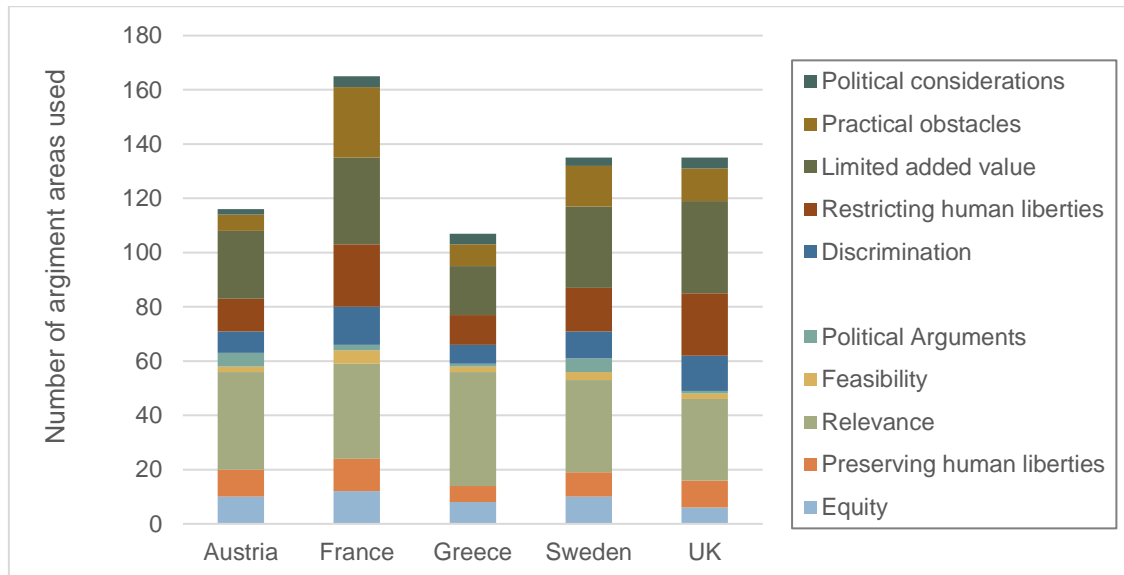
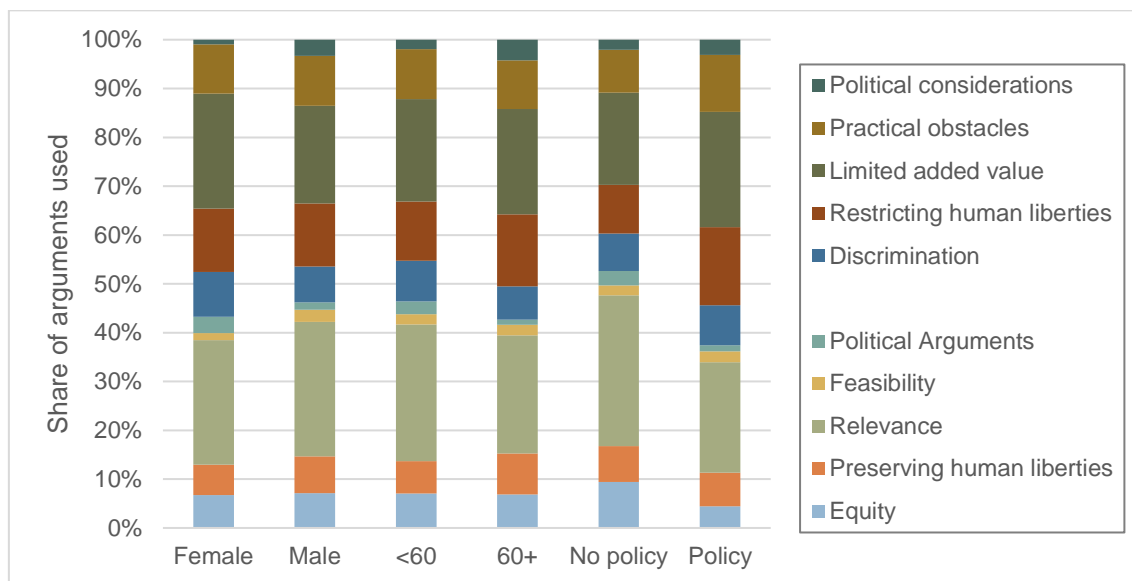


Figure 49 shows the difference in distribution of arguments between male and female respondents, those younger or older than 60, and those within and outside the 'policy group', consisting of parliamentarians and officials from national and local authorities. It can easily be seen that there are hardly any differences between gender and age groups, with males using 'Relevance' a bit more and 'Limited add value' a bit less.

One can observe some differences in the distribution between the 'policy group' and the other interviewees. I recall (cf. Figure 40) that the interviewees from the 'policy group' are in general more opposed to the measures than the others. This is also reflected in the distribution of arguments, with a higher number of arguments in the negative argument areas at the expense of 'Relevance'.

Figure 49. Relative distribution of arguments by gender, age group and employer group



5.8 Summary

Chapter 5 focuses on the concept of fairness and the arguments that can be used to support or oppose measures. The findings are based on an analysis of forty interviews with policy-makers and experts in road safety from five different countries. A classification scheme was developed which groups dimensions of fairness and unfairness into five areas: equity, human liberties, relevance, feasibility and political aspects. The same overall categorisation was used to group the type of arguments used by the interviews to support or oppose eight road safety policy measures.

When comparing the interviewees' initial perspectives on fairness and their assessments of the different measures one can observe a difference between the ethical and theoretical view on fairness, which is strongly linked to equity and to a lesser extent human liberties, and on the other hand, the 'practical' perspective where relevance is often the most important perspective.

Most policy measures discussed were supported by the interviewees and perceived as fair. Most arguments in favour or against the measures were related to relevance and effectiveness. Discrimination was in general not perceived as a big issue – although most interviewees were able to identify at least one example of discrimination in the road safety system in their country. When arguments are used to justify opposition to a measure, they often belong to different areas than the arguments used in favour. The number of negative arguments used by interviewees when opposing a measure, was much higher than the number of positive arguments when supporting one.

"We should assist these people who have weaknesses to stop driving when drunk. It's only fair for us because we make roads safer. The unfair thing is that it's expensive and it's not for everybody."

6. Results from the dilemma survey

6.1 Dataset used

6.1.1 Characteristics of the sample

After cleaning, data recoding and data enrichment, the dataset based on the dilemma survey contained 5587 records and 931 variables. Table 52 presents some characteristics of the sample. Because of the thorough cleaning process, the initial target of approximately 480 respondents per region was attained in only seven of the twelve regions. The age groups with the biggest discrepancies with the original targets were the oldest age group in Nigeria and the youngest in Greater London. When ignoring Nigeria, the average sample per age-gender group was 72 rather than the 80 aimed for initially. The gender distribution was almost 50/50. The distribution across the three age groups was very balanced: 31.7% for the 18–25 group, 31.5% for those 36–47, 32.2% for ages 58–69, and 4.6% for respondents with ages outside these age groups (259 cases, not in the table). The average length of interview (LOI) of the sample was 16 minutes. The LOI is higher in the case of Nigeria and, to a lesser extent, Argentina. This phenomenon is probably related to slower internet connections. As mentioned in Section 3.5.9, for most analyses data weighting was used so that for each country the six gender-age groups had equal weight, except the oldest age group for Nigeria, which was left out because of the very small sample.

Table 52. Administrative survey sample characteristics after data cleaning

Region	Language	Sample size	Median LOI	Age			Gender	
				[18-25]	[36-47]	[58-69]	Female	Male
			(minutes)					
Argentina	Spanish	507	20	159	173	175	255	252
Austria	German	472	16	148	151	167	248	224
California	English	390	15	105	111	160	209	179
China	Mandarin	492	16	139	138	135	236	256
Flanders	Dutch	466	15	145	146	167	246	218
London	English	388	13	88	129	149	208	179
Greece	Greek	475	17	164	163	148	233	241
Nigeria	English	616	24	303	201	9	230	386
Sweden	Swedish	429	15	116	147	166	227	199
Texas	English	433	15	121	127	173	221	211
Wallonia	French	461	15	149	141	171	241	220
W. France	French	458	15	134	132	178	239	219
Total		5587	16	1771	1759	1798	2793	2784

6.1.2 Policy measures considered

Table 53 shows how the policy measures were formulated in the dilemma survey, as well as the small differences with the formulation used in the interviews. A three character code and a short name are also included.

Table 53. Policy measures used in the survey and differences with the interviews

Code	Formulation of policy measures in the dilemma survey	Short name	Differences with the interviews
ZER	Zero tolerance for driving under the influence of alcohol (0,0‰ blood alcohol concentration) for all drivers of vehicles (cars, trucks, motorcyclists, cyclists, ...)	Zero tolerance for alcohol	No difference
ISA	All cars should be equipped with an Intelligent Speed Assistance (ISA) system that automatically limits the speed of the car to the maximum speed limit and that cannot be turned off by the driver.	ISA in all vehicles	No difference (the specification "that cannot be turned off" was added after a few interviews)
PAY	Fines that people have to pay after they have committed a traffic offence should be proportional to their income.	Fines proportional to income	No difference
HEL	All cyclists should wear a helmet.	Cyclists wear helmets	No difference
LIC	The education and training needed for a car driving licence should be free of charge and integrated in the school curriculum.	Free driving education	Not included in the interviews
ALC	All cars should be equipped with an alcohol ignition interlock system (which prevents starting and driving the car if the driver's alcohol concentration is above the legal BAC limit).	Interlocks in all cars	No difference
30K	In all urban areas and villages the speed limit should be 30 km/h for all vehicles.	30 km/h in built-up areas	Added "except on the main thoroughfares)
SCR	All people aged 70 or more should be screened every 3 years, in order to let a medical expert decide whether they are still allowed to drive a car or not.	All elderly drivers screened	'on a 5 yearly basis' instead of 'every 3 years'; No mention of "medical"
RFL	Pedestrians should wear retroreflective clothing, shoes or bags when walking or running in the dark on public streets and roads.	Retroreflective pedestrians	No distinction between "streets" and "roads"
INS	Insurance companies should be allowed to differentiate the price for the car insurance premiums between men and women.	Differentiation in insurance	Not included in the interviews

6.1.3 Comparison of results with ESRA data

Four questions in the dilemma survey were almost identical to those in ESRA2 and three to those in ESRA1. Seven of the ten countries in the dilemma participated in ESRA2 and eight in ESRA1. Despite differences in the formulation of the question on support for measures (see Table 54), age distributions and geographical spread, a comparison of my survey results with ESRA data could serve as a partial validation.

Table 54. Differences between the question on the support for policy measures

Formulation of policy measures in the dilemma survey	Differences with ESRA2	Differences with ESRA1
1. Zero tolerance for driving under the influence of alcohol (0,0‰ blood alcohol concentration) for all drivers of vehicles (cars, trucks, motorcyclists, cyclists, ...)	<i>Identical</i>	<i>Almost identical (less details given). More limited scale.</i>
2. All cars should be equipped with an Intelligent Speed Assistance (ISA) system that automatically limits the speed of the car to the maximum speed limit and that cannot be turned off by the driver.	<i>In ESRA2 it was not stated that the system could not be turned off.</i>	<i>Not asked in ESRA1</i>
3. All cyclists should wear a helmet.	<i>Identical</i>	<i>Identical. More limited scale.</i>
4. All cars should be equipped with an alcohol ignition interlock system (which prevents starting and driving the car if the driver's alcohol concentration is above the legal BAC limit).	<i>In ESRA2, the measure only applies to people who have been drunk driving twice or more</i>	<i>Almost the same as in ESRA2 (less details given). More limited scale.</i>

The two measures which formulated exactly the same in the dilemma survey, ESRA1 and ESRA2 are ZER and HEL. As can be seen from Figure 50 and Figure 51, the results across the three surveys are very similar; for HEL one can observe an increase over time. Two policy measures were formulated in a stricter way in the dilemma survey than in ESRA: installation of ISA (in the dilemma survey it was stated that it cannot be turned off) and installation of an alcohol interlock (for all car drivers, not just for repeated drunk drivers). As expected, the support was lower in the dilemma survey than in ESRA. Overall, the comparison between the values from the dilemma survey and from ESRA supports the plausibility of the values I obtained in the dilemma survey.

Figure 50. Level of support for ZER in the dilemma survey, ESRA1 and ESRA2

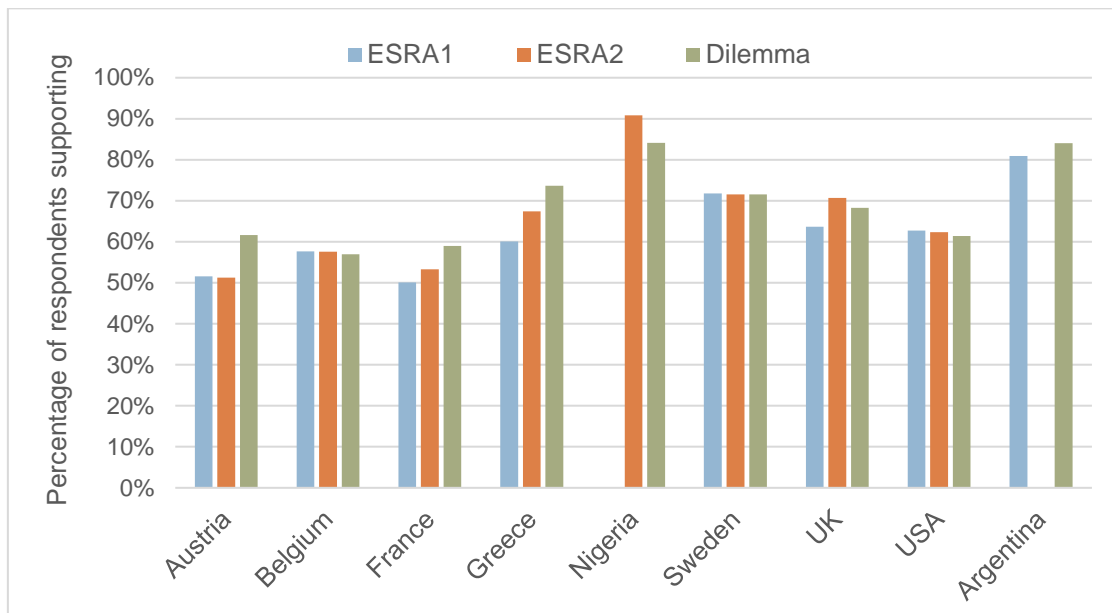
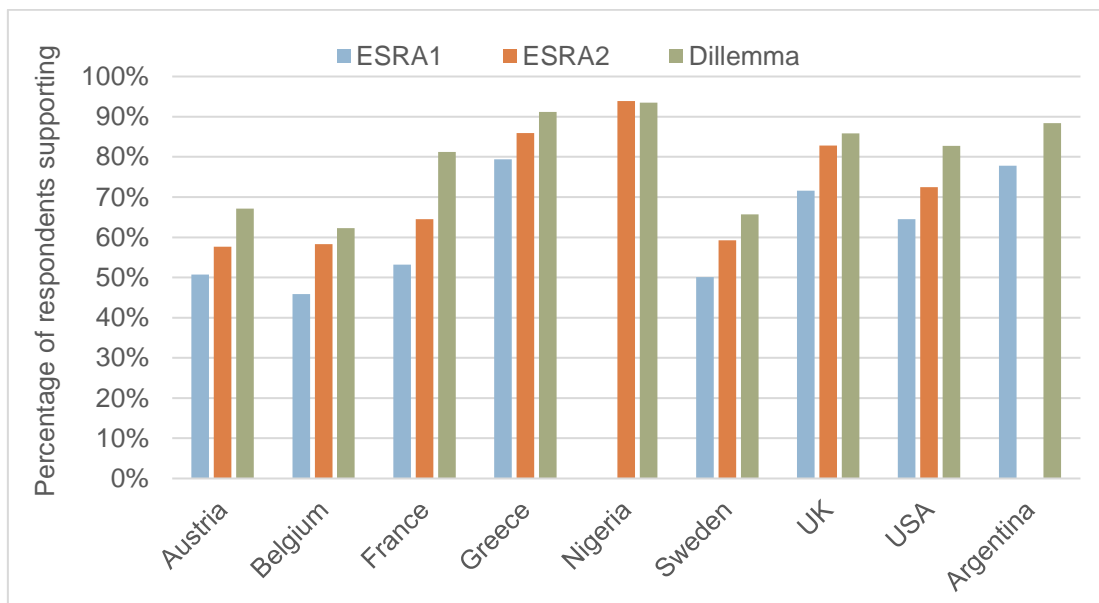


Figure 51. Level of support for HEL in the dilemma survey, ESRA1 and ESRA2



6.1.4 Socioeconomic situation (SES) of the respondents

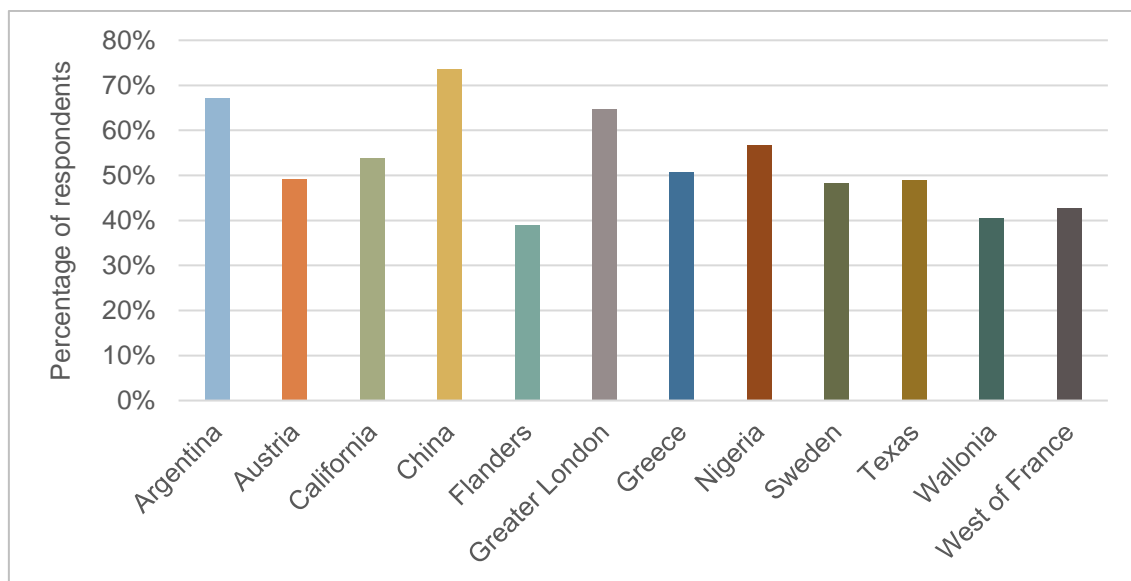
Within the sample, 57.2% of the respondents have a higher education degree⁹ (including 14.2% a Master's degree or higher), 41.3% of the respondents have no higher education degree and for 1.6% the highest educational qualification is not known. Very similar percentages apply to the weighted sample. A comparison with national educational statistics revealed that in particular in the Chinese, Nigerian and

⁹ It is recalled that for respondents who were still students the degree level associated with the record was set at the degree they expected to obtain with their current studies.

Argentinian sample the respondents with a Bachelor's degree are overrepresented. This is linked to the composition of the online panels in these countries. From this perspective, the sample of respondents is not representative for the general population in these countries. Fortunately however, for most findings the education level was not a differentiating factor.

An area where the sample characteristics differed quite considerably between regions is the percentage of respondents who have a job (as an employee or independent) and of those who are not at work (student, unemployed, stay-at-home, ill, retired, etc.). The differences are shown in Figure 52. The highest percentage of respondents with a job is in China (almost three quarters of the respondents) whilst the lowest percentages (around 40%) in Belgium and France. This is linked to the number of students, unemployed and retired people in the sample of these countries.

Figure 52. Percentage of respondents with a job, by region



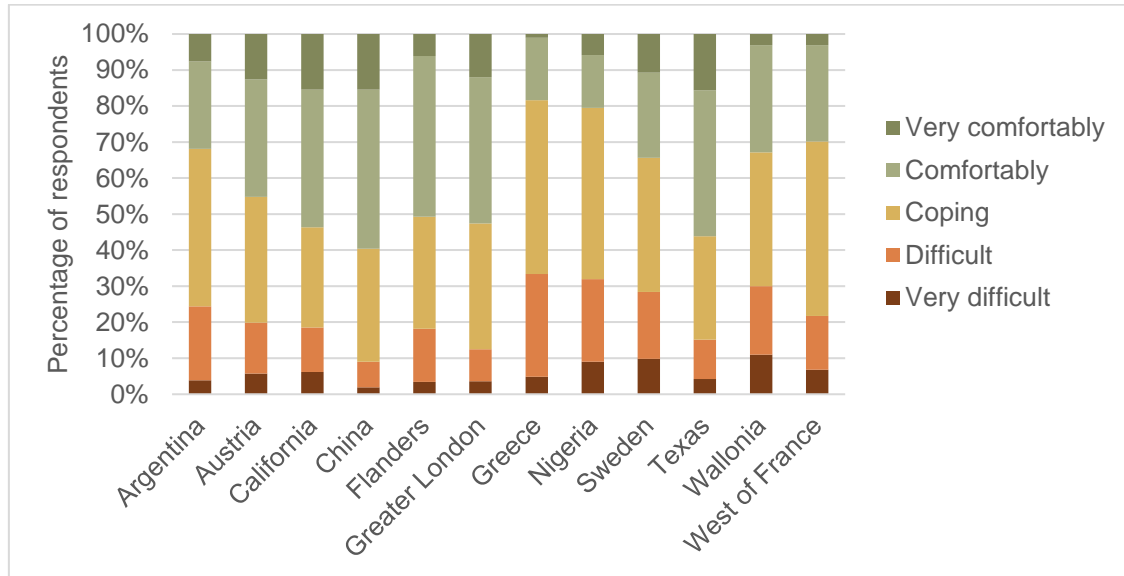
In the survey the income level was subjectively assessed through a question, taken from the EVS survey, on how comfortable respondents could live with their current income. The question was formulated as follows:

Which of the following statements best describes how the income of your household meets your needs?

- ☐ *Living very comfortably on present income*
- ☐ *Living comfortably on present income*
- ☐ *Coping on present income*
- ☐ *Finding it difficult on present income*
- ☐ *Finding it very difficult on present income*

The distribution of the responses to this question is shown in Figure 53. The self-assessed income situation of the respondents is worst in Nigeria, Greece, Wallonia, and Sweden. Please note that this is a subjective measure which cannot be compared across countries because the answer depends on the level of comfort and lifestyle people expect. Further analyses have shown that the income of the highest age group in the sample of respondents is somewhat higher than that of the youngest.

Figure 53. Distribution of the income comfort of respondents



6.1.5 Use of transport modes

The question on the use of transport modes was formulated as follows:

Over the past 12 months, which of the following modes of transport did you use regularly (at least a few days a month during most months) in your country?

- ☐ walking (including running, jogging, inline skate, skateboard, ...) at least 200 meter per trip
- ☐ cycle (including e-bikes and speed pedelecs)
- ☐ ride a moped or a motorcycle (including electrical ones)
- ☐ drive a car
- ☐ use public transport (train, bus, tram, streetcar, subway, underground, ...)
- ☐ be a passenger in a car (without being the driver)

The distribution of the answers is given in Table 55. Very similar values were found for the weighted sample. Some important observations are:

- In all regions except Nigeria, over 60% of the respondents regularly drives a car.
- There is much less frequent pedestrian walking in the USA and Nigeria than in the other regions of the sample. In Europe the lowest prevalence is in Greece.

- Over half of Flemish respondents cycle regularly; the figure is much lower in Wallonia. Lowest values are in the USA, Greater London and Nigeria.
- Only in five countries more than 10% of the respondents regularly ride a motorcycle or a moped: Argentina, Austria, China, Greece and Nigeria. Three-quarters of the motorcyclists in the sample are from these five countries.
- Regular use of public transport is low in California and even lower in Texas.

Table 55. Regular use of particular transport modes by region

	On foot	Cycle	Motor-cycle	Car driver	Car passenger	Use public transport
Argentina	70.6%	33.3%	15.8%	65.7%	60.2%	72.8%
Austria	76.3%	46.8%	12.3%	81.4%	58.7%	62.5%
California	40.5%	14.6%	3.1%	84.6%	59.0%	25.4%
China	67.7%	42.5%	14.0%	60.6%	38.4%	72.8%
Flanders	71.9%	57.1%	4.3%	77.0%	64.2%	55.8%
Greater London	80.9%	17.8%	1.0%	60.1%	60.6%	88.7%
Greece	55.4%	13.3%	16.2%	70.3%	46.9%	58.3%
Nigeria	38.1%	9.1%	13.3%	31.0%	58.8%	69.3%
Sweden	58.7%	34.0%	4.7%	61.5%	46.2%	49.0%
Texas	24.9%	10.2%	2.1%	86.1%	57.5%	11.3%
Wallonia	60.5%	19.1%	5.2%	75.7%	47.1%	43.4%
West of France	67.0%	30.8%	7.6%	81.9%	52.8%	41.0%
Average	59.1%	27.4%	8.8%	68.4%	54.2%	55.1%

6.1.6 Socio-political attitudes

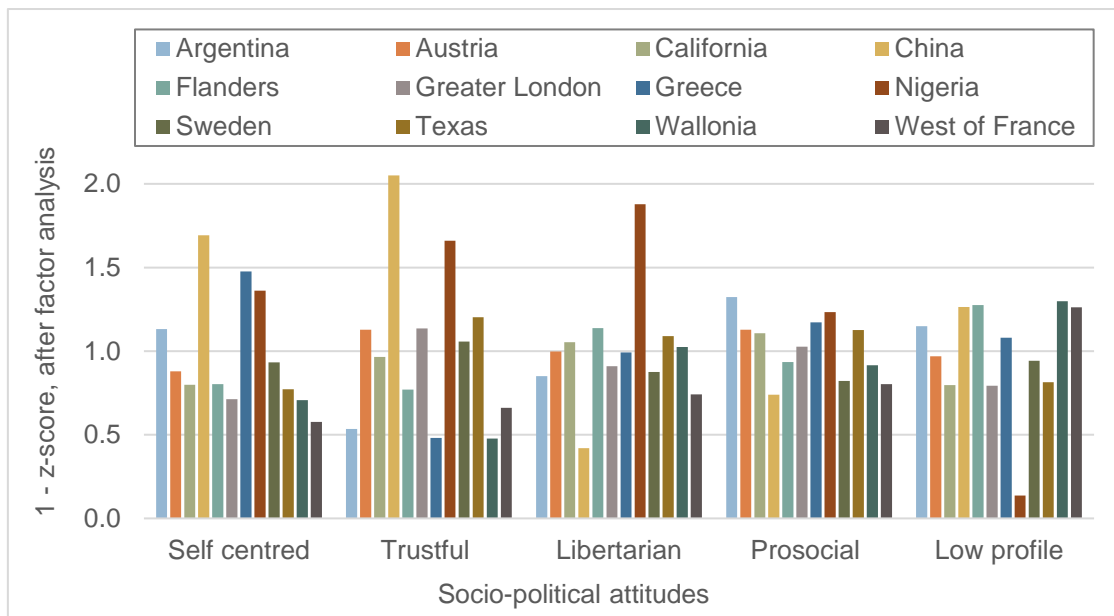
I undertook a factor analysis based on all the items in the survey relating to values, attitudes, opinion and behaviour. I tried out several numbers of factors and eventually I found a meaningful set of five constructs: 'Self-centred', 'Trustful', 'Libertarian', 'Prosocial' and 'Low profile'. The meaning of these labels is illustrated in Table 56; I will refer to these labels as 'socio-political attitudes'.

An analysis of the z-scores shows that on average males are somewhat more self-centred, trustful and libertarian, and somewhat less prosocial and low profile than women. Being self-centred, libertarian and trustful decreases with age, while prosocial and low-profile increase. I also compared the regions; the results are shown in Figure 54. For readability, is used "1-z" on the Y-axis, rather than the z-score itself.

Table 56. Five socio-political attitudes and the three variables that loaded most on them

Socio-political attitude	Variables with highest loading on the construct
Self-centred	I like to have the power to tell people what to do
	I would like to achieve fame and glory
	I like to compete with people
Trustful	I have a great deal of confidence in the courts and the legal system
	I have a great deal of confidence in our national government
	Most people can be trusted
Libertarian	I have no confidence at all in the civil and public services
	I have no confidence in the police
	The state intervenes too much in the life of the people
Prosocial	I think that people deserve the same respect, even if they are not my friends or relatives
	I am like the person that people see. I am an open book
	I make strong efforts to maintain good relationships with people that I know
Low profile	I am an ordinary person, without any unique special qualities
	I try to act like most other people in my society
	[Reversed] Taking risks makes life more fun

Figure 54. Differences in socio-political attitudes between regions



It can be seen that the differences between regions are small for 'Prosocial' and 'Low profile' (with the exception of Nigeria) but higher for the three other socio-political attitudes 'Self-centred', 'Trustful' and 'Libertarian'. China stands out with high values for 'Self-centred' and 'Trustful' and low values for 'Libertarian'. Nigeria has high values for

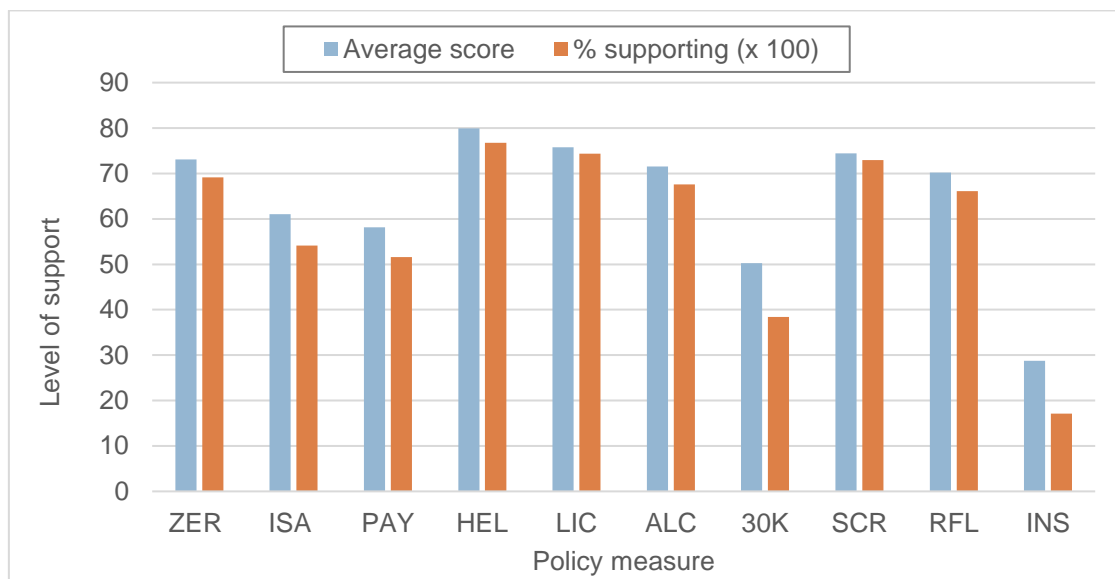
everything except 'Low profile'. Greece has a high value for 'Self-centred' and a low one for 'Trustful' (together with Argentina, Wallonia and West of France).

6.2 Support for policy measures

6.2.1 Level of public support

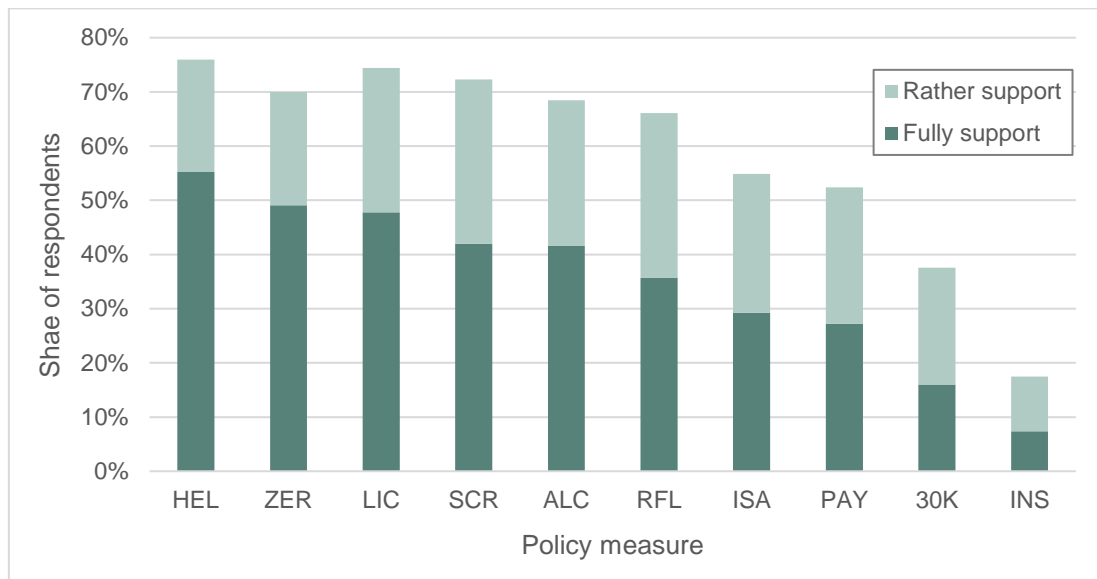
Like for the country analyses in Chapter 4, the main indicators used for analysing the level of support are the percentage of respondents supporting the measure (answer "rather support" or "support") and the average value of the level of support (after converting the scores to a value on a scale between 0 and 100). Both indicators are compared in Figure 55 for the weighted sample. It can be seen that the values for both indicators are very close, except for 30K and INS, where support is lower. For most measures, the respondents' level of support is quite high. This is an interesting finding, given that these measures are contentious and that hardly one of them has been implemented in the regions considered. The highest level of support is for HEL, followed by LIC, SCR, and ZER, and the lowest is for 30K and INS.

Figure 55. Difference between the two main indicators for the level of support



Please note that the level of support would be lower if only 'full support' (score 5) would be used for the indicator on level of support. This is illustrated in Figure 56 for the total sample in the dilemma survey. However, the differences in level of support between measures remain largely the same (e.g. high support for HEL and low for 30K).

Figure 56. Extent of support for the measures in the dilemma survey



6.2.2 Differences in support by gender, age and region

For eight measures, support is higher with females than with males (Figure 57); this is consistent with findings in Chapter 4 and the literature (Sections 2.7.4 and 2.7.5). Men show slightly higher support than women only for PAY and INS, measures with a financial element in it and with unclear effects on road safety. The latter also applies to LIC, for which the gender difference is very small. All the gender differences are statistically significant at the 0.01 level, except for PAY, where it is significant at the 0.05 level.

Figure 57. Distribution of level of support by gender

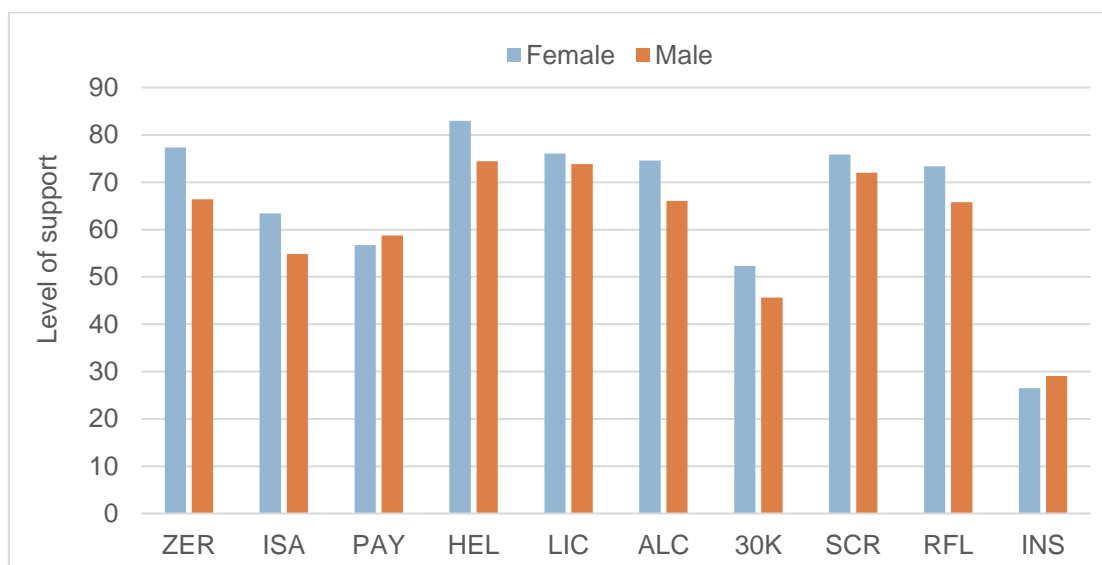


Figure 58 shows that public support decreases with age for PAY, LIC, ALC, 30K, SCR, and INS. The decrease is most pronounced for SCR, which is not surprising given that this measure targets older people. For ZER, HEL and RFL, the support increases with age; for ISA, no systematic age gradient can be observed. These results apply for the whole sample; there are often age gradients when individual regions are considered. In Section 4.3.2 such varying patterns were also observed in the ESRA sample. Whatever the pattern, the differences between the youngest and oldest age group are statistically significant at the 0.01 level except for ALC ($p < 0.05$) and ISA (not significant).

These age related findings are often not linked to aging per se, but may result from older people's longer experience in traffic, higher valuation of safety higher and lower violation of traffic rules than the young (such factors will be discussed in the next sections). In case older people feel they will be more negatively affected by a measure, one can expect the opposition to be higher; this is the case for SCR.

Figure 58. Distribution of level of support by age group

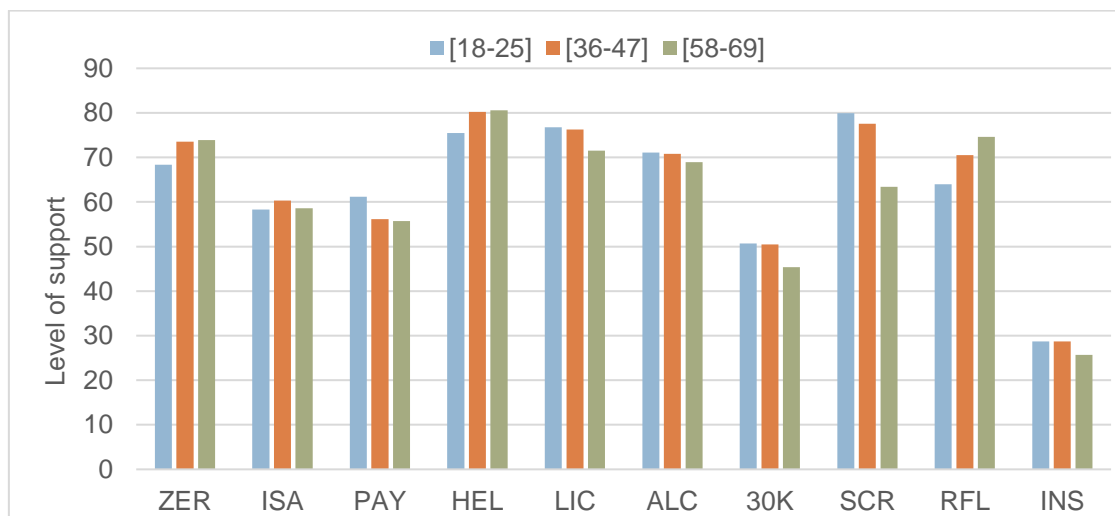


Table 57 shows for each region the average value for the level of support for the ten measures. For each measure, the three highest values are marked in light green, and the three lowest values in light orange. In the LMICs in the survey (Argentina, China, and Nigeria), support for the measures is in general higher than in Europe and the United States; this is consistent with our findings on differences between HICs and LMICs in Section 4.3.3. Within Europe, the highest level of support is often found in Greece and the lowest in Flanders. Across the whole sample, Texas and California were often the regions with the lowest support for the road safety measures. The highest variation across countries was for ISA. In all countries, INS was the measure supported the least; for China, the level of support was still fairly high (51.9).

Table 57. Level of support for measures by region

	ZER	ISA	PAY	HEL	LIC	ALC	30K	SCR	RFL	INS
Argentina	86.1	71.5	63.4	89.0	88.0	82.2	63.5	85.1	67.0	24.1
Austria	67.3	49.3	65.4	73.4	58.7	68.6	28.3	69.8	72.1	18.5
California	63.1	39.4	49.4	82.5	77.7	56.1	41.3	66.9	66.2	26.4
China	81.5	75.0	63.8	65.9	75.9	81.3	59.3	80.9	70.6	51.9
Flanders	63.1	58.4	53.3	57.2	71.8	64.5	38.7	61.1	66.5	11.6
G. London	72.5	59.7	56.7	86.6	65.0	71.8	56.1	73.5	58.9	36.7
Greece	75.9	65.0	56.2	88.9	81.6	75.4	56.0	84.3	67.2	23.5
Nigeria	84.4	82.6	63.8	93.2	87.8	83.9	68.8	88.4	70.3	46.5
Sweden	75.3	50.2	63.2	71.6	60.5	72.2	55.7	69.8	74.8	24.6
Texas	68.1	44.5	49.6	83.8	79.3	52.9	39.4	67.6	79.6	31.9
Wallonia	65.6	60.9	57.5	82.4	78.8	67.2	43.1	64.8	73.1	18.0
W. France	66.9	61.4	50.8	81.6	76.5	72.8	44.2	73.0	75.0	25.8

6.2.3 Association with road safety and traffic law enforcement

The survey included several questions regarding involvement in crashes. Surprisingly, there was hardly any association between crash involvement and support for measures. However, I found some weak associations with the **subjective feeling of safety** in traffic. In Table 58 only statistically significant correlations are shown. It can be observed that if people feel unsafe using public transport, they tend to be more supportive of the road safety measures discussed. Car drivers who feel safe on the road feel less the need for speed-reducing measures such as ISA and 30K. Cyclists who feel safe on the road are less in favour of making wearing a helmet obligatory.

Table 58. Correlation between level of support and subjective safety of road users

	Walking	Cycling	Riding a motorcycle	Driving a car	Be a car passenger	Use public transport
ZER						-.070**
ISA				-.106**	-.045*	-.052**
HEL	-.086**	-.109**				-.127**
LIC					-.041*	-.074**
30K				-.050**		-.061**
SCR	.038*					-.057**
INS	.076**	.144**	.124**		.039*	

It seems plausible that people who believe a particular **behaviour** (e.g., speeding or drunk driving) to be an important cause of road traffic injuries will be more supportive of policy measures meant to reduce this phenomenon. This assumption was supported by

correlation analyses, except for RFL. Table 59 shows the correlation coefficients between agreement with five statements and support for seven policy measures. Only correlations that are significant at the $p < 0.01$ level and with an absolute value higher than 0.1 were included. All expected correlations are present; the associations are moderate. One can also observe that people concerned about speeding also tend to support DUI related measures; the opposite is less the case.

Table 59. Correlation between beliefs on causes of crashes and support for measures

	ZER	ISA	HEL	ALC	30K	SCR
<i>"Cyclists are at high risk of sustaining a head injury"</i>			.215**			
<i>"Driving after drinking alcohol is a major cause of accidents"</i>	.236**		.110**	.155**	.113**	.127**
<i>"Speeding is a major cause of accidents"</i>	.223**	.270**	.151**	.194**	.268**	.153**
<i>"Older car drivers are often a danger to themselves and other road users in traffic"</i>						.304**

I expected to find an association between the perception of **traffic rules and enforcement** and the willingness to support supplementary interventions. I had reported already about such relationships on the basis of ESRA data (Van den Berghe, Sgarra, et al., 2020) and I also found it to apply at national level (see Section 4.4.3). Ignoring PAY and INS for a moment, Table 60 (p.222) shows that satisfaction with the current traffic enforcement practice was not or only weakly negatively correlated with support for measures. Respondents who think that the current penalties for DUI of alcohol or speeding are too severe, also tend to oppose somewhat more the measures further restricting that behaviour. Thus, the expected tendencies are found, but the level of association is weak. For PAY and INS there is a weak but positive correlation with the perception of the traffic enforcement climate. This can be considered as a sign of trust in the system.

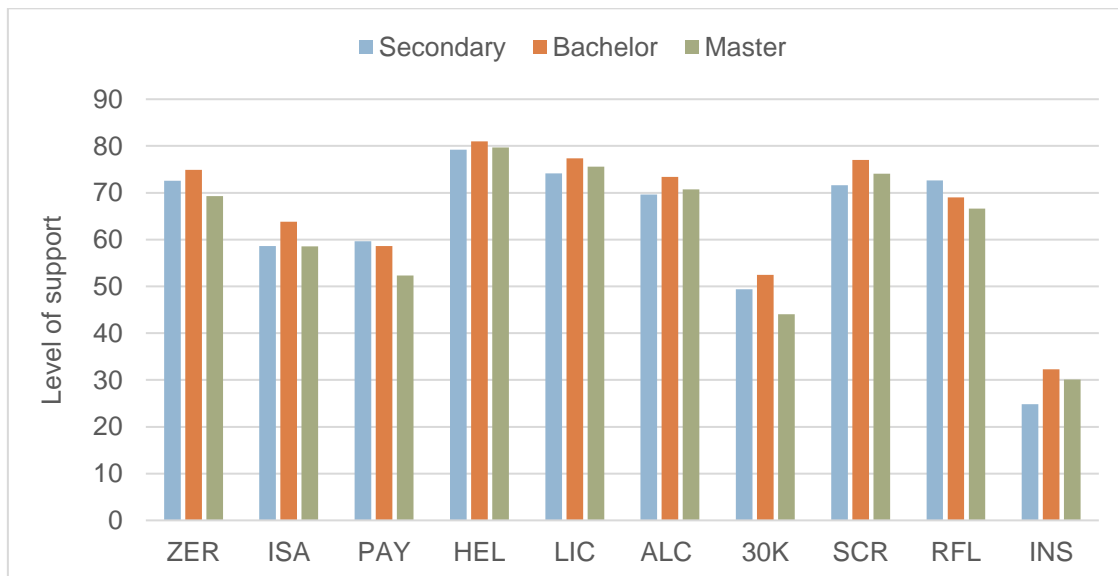
6.2.4 Association with socioeconomic characteristics

Figure 59 shows the variation in the support for measures by **education level** for the whole sample (respondents with only primary education were left out because of the small numbers). The differences appear to be small. Only for PAY and RFL there is a weak negative qualification gradient, i.e. the higher people are qualified the less they are supportive of the measure. It can also be observed that for eight of the ten measures, people with Bachelor's degrees are most supportive of the measures.

Table 60. Correlation between support for measures and opinions about traffic rules and enforcement

	<i>"The current traffic safety regulations are well enforced by the police in my country"</i>	<i>"The current traffic safety regulations are well respected by the road users of my country"</i>	<i>"The penalties for driving under the influence of alcohol are too severe"</i>	<i>"The penalties for driving faster than the speed limit are too severe"</i>
ZER	-.035**		-.130**	
ISA				-.157**
PAY	.030*	.053**	.026*	.032*
HEL	-.078**	-.155**		
LIC	-.032*	-.073**		
ALC	-.031*	-.027*	-.069**	
30K				-.146**
SCR		-.037**		
RFL				
INS	.094**	.147**		

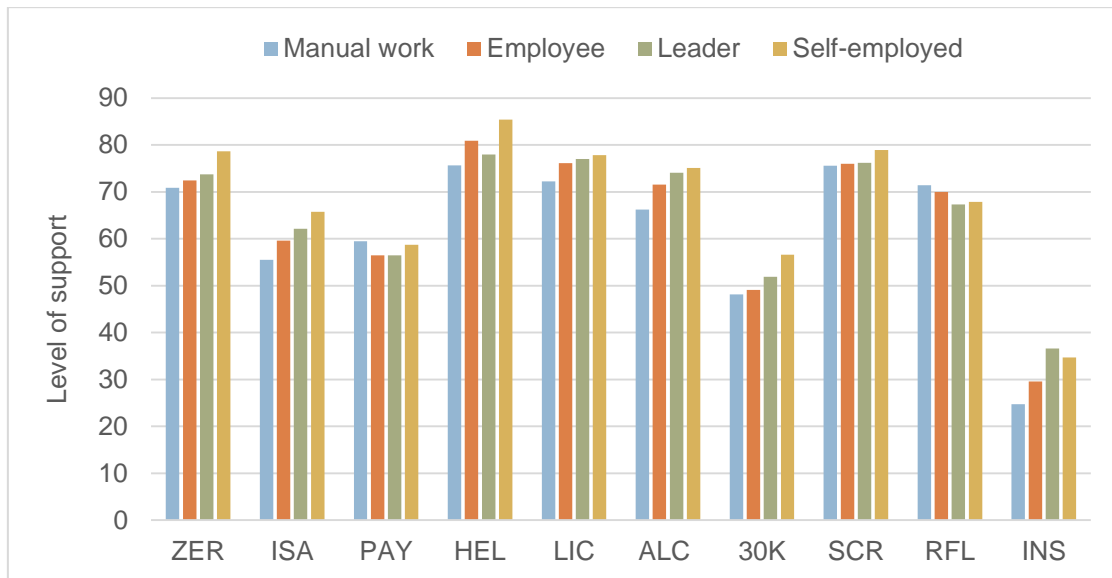
Figure 59. Support for measures by level of education



Urbanisation level, for which only European data was available, is not or only weakly correlated with support for measures. The highest negative correlation ($r = -0.143$, $p < 0.01$) was found for RFL, meaning that people from urban areas are more against this measure. There is also a very weak but significant correlation between level of urbanisation and 30K ($r = 0.052$, $p < 0.01$). People from intermediate areas support somewhat less HEL and SCR than people from urban and rural areas.

For the respondents with a **job**, the self-employed and those in leading positions (CEO, department head) are in general somewhat more supportive than those doing manual work (Figure 60). Employees occupy an intermediate position. The only measures where this general trend does not apply are PAY (hardly any difference between occupational groups) and RFL (manual workers most supportive).

Figure 60. Support for measures by type of job



6.2.5 Association with transport modes and behaviour

Respondents with a car driving licence are less supportive of most measures than those without a licence; the biggest differences are with the speed related measures (30K and ISA). Only for RFL those with a car driving licence are more in favour; for HEL it is about equal. The association with support for measures is somewhat stronger with the number of vehicles in the household. Figure 61 illustrates that a higher number of vehicles is associated with lower support for six of the eight car-related measures. The strongest association is with ISA ($r = -0.192$, $p < 0.01$). For support for HEL, LIC and RFL there is no association with the number of vehicles.

Figure 62 shows the level of support for the measures of three groups of road users: cyclists (N = 44), users of public transport (N = 208) and car drivers (N = 794). It concerns respondents who use only that particular transport mode on a regular basis. It can be seen that people who only use public transport are most in favour of the measures proposed (except RFL and INS) and that car drivers' support is the lowest (except RFL and HEL). Cyclists are least supportive for the obligation to wear a helmet. Overall then, these findings give some support to the observation made by others

(Watling & Leal, 2012) that road users are more supportive for road safety measures and enforcement that do not affect them negatively.

Figure 61: Support for measures by number of vehicles in the household

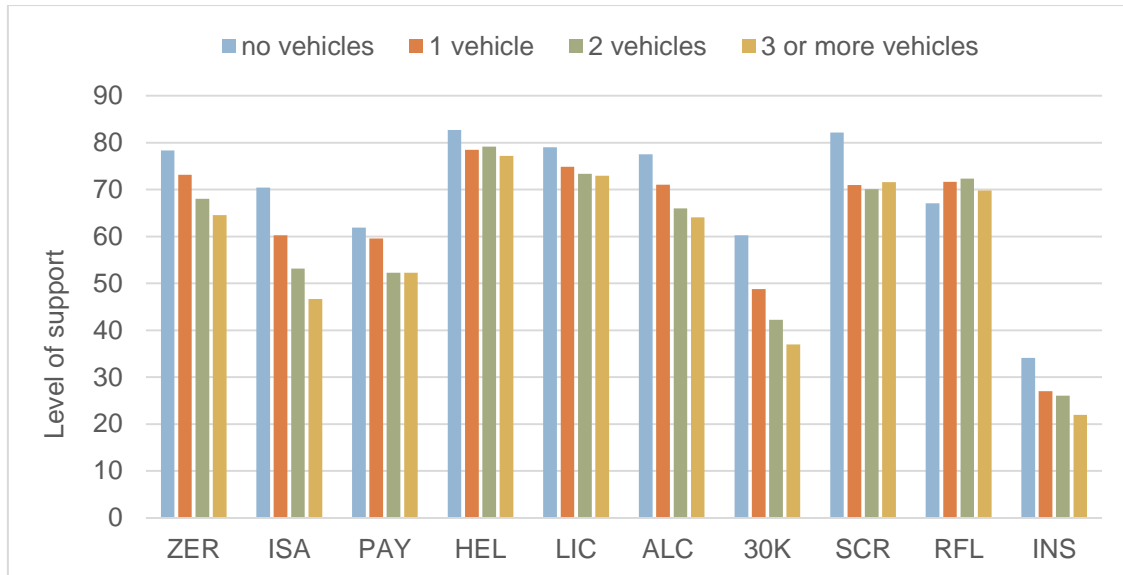
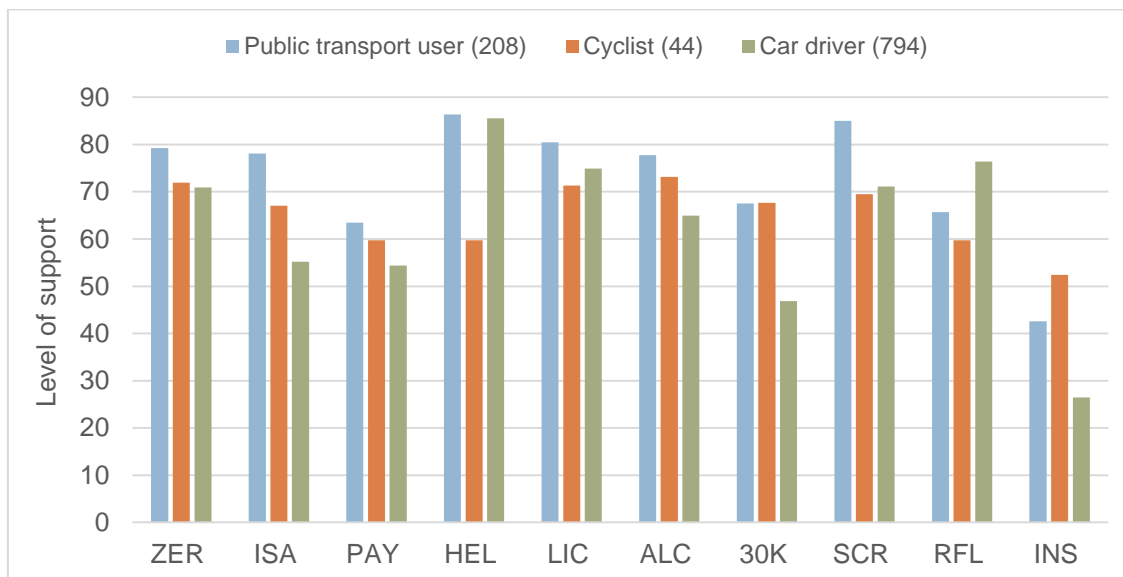


Figure 62: Support for measures by people using only one transport mode regularly



Respondents were asked whether they had engaged in particular risky behaviours on the road. I hypothesized that someone engaging in risky behaviour would be more opposed to measures restricting that behaviour even further; I have already shown that such a relationship exists at the national level (cf. Section 4.4.4). Table 61 shows the correlations between the extent of engagement in particular behaviours and the support for measures targeting motorists (non-significant correlations were left out).

The questions on behaviour asked whether the respondent had engaged in this behaviour over the previous 30 days (for the exact formulation of the questions on behaviour, see Appendix A4). Respondents were only asked to report this for the transport modes they used regularly.

Table 61. Correlation between support for measures and car drivers engaging in particular behaviours

	ZER	ISA	PAY	LIC	ALC	30K	SCR	INS
Drunk driving	-.121**			.048**	-.061**			
Speeding in built-up areas	-.095**	-.114**			-.079**	-.142**		
Speeding in rural areas	-.096**	-.149**		-.043**	-.084**	-.159**		-.034*
Speeding on motorways	-.120**	-.231**	-.043**		-.103**	-.152**		-.037*
Use mobile phone				.066**			.140**	.066**
Sleepy driving				.036*			.040*	.056**
Not see pedestrians			.038*		.034*		.041*	
Use cruise control	-.079**	-.067**		-.035*	-.053**	-.100**		

Although the correlations are not very strong, drivers who self-reported speeding were less supportive of 30K, ISA, ZER and ALC. Drivers who admitted drunk driving were less supportive of ZER and slightly less supportive of ALC; no correlation was evident with ISA and 30K. Thus, drunk drivers are, on average, neutral to speed-related measures, but speeders are also opposed to alcohol-related measures. Further observations include that regular use of cruise control does not lead to support for ISA or ALC, but rather the opposite - perhaps because drivers have experienced the limitations of these systems? In addition, the positive association between mobile phone use while driving and SCR is to be noted. This is related to differences between age groups: younger people use more mobile phones and are more in favour of SCR than older people.

I also checked the possible association between not using bike helmets and support for HEL. The association was negative and moderate ($r = -0.286$, $p < 0.01$). Cyclists who reported drunk driving were also more opposed to HEL ($r = -0.121$, $p < 0.01$) and ZER ($r = -0.141$, $p < 0.01$). Pedestrians who reported wearing retroreflective clothing in the dark tended to support RFL ($r = 0.136$, $p < 0.01$). The strongest negative association was observed between pedestrians ignoring red lights and RFL ($r = -0.185$, $p < 0.01$).

6.2.6 Association with socio-political attitudes and the social norm

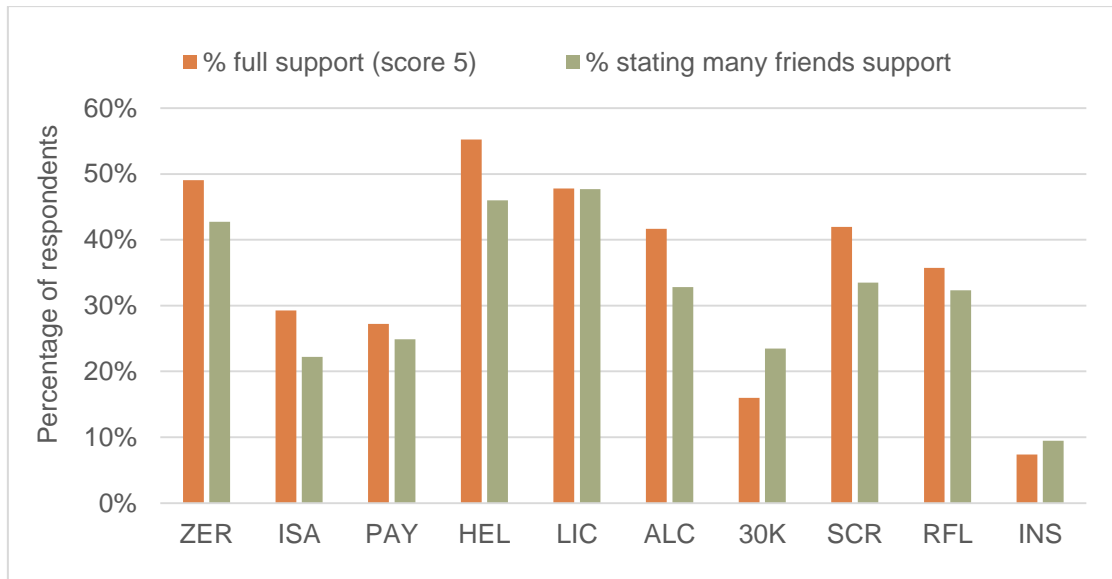
Table 62 shows the correlations between socio-political attitudes of the respondents and their support for the policy measures (non-significant correlations are left out). Although the correlations are weak, almost all of them are significant. Respondents who are 'Trustful' or 'Prosocial' tend to be somewhat more supportive of the measures. The opposite holds for those who are more 'Libertarian' – which is plausible given the items on which the libertarian construct is based (see Table 56). People who are self-centred tend to support most measures except ZER, HEL and RFL. 'Low profile' is correlated, mostly positively, with support for about half of the measures.

Table 62. Correlations between support for measures and socio-political attitudes

	Self-centred	Trustful	Libertarian	Prosocial	Low profile
ZER	-.036**	.058**	-.061**	.076**	.060**
ISA	.036**	.138**	-.032*	.051**	.092**
PAY	.058**	.049**	.038**		
HEL	-.049**	-.036*	-.068**	.151**	
LIC		-.043**		.097**	
ALC	.039**	.064**	-.059**	.079**	.051**
30K	.064**	.123**	.045**		
SCR	.116**	.029*		.061**	-.045**
RFL	-.056**	.045**	-.053**	.094**	.080**
INS	.153**	.222**	.068**	-.081**	

Another element to be considered is the so-called '**Social norm**', which was operationalised in the survey by a question on whether the respondents thought the measure would be supported by their friends. The findings are shown in Figure 63, comparing the full support by the respondents themselves (excluding those who said 'rather support') with the perception of whether their friends would support it. It can be seen that the willingness to support a measure and the perceived social norm about the measure are strongly associated with each other.

Figure 63: Comparison between full support for measures and the perception of whether friends would support.

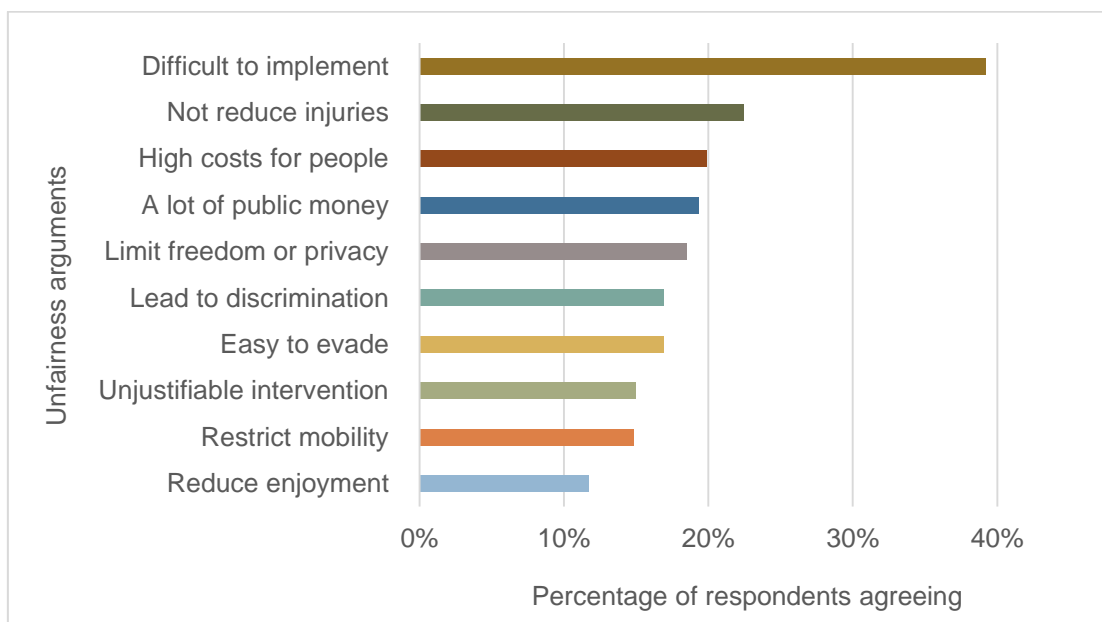


6.3 Distribution of the unfairness arguments

6.3.1 Frequency of the arguments used

As explained in Section 3.5.5, respondents had to indicate whether they agreed with a range of statements about the measures; each respondent was presented with three measures selected at random. For brevity I refer to agreements with these statements as 'unfairness arguments', 'counterarguments' or simply 'arguments'. Figure 64 shows how frequent each of these arguments has been used, all measures taken together.

Figure 64. Frequency of unfairness arguments used



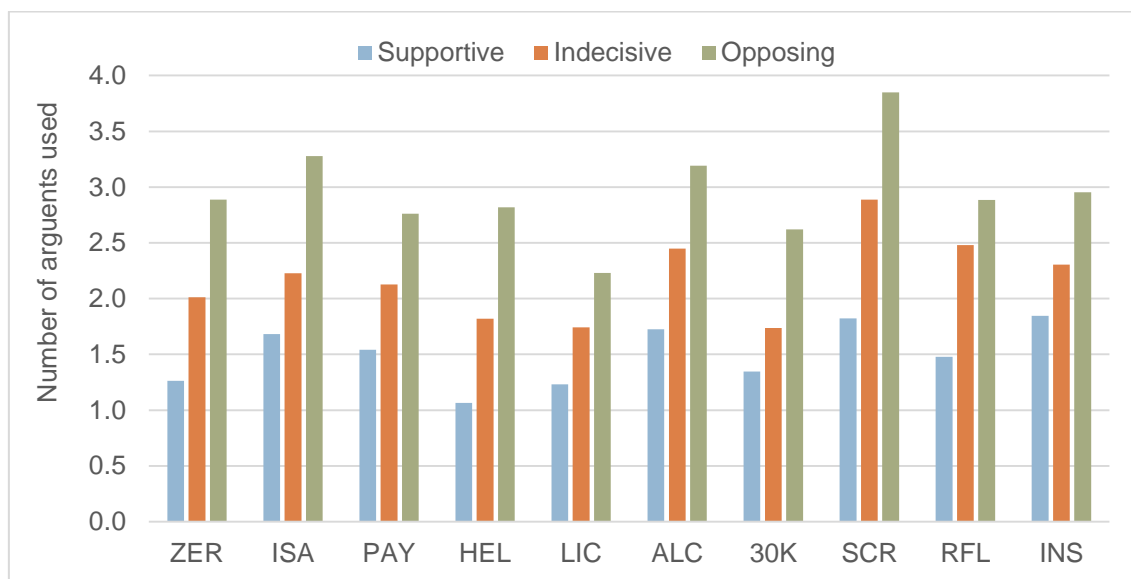
Obviously 'Difficult to implement' is seen as the most relevant argument across all measures combined; it was used in 39% of cases. Most other arguments were used in about 15 to 20% of cases; "Reduce enjoyment" was used least (12% of cases). This distribution differs with the views of the experts (see Section 5.7.1) who used more counterarguments related to 'Limited added value'. In the dilemma survey the limited added value, operationalised as 'Will not reduce injuries', only came second.

6.3.2 Opposition to measures and the use of unfairness arguments

On average, respondents used two counterarguments per measure. I expected stronger opposition to be associated with a higher number of unfairness arguments, because of the association between perceived unfairness and opposition to measures observed in the interviews (cf. Section 5.6.4). This assumption was confirmed: for each measure, there is a negative and statistically significant ($p < .01$) correlation between the level of support for that measure and the number of counterarguments. The range of the correlation coefficients was between -0.391 (HEL) and -0.229 (INS).

This systematic negative association is illustrated in Figure 65. The figure shows for each measure the number of counterarguments used by those supporting the measure, by those opposing it and those who are indecisive. Opponents to a measure systematically use more counterarguments than those who support it. The figure also illustrates that people can be supportive of a measure even if they agree with one or more of the counterarguments.

Figure 65: Number of unfairness arguments used by supportive, indecisive and opposing



The correlations between the level of support for policy measures and the use of particular arguments are displayed in Table 63. With few exceptions, all relationships are negative and statistically significant. The strongest negative associations of an argument with support for the measures is for 'Unjustifiable state intervention', with correlations ranging from -0.254 (LIC) to -0.435 (ISA). Moderate to strong associations are seen for 'Not reduce injuries' and 'Limit freedom or privacy.' The weakest associations are found with 'Easy to evade', 'High costs for people' and 'Difficult to implement'. This means that these arguments are not an important factor for determining the level of support for the set of measures considered. It is interesting to note that this conclusion also holds for 'Difficult to implement', despite the fact that it is the argument used most.

'Lead to discrimination' is only strongly (negatively) associated with three measures that could be perceived as discriminatory: INS, SCR, and PAY. These were also the three measures that I had included in my list of contentious measures because I expected them to be seen as discriminatory by part of the respondents.

Table 63. Correlation between support for measures and the use of the unfairness arguments

	ZER	ISA	PAY	HEL	LIC	ALC	30K	SCR	RFL	INS
Not reduce injuries	-.250**	-.253**	-.210**	-.221**	-.241**	-.160**	-.303**	-.306**	-.166**	-.190**
Limit freedom or privacy	-.352**	-.347**	-.148**	-.371**	-.061*	-.275**	-.193**	-.292**	-.308**	-.214**
Reduce enjoyment	-.282**	-.193**	-.088**	-.351**	-.071**	-.196**	-.198**	-.258**	-.236**	-.096**
Restrict mobility	-.280**	-.248**	-.056*	-.209**		-.170**	-.241**	-.188**	-.176**	-.057*
Lead to discrimination	-.188**	-.143**	-.344**	-.129**	-.072**	-.168**	-.126**	-.349**	-.123**	-.379**
A lot of public money	-.122**		-.048*	-.108**	-.184**	-.058*	-.070**		-.068**	.123**
High costs for people		-.076**		-.115**		-.113**	-.061*	-.145**	-.133**	
Easy to evade			-.056*			-.082**				
Difficult to implement	-.093**		-.072**	-.091**	-.089**	-.065**	-.059*		-.121**	.112**
Unjustifiable state intervention	-.304**	-.435**	-.329**	-.346**	-.254**	-.369**	-.358**	-.391**	-.302**	-.291**

The strongest correlations with a range of counterarguments are found for HEL, ZER, SCR and ISA. For LIC the association with the arguments is not very strong. This suggest that other types of arguments need to be taken into consideration when

assessing whether the measure should be supported. The pattern for INS is quite unique: the level of support for this measure is very strongly associated with 'Lead to discrimination' (more than with 'unjustifiable state intervention') and there is a statistically significant positive correlation with 'A lot of public money' and 'Difficult to implement'. So even when respondents think that the measure will not require a lot of money or would be easy to implement, they nevertheless oppose the measure, probably because they consider it to be highly discriminatory.

Please note both LIC and PAY were included on purpose in the set of measures because they had other value conflicts than the other measures and transcended beyond road safety. Hence it was to be expected that this would be reflected in different patterns of associations with these measures, including the use of the counterarguments.

6.3.3 Differences in the use of unfairness arguments by gender, age and region

Figure 66 (p.231) shows that men use more counterarguments than women, which is consistent with the observation that their opposition to measures is somewhat higher. The biggest gender differences are seen with ZER, ISA, HEL, ALC, and 30K, measures which are inhibiting risky behaviour and freedom of movement. There is no gender difference for PAY, and the male-female difference is small for SCR, LIC, and INS. For all measures (except SCR), the number of counterarguments decreases with age; this is most pronounced in the case of ISA, HEL, ALC, and RFL.

The highest number of arguments was used in Austria (22.0%), Nigeria (22.3%), and Wallonia (22.0%), and the lowest number in China (16.2%) and Sweden (16.9%). Figure 67 and Figure 68 show how the use of these arguments differs between regions. The argument 'Difficult to implement' was the one used most in all regions. The highest value was for Greece (51.0%), meaning that the Greek respondents on average used this for five measures. The lowest prevalence was in Flanders (30.9%). Please note, however, that this 'low' value is still higher than the value for any other region-argument combination of region and arguments, with the exception of 'Not reduce injuries' in Austria. Other interesting observations are the low values for "Limit freedom or privacy", "Lead to discrimination," and "Easy to evade" in the case of China. Other relatively exceptional values can be seen for "High costs for people" in Nigeria and "Unjustifiable intervention of the state" in California and Texas.

Figure 66: Number of unfairness arguments used by gender and age group

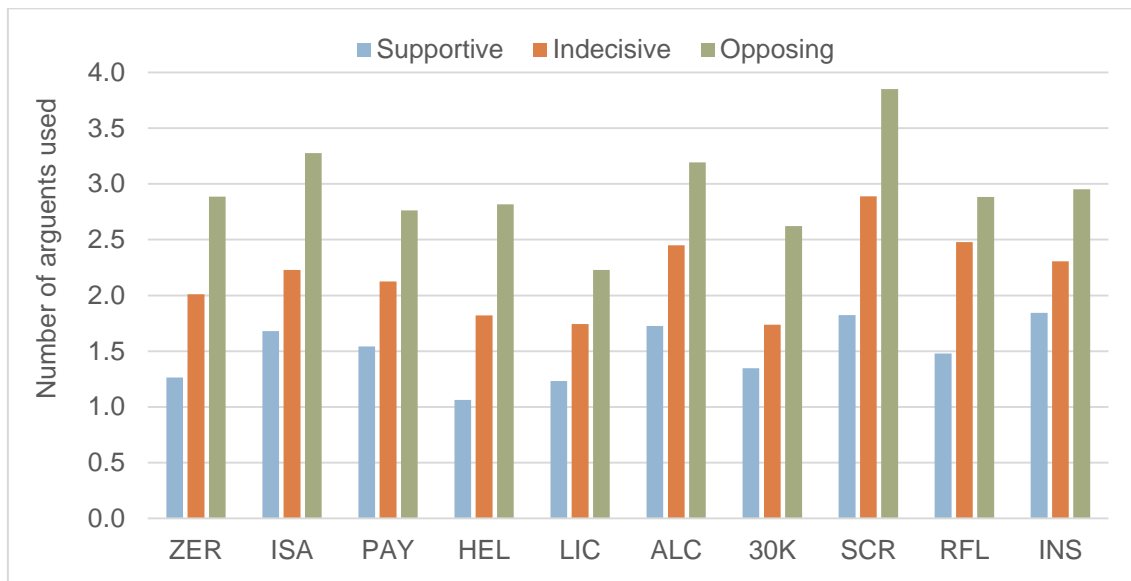


Figure 67. Frequency of unfairness arguments used, by region (1)

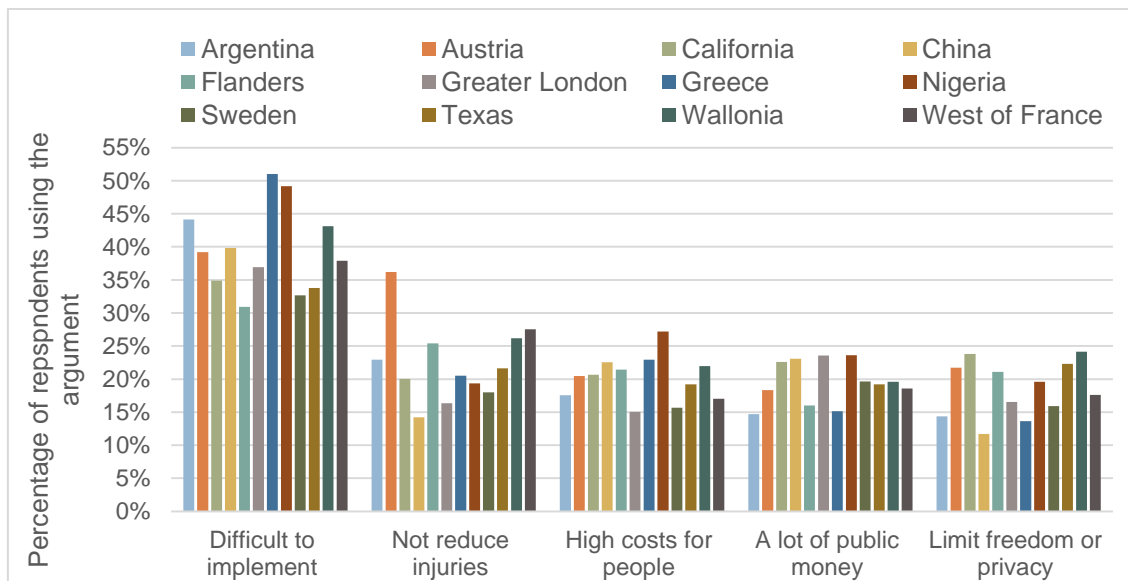
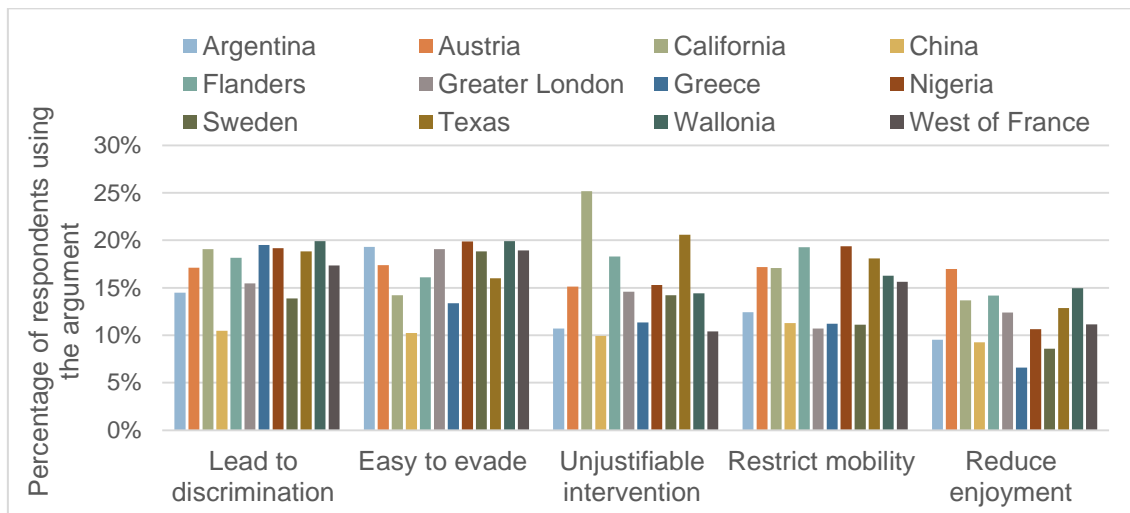


Figure 68. Frequency of unfairness arguments used, by region (2)

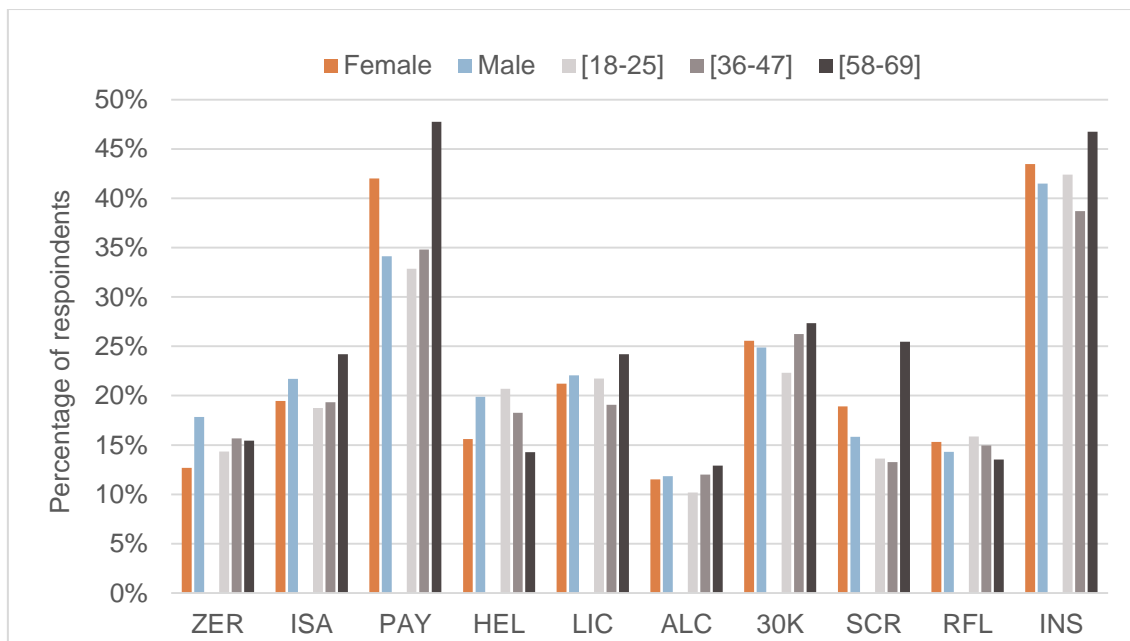


6.4 Further analysis of each of the arguments

6.4.1 'This policy measure would not reduce road traffic injuries'

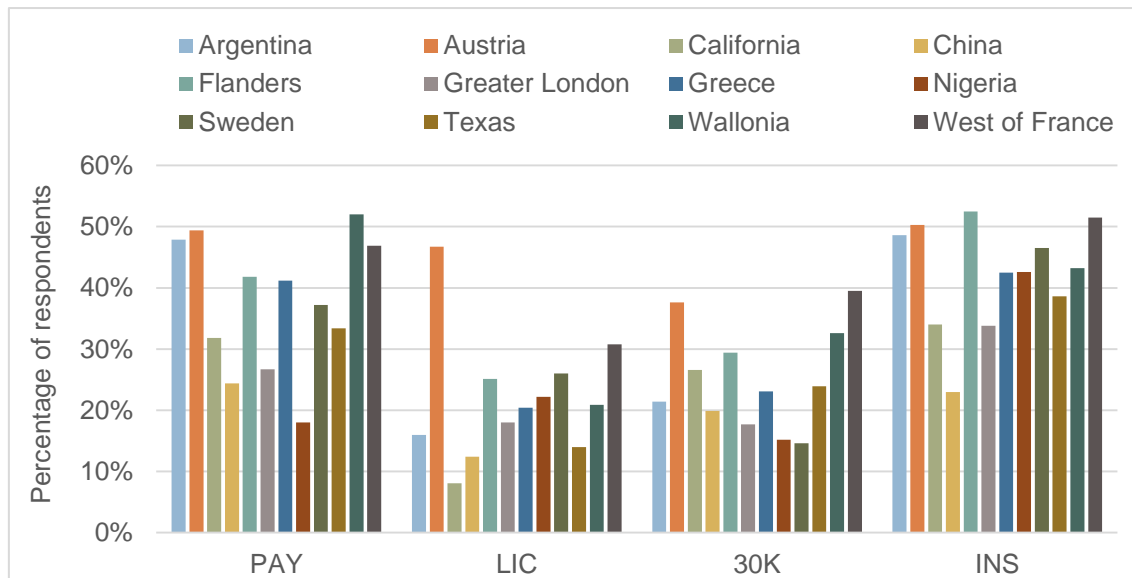
Figure 69 shows that around 40% of the respondents believe that INS and PAY would not reduce road traffic injuries. For 30K it is approximately 25% and for the other measures this argument is used even less. The lowest value is for ALC; around 10% do not believe in its effectiveness. For seven measures it is the oldest age group that has most doubts about their effectiveness; the difference with other age groups is quite substantial for SCR and PAY. With the exception of PAY, where females believe less in effectiveness than males, gender differences are small.

Figure 69. Perceived ineffectiveness of measures in reducing injuries, by gender and age



When all measures are considered together, Austria, West of France, Wallonia, and Flanders are the regions where respondents have the highest doubts on the safety effects of the measures; the highest beliefs are in China and London. Figure 70 shows the distribution by region for the four measures where effectiveness is questioned most: PAY, LIC, 30K and INS. For three of them, China has the lowest disbelief.

Figure 70. Perceived lack of effectiveness of four measures, by region

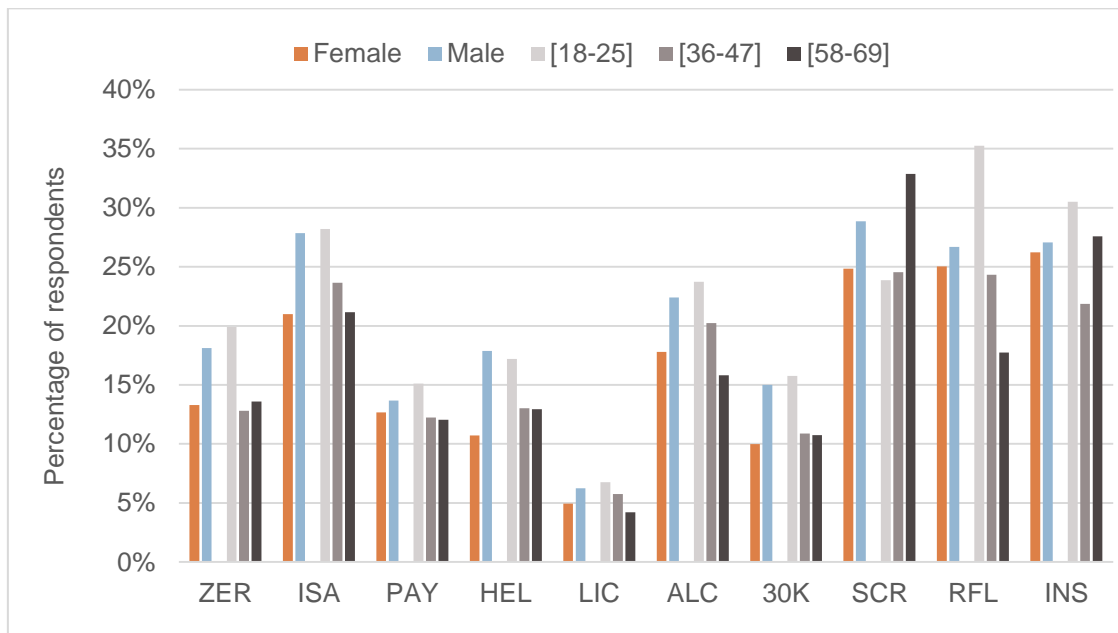


Respondents from Argentina, Austria, Flanders, and West of France believe most that PAY and INS would lead to a reduction of injuries (values around 50%). The differences between regions are smaller for INS than for PAY. The low values for PAY in Nigeria and London mean that many respondents believe in its effectiveness in reducing road crashes and injuries. Austria and West of France have the highest values for LIC and 30K, implying more doubts about the road safety effects of these measures. For LIC the low values for the United States (California and Texas) should also be noted.

6.4.2 'This policy measure would limit people's individual freedom or privacy'

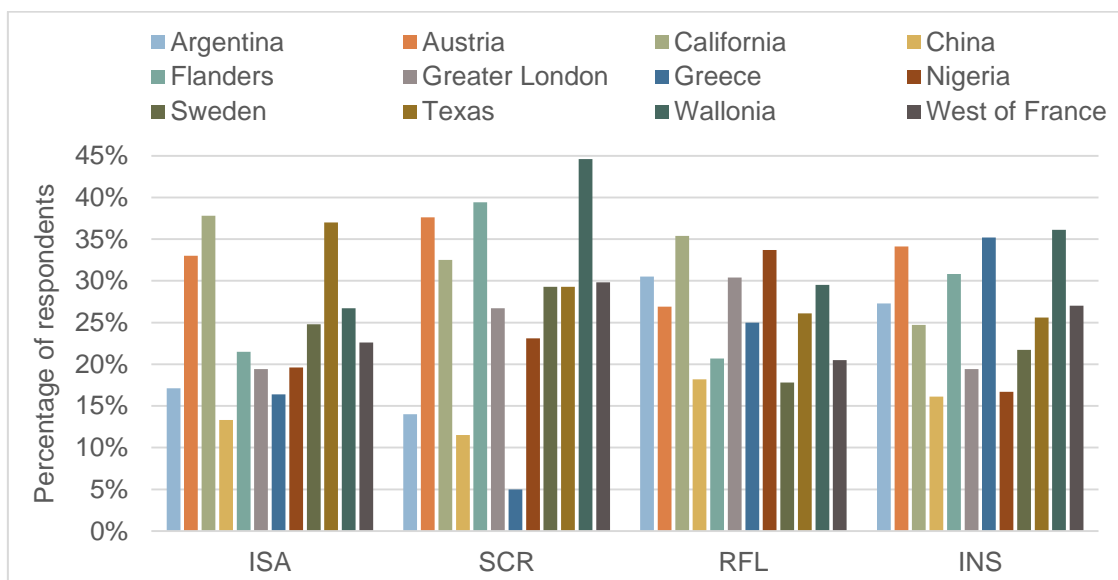
About 25% of the respondents think that ISA, SCR, RFL and INS would lead to a limitation of people's individual freedom or privacy. As Figure 71 shows, the lowest value is for LIC (about 5%). Men seem to be more concerned about the restriction of freedom and privacy than women; this difference is highest for ISA and HEL. For all measures except SCR and INS, the perception of restriction of freedom or privacy diminishes with age. The biggest age differences can be observed for RFL.

Figure 71. Perceived limitation of freedom or privacy of measures, by gender and age



All measures considered together, respondents from Austria, Belgium, and the United States are most concerned about the restriction of freedom and privacy; the concerns are lowest in China, Greece and Argentina. Figure 72 shows the distribution by region, for the four measures with most concerns about freedom and privacy: ISA, SCR, RFL and INS.

Figure 72. Concern about limitation of freedom or privacy for four measures, by region



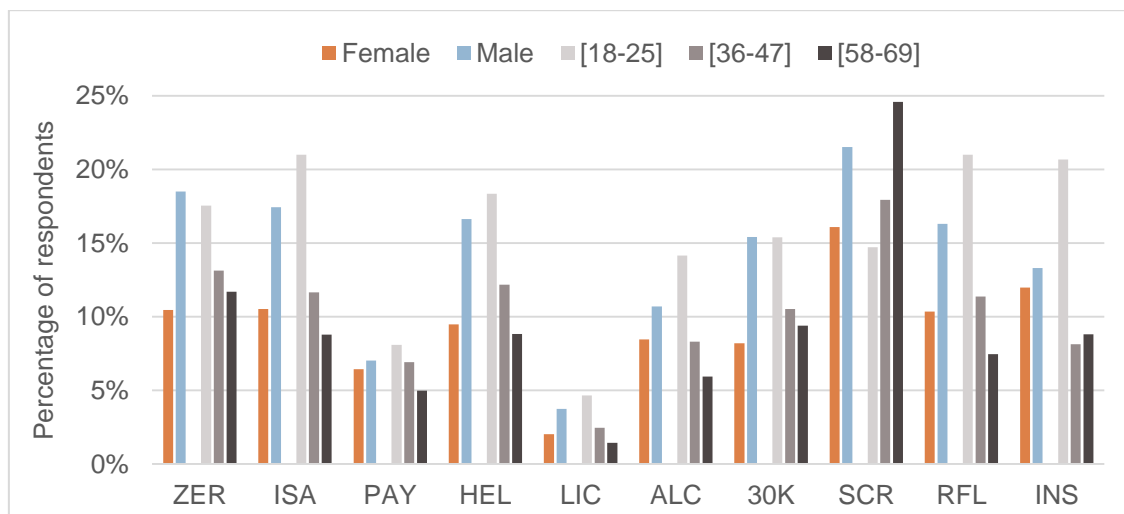
For ISA the highest concerns are with the respondents from Austria, California, and Texas (about 35%). Even higher concerns are found for SCR in Belgium (over 40%). For SCR, the lowest values are in Argentina, China and Greece; in the case of Greece

this could be related to the fact that such a screening system already exists. For RFL, the highest concerns are in California and the lowest in China, Flanders, and Sweden. A different picture emerges for INS, with highest concerns in Wallonia, Greece and Austria. Interestingly, within Belgium, Flanders has much higher values than Wallonia for SCR, but the opposite holds for INS and RFL. For the four measures shown, the concern for freedom and privacy is higher in California than in Texas.

6.4.3 ‘This policy measure would reduce people’s enjoyment in life’

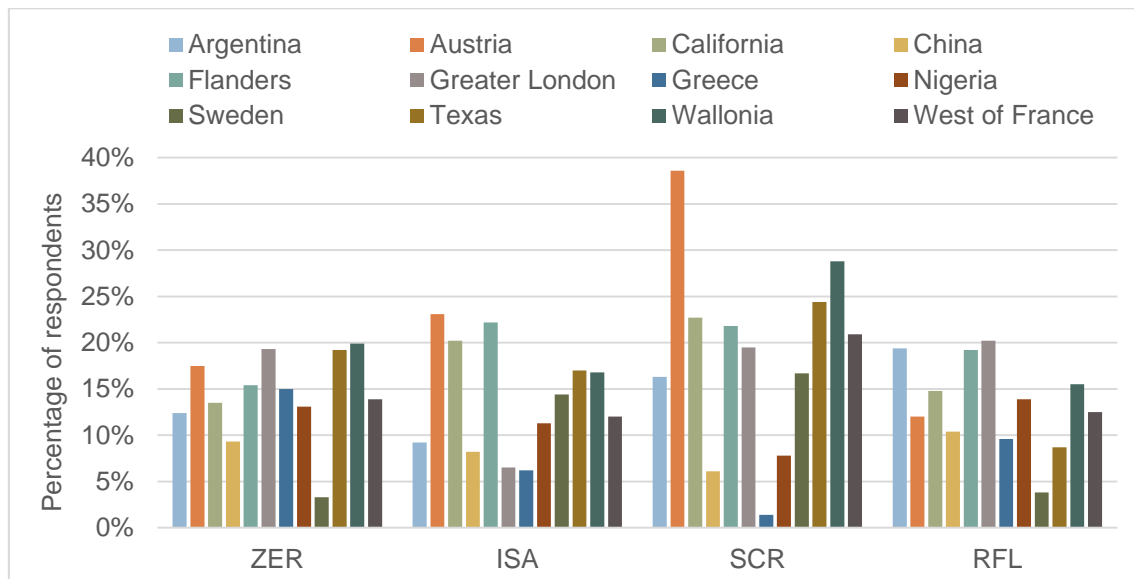
Figure 73 illustrates that almost 20% of the respondents think that SCR would lead to a limitation of people’s enjoyment in life; it is 25% in the highest age group. LIC and PAY are seen as the measures which reduce joy in life the least. For all measures, men are more concerned about this than women; the differences are considerable for ZER, ISA, HEL, 30K, SCR and RFL. With the exception of SCR, young adults are much more concerned about possible loss of enjoyment in life than the two other age groups; the difference is quite substantial for ISA, HEL, RFL and INS.

Figure 73. Perceived reduction of joy by the measures, by gender and age



All measures considered together, Austria, Belgium, and the United States are the countries where people are most concerned about the possible reduction of joy in life; this was also the case for freedom and privacy (Section 6.4.2). The concerns are lowest in Greece and Sweden. Figure 74 shows the distribution by region, for the four measures for which there is most concern about possible reduction of enjoyment in life: ZER, ISA, SCR, RFL.

Figure 74. Perceived reduction of joy with four measures, by region



Perceptions about reduced enjoyment in life vary most between countries for SCR, with very high values for Austria (almost 40%) and very low for Greece (almost zero). Flanders and Wallonia have values between 15% and 25% for the measures displayed in the chart. In London the values are around 20%, except for ISA, where the value is lower. In Argentina, about 20% of the respondents think that joy in life would be reduced if RFL would be implemented. The relatively low values for China (all four measures) and Sweden (ZER and SCR) are also noteworthy.

6.4.4 'This policy measure would restrict people's mobility'

Figure 75 clearly shows that SCR is the measure that is perceived to restrict mobility the most: one-third of the respondents used this mobility argument. This percentage is quite stable across gender and age groups; the value of the oldest age group differs by only 6.2% from that of the youngest. For four other measures, over 15% of the respondents had mobility concerns: 30K, ISA, ALC, and ZER. For all of these, there is a systematic decrease with age, suggesting that older people are less concerned that these measures would affect their mobility; the opposite is the case for SCR. PAY is the measure for which the mobility argument is used the least (6.9%).

When all measures are taken together, Flanders, Nigeria, and Texas are the regions with the greatest concern for reduced mobility; Sweden, Greece, and China have the lowest. Figure 76 shows the distribution by region for the four measures with the highest perceived restriction of mobility (ISA, ALC, 30K, and SCR). The graph illustrates that the mobility argument for SCR is used most frequently in Belgium,

Austria, France, and the United States, but hardly at all in China. For ISA, the strongest concerns are again in the United States and in Flanders. The highest value for ALC was in Texas, the lowest in Sweden. The fear that 30K will reduce mobility is the highest in Austria; it is the lowest in Greater London and western France.

Figure 75. Perceived restriction of mobility for the measures, by gender and age

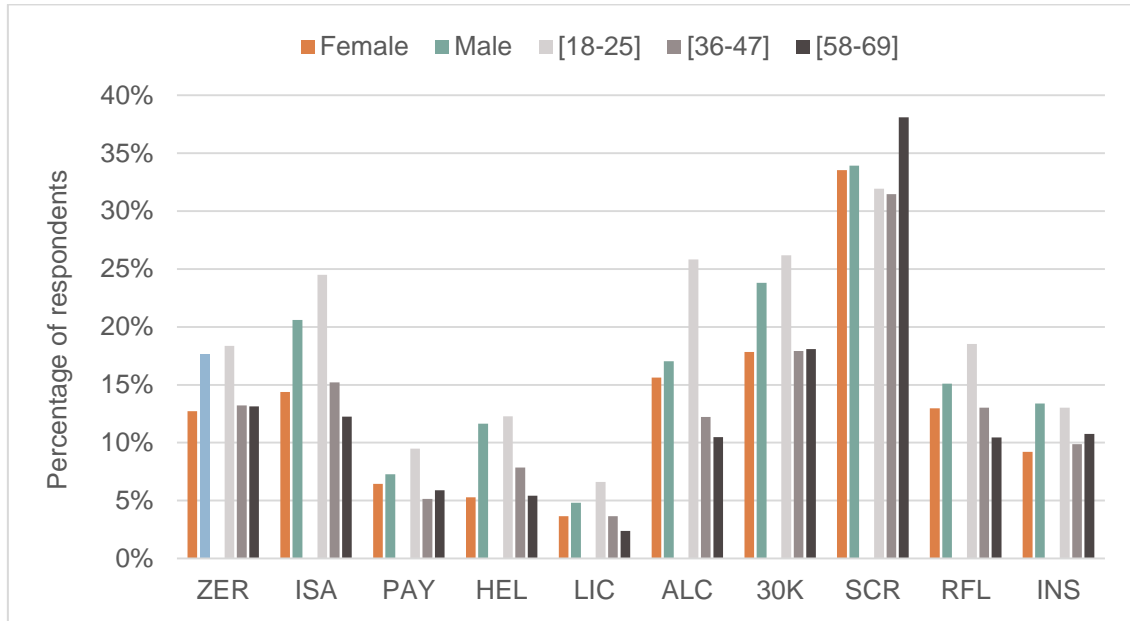
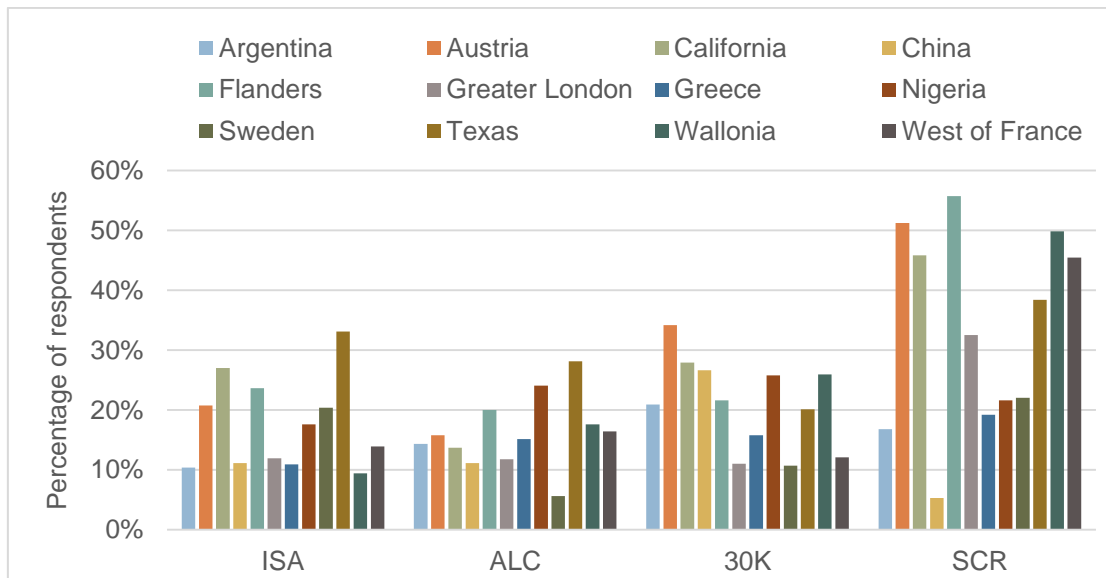


Figure 76. Perceived restriction of mobility for four measures, by region

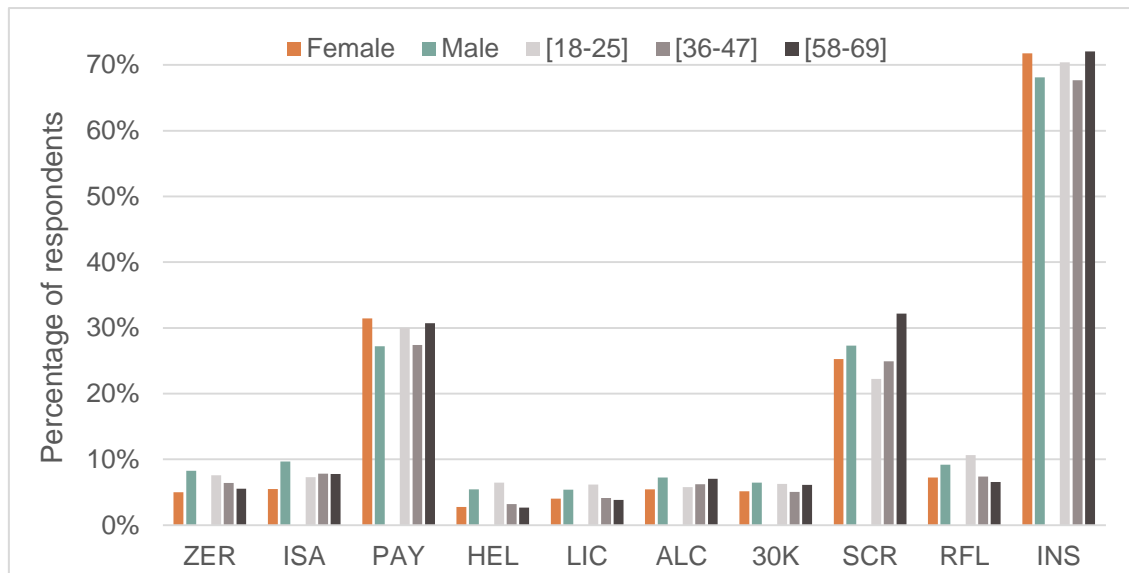


6.4.5 'This policy measure would lead to discrimination'

Figure 77 illustrates that discrimination is only perceived as an issue for three of the ten measures. The value is very high for INS: about three-quarters of the respondents

consider that such a measure would be discriminatory, with little variation across genders and age groups. About a quarter of the respondents believe that two other measures, SCR and PAY, lead to discrimination. One-third of the oldest age group considers SCR to be discriminatory. It is also interesting to observe that most respondents consider the built-in unequal treatment in PAY to be justifiable.

Figure 77. Perceived discrimination by the measures, by gender and age

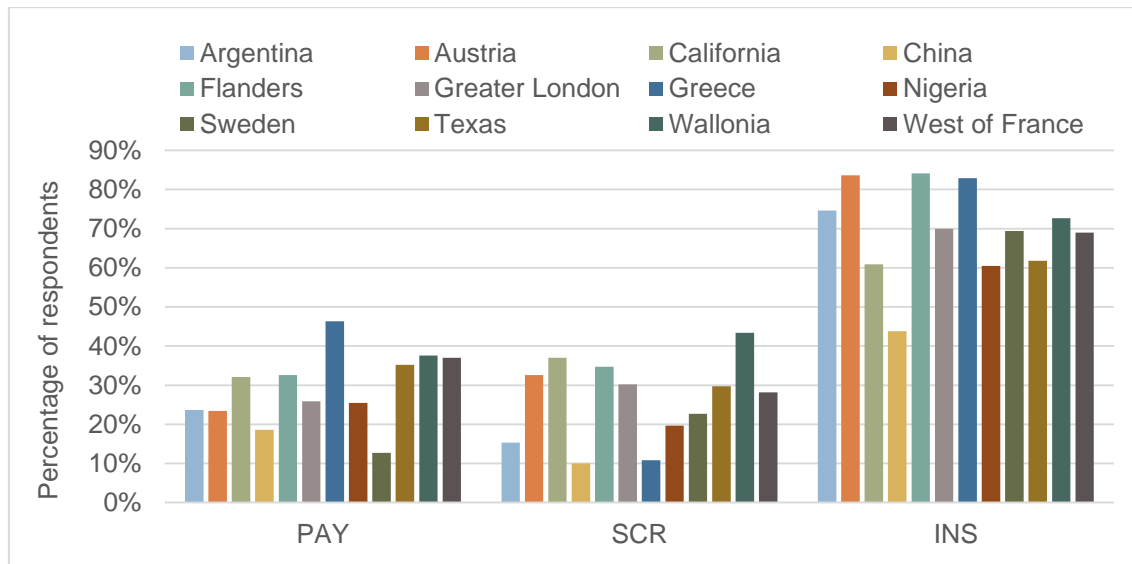


When all measures are considered together, respondents from Greece, Nigeria, Belgium and the United States perceive the most discrimination (about 20%), while the Chinese perceive the measures to be the least discriminatory. Figure 78 shows the distribution by region for the three measures with the highest perceived discrimination (PAY, SCR, INS). In all regions except China, INS is seen as discriminatory by 60-85% of the respondents; the percentage is only around 40% for China. Respondents in Austria, Flanders, and Greece were most likely to perceive INS as leading to discrimination. Almost half of the Greek respondents find PAY discriminatory, compared with approximately 10% in Sweden, even lower than the Chinese value. It is well known that Sweden is one of the most egalitarian societies in the world (Wilkinson & Pickett, 2011), and some measures that are similar to PAY are already applied.

The low value for Greece (about 10%) for SCR can be explained by the fact that a comparable measure is already operational in that country. The low Chinese value for SCR may be related to an above-average belief that older drivers are bad drivers. This is supported by data from the survey: 38.6% of the Chinese respondents agreed fully with the statement “Older car drivers are often a danger to themselves and other road users in traffic”, while the total sample average was 29.8%. The lower value for INS is

linked to the higher support for INS; three-quarter of the Chinese respondents supporting INS do not consider the measure to be discriminatory. Moreover, the Chinese appear to be more convinced than other regions that men are better drivers than women (this is believed by 32.3% of the whole sample, but by 66.4% of the Chinese).

Figure 78. Perceived discrimination for three measures, by region



6.4.6 'This policy measure would require a lot of public money'

Figure 79 shows that several of the measures are seen to require a lot of money. Almost half of the respondents think that LIC would be very costly for society. ISA, ALC and SCR are perceived as expensive interventions by about one-quarter of respondents. The measures considered to be cheap for society are HEL and INS. Males tend to be more concerned about the costs, but differences with females are in most cases small. The younger age group seems to be most concerned about the cost issue; this is particularly visible for ISA, ALC and SCR.

When all measures are considered together, respondents from Greater London, Nigeria and California seem to be most sensitive to the cost issue; this is least the case in Greece and Flanders. Figure 80 shows the distribution by region for the four measures which are seen to require most public resources (ISA, LIC, ALC and SCR). The differences in views across countries about LIC in relation to the perceived need of public resources are considerable: around 60% in Austria, Greater London and Sweden, versus around 30% in Argentina, Flanders, Nigeria and Texas. If anything, these differences illustrate how difficult it is for people to assess how much financial

resources governmental interventions actually require. For ISA, ALC and SCR the differences between countries are smaller. Noteworthy are the low values for SCR in Argentina and Greece, and the low values in Argentina, Austria and Flanders for ISA and ALC.

Figure 79. Perception of the need for a lot of public money, by gender and age

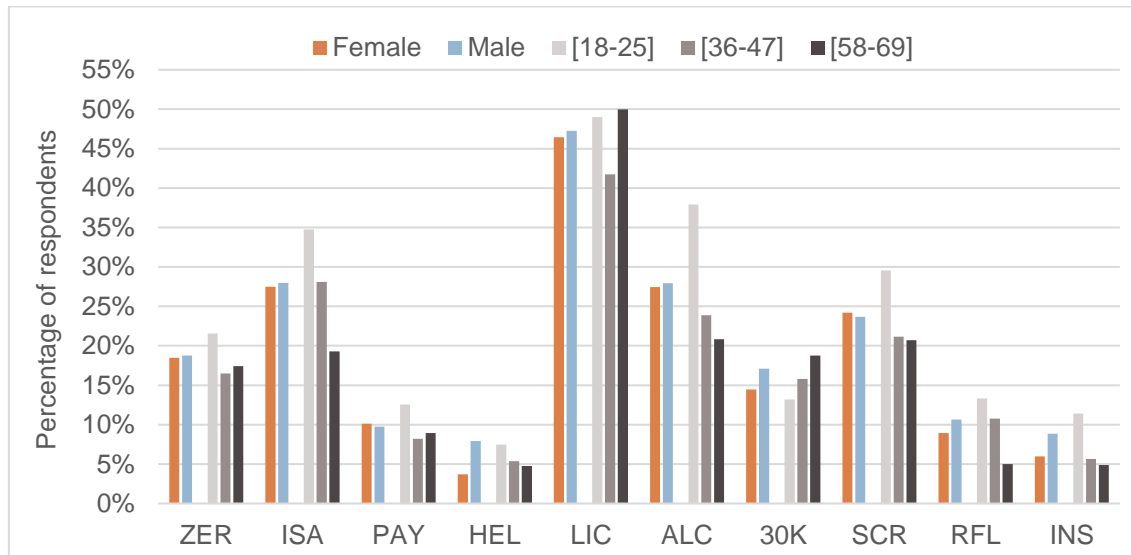
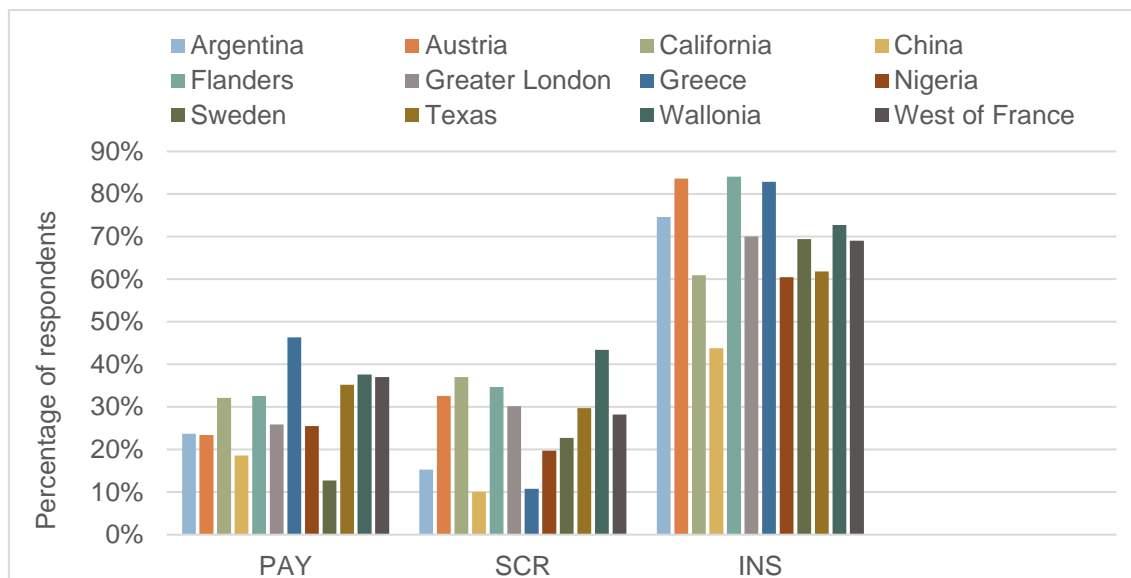


Figure 80. Perceived need for a lot of public money for four measures, by region

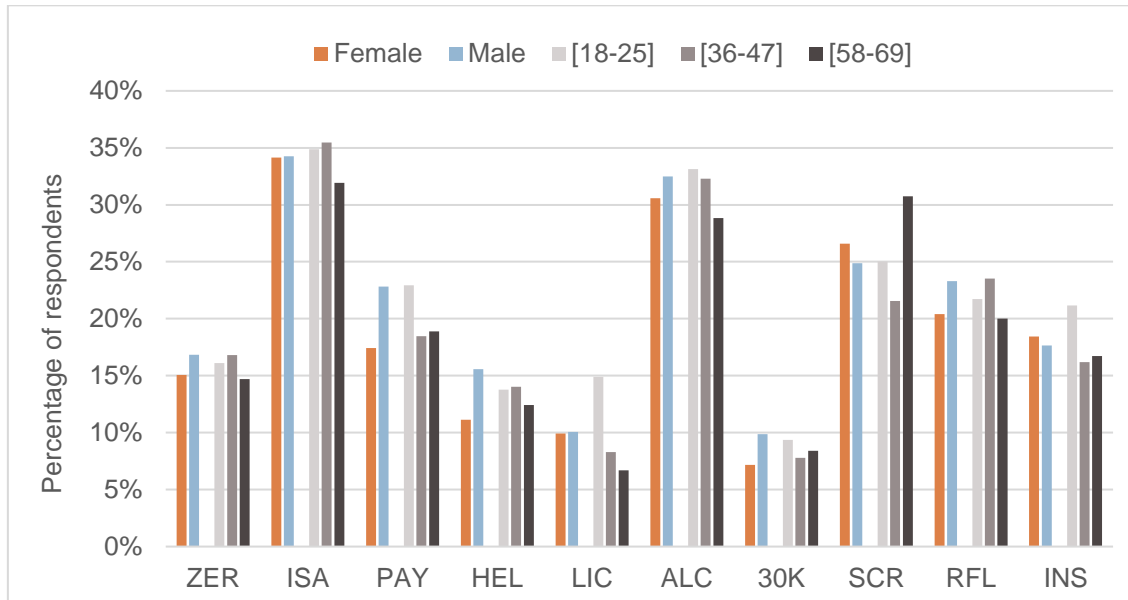


6.4.7 'This policy measure would imply high costs for the people concerned'

Figure 81 illustrates that about one-third of respondents think that ISA and ALC would be expensive for people. The percentage is around 10% for LIC and 30K. Gender differences are in general small, except for PAY and HEL, where men are somewhat more concerned about the financial implications than women. With the exception of

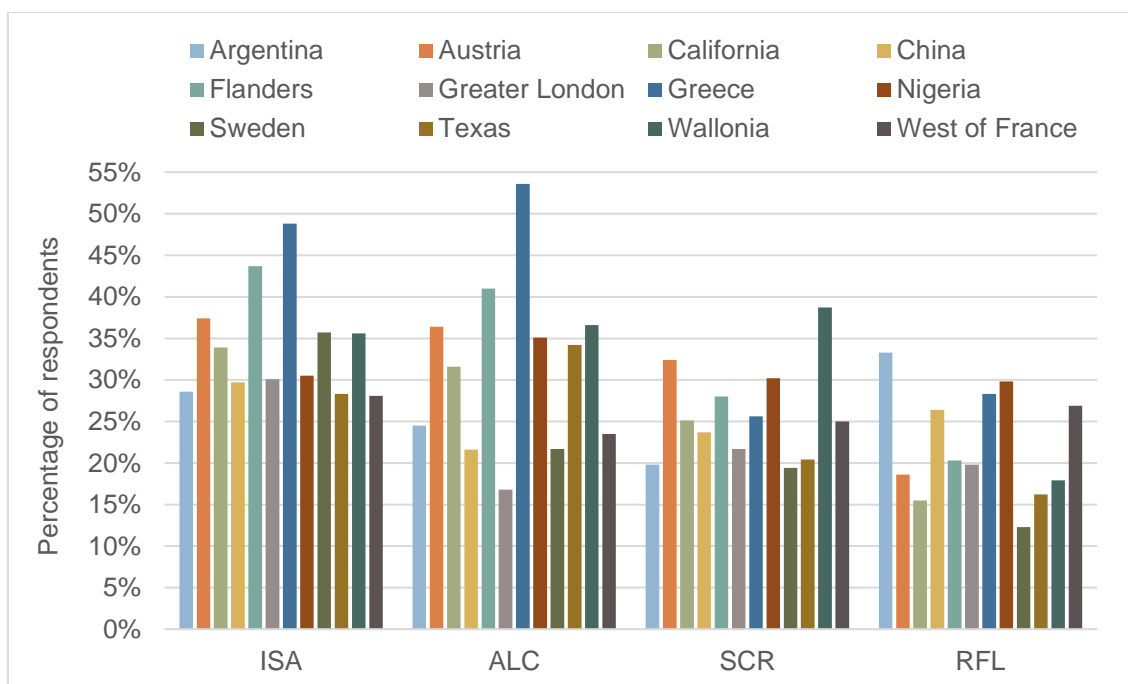
SCR, respondents from the oldest age group seem somewhat less concerned about the financial implications of the measures than the other respondents.

Figure 81. Perception of high costs for people, by gender and age



Overall, respondents from Nigeria, Greece, Belgium, and China seem to be most sensitive to the personal cost issue; this is least so in Greater London and Sweden. Figure 82 shows the distribution by region for the four measures which are perceived to be the most expensive for people (ISA, ALC, SCR and RFL).

Figure 82. Perception of high costs for people for four measures, by region

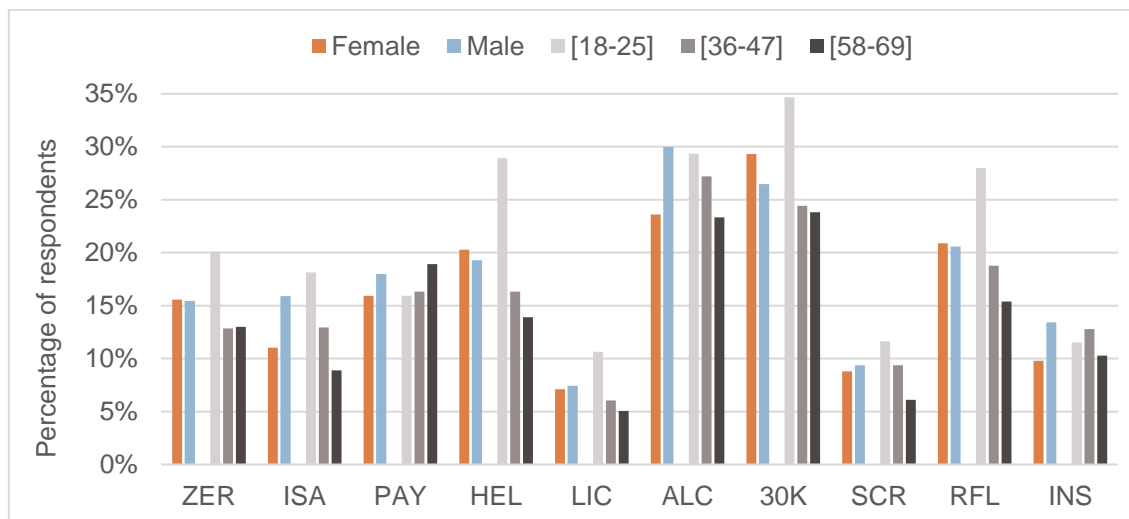


Respondents from Greece, and to a lesser extent Flanders and Austria, are most concerned about the cost implications of ISA and ALC. For ALC, this is seen less as an issue in Greater London, China, Sweden, West of France, and Argentina. A relatively high value can be observed for SCR in Wallonia (almost 40%); this is in line with the sensitivity for this measure that was also observed through the use of other arguments. One third of Argentinians believes that RFL would imply high costs for people; in Sweden the value is three times lower.

6.4.8 ‘This policy measure would be easy to evade’

Figure 83 shows that about one quarter of respondents think that ALC and ISA could be easily evaded (and hence be ineffective or discriminatory). Less than 10% believe that this would be the case for LIC and SCR. In general, gender differences are small; for some measures, such as 30K, females have more concerns than males, but for other measures, such as ALC and ISA, it is the opposite. For all measures, except PAY and INS, the perception that it would be easy to evade diminishes with age, sometimes (HEL and RFL) quite strongly.

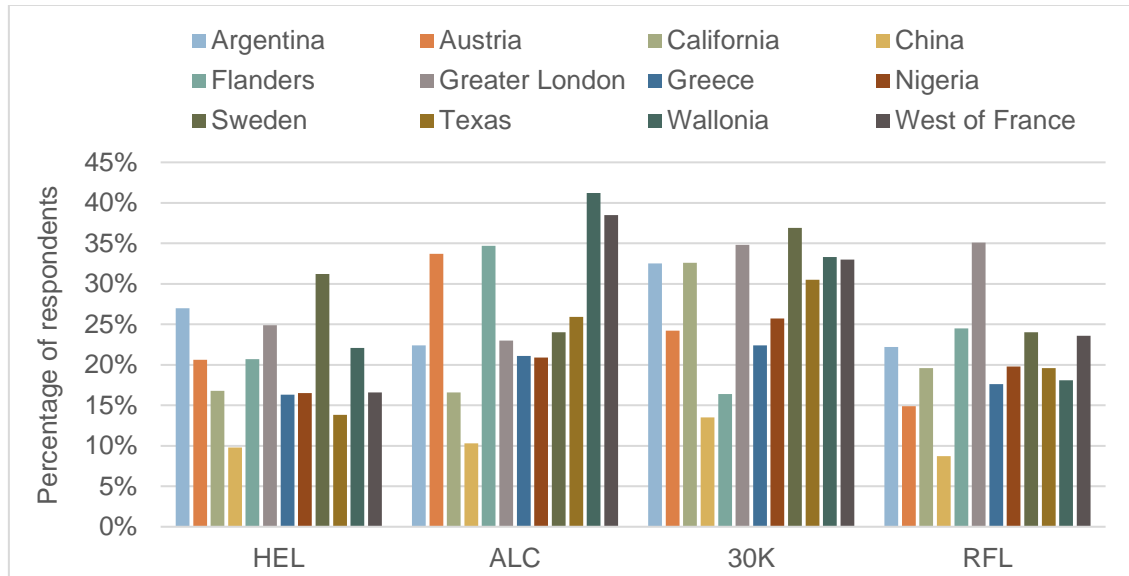
Figure 83. Perception that measures would be easy to evade, by gender and age



All measures considered together, respondents from Wallonia, Nigeria, Argentina, and London report most that the measures could be evaded; in China and Greece it is less believed that this would happen. Figure 84 shows the distribution by region for the four measures which are perceived as most easy to evade (30K, ALC, RFL and HEL). The figure shows that differences between countries are considerable, with a consistently low value for China; only Flanders comes close to China for 30K. For HEL, the perception of easy evasion is highest in Sweden, followed by Argentina and Greater

London. The respondents from Greater London are most numerous in thinking that RFL could be evaded. High values for ALC can be observed for Wallonia, West of France, Flanders and Austria.

Figure 84. Perception that measures are easy to evade for four measures, by region



6.4.9 'This policy measure would be difficult to implement correctly'

The difficulty to implement a measure correctly is the argument used most by the respondents. Figure 85 shows that this argument was used by about half of the respondents for 30K, RFL, ALC and ISA; the lowest percentages, around 30%, were for INS, SCR and HEL – which is still higher than most of the high values for other arguments. Interestingly, gender and age differences are relatively small and there is no consistent pattern across measures.

Overall, respondents from Greece and Nigeria believe most that feasibility is an issue; this is least the case for Flanders and Sweden. Figure 86 shows the distribution by region for the four measures which are perceived to be the ones that are most difficult to implement (30K, RFL, ALC, ISA). The biggest differences between regions are seen for 30K: three-quarters of Greek respondents think that this measure would be difficult to implement, but less than 40% of the Texas respondents see it that way. About 60% of Greek and Argentinian respondents have doubts about the feasibility of RFL; this is only the case for about one-third of Flemish, Texan and Swedish respondents. Sweden has also the lowest value for ALC (about 30%); in Argentina it is almost the double. For ISA, the differences between countries are smaller; the values vary between one-third and half of the respondents.

Figure 85. Perception that measures would be difficult to implement, by gender and age

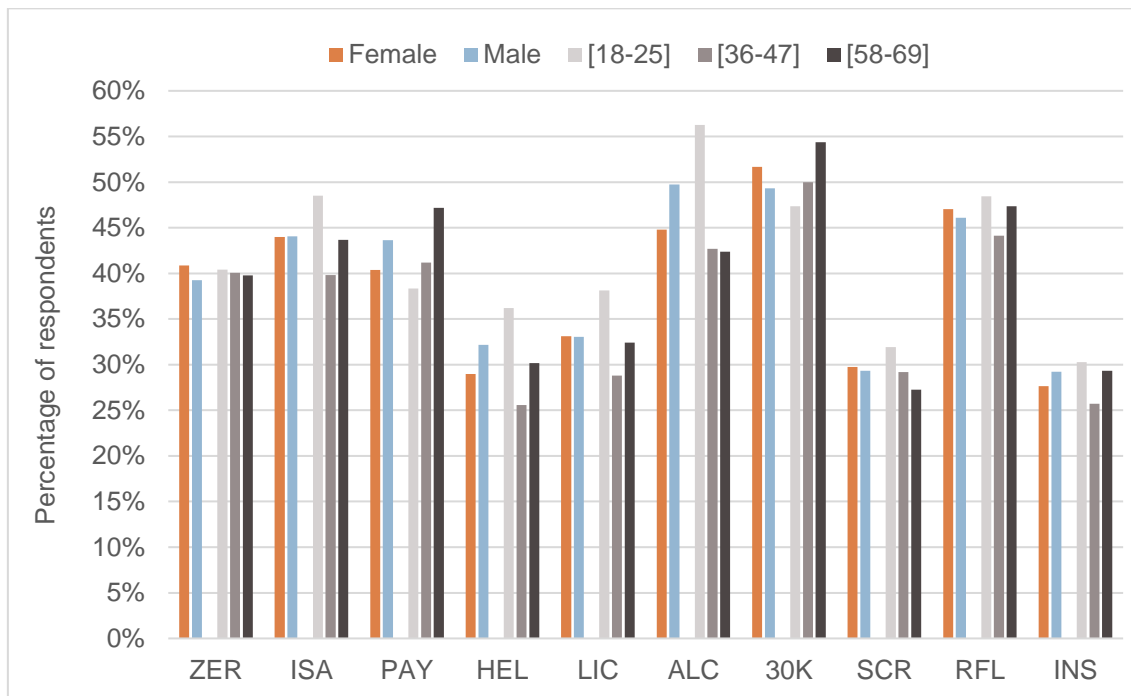
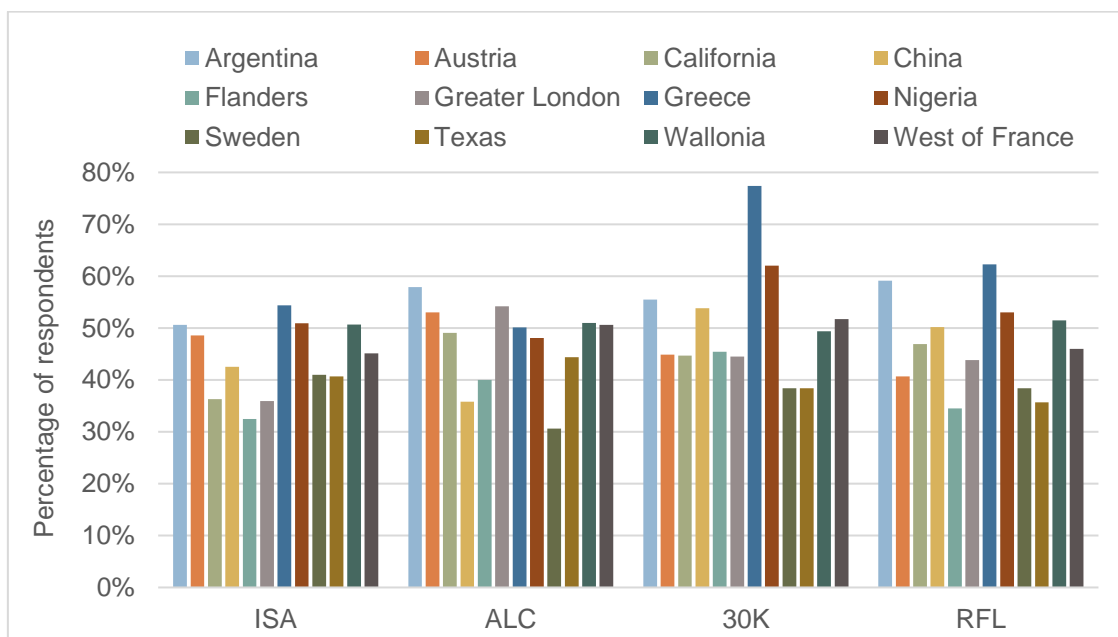


Figure 86. Perception that measures are difficult to implement for four measures, by region

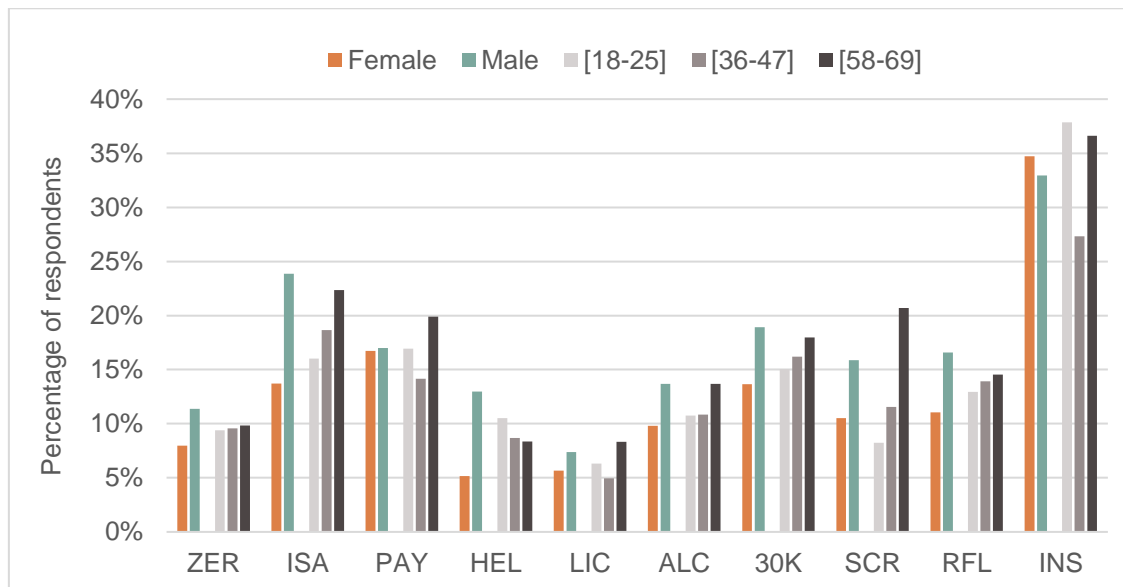


6.4.10 'This policy measure would be an unjustifiable intervention by the state'

Figure 87 shows that INS is the measure for which about one-third of respondents consider that a state intervention would not be justifiable. In other words, two-thirds consider that insurance companies should not be allowed to differentiate between men and women. Between 15% and 20% of respondents think that the government should

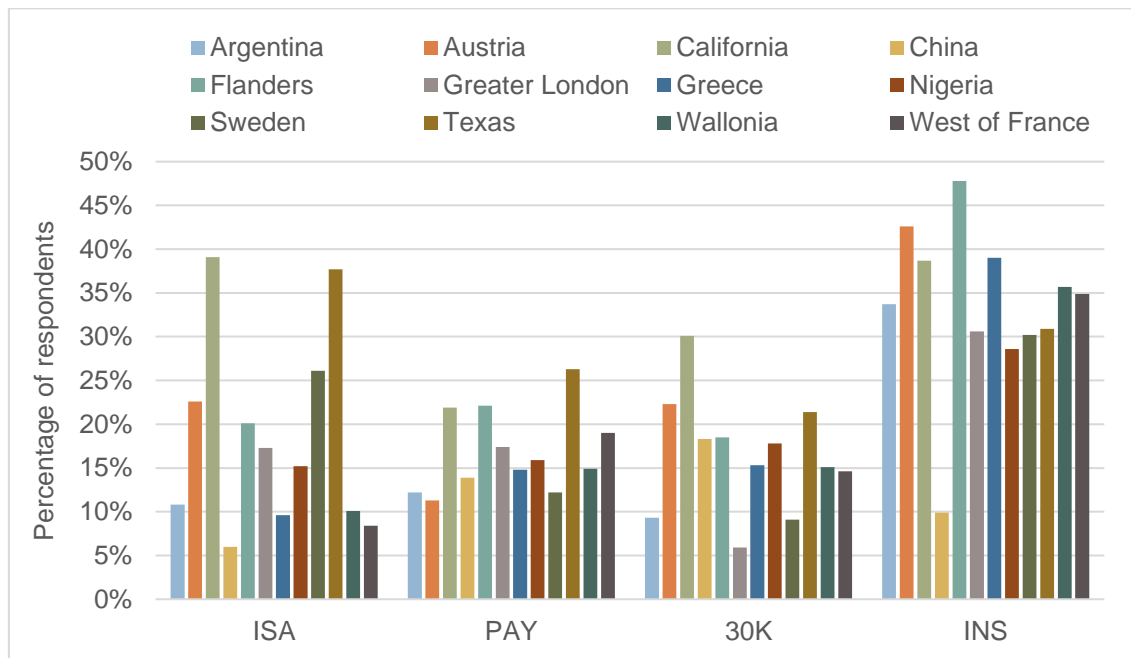
not intervene in relation to ISA, PAY and 30K. For ISA, almost one in four male respondents use this argument. Across the various measures, males consider the proposed state interventions to be less justifiable than females. For measures like ISA, ALC and 30K, the feeling that state intervention is unjustifiable seems to increase with age (see Figure 58). However, the trends are not so clear for other measures; for RFL higher resistance to state intervention with age even appears to be aligned with higher support for the measure.

Figure 87. Perceived unjustifiability of state intervention, by gender and age



Overall, respondents from California, Texas, and Flanders seem to object state intervention the most; the lowest percentages of objections are in China, West of France, and Argentina. Figure 88 shows the distribution by region for the four measures for which state intervention is seen the least justifiable (ISA, PAY, 30K and INS). For INS, there is a striking difference between China (10%) on the one hand, and all other regions, on the other (up to almost 50% for Flanders). The low value for China may be explained by the combination of a generic higher acceptability of state intervention and higher gender inequality. For ISA, there is much variation between countries, with high rejection in the United States and low values (10% or lower) in Argentina, China, Greece, Wallonia, and West of France. For 30K, California has a relatively high value again, and Greater London has a very low value. In other words, almost all Londoners think that public authorities are justified to impose a speed limit of 30 km/h (20 mph). For PAY, differences between countries are smaller, with the highest value in Texas.

Figure 88. Perception of unjustifiability of state intervention for four measures, by region



6.5 The impact of the expected consequences

6.5.1 Association between expected consequences and support for measures

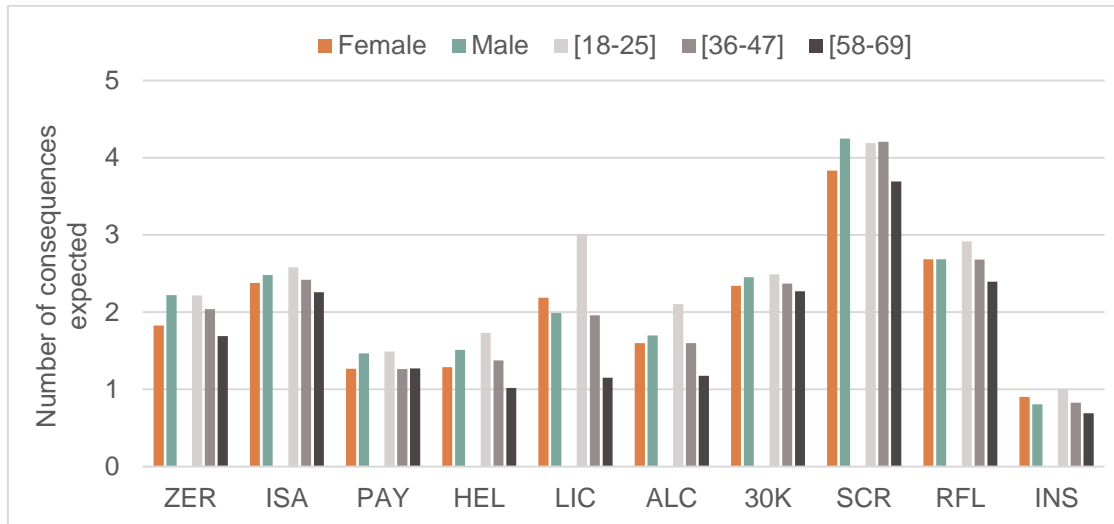
The literature revealed that people will tend to oppose a measure if they think it will have negative consequences for themselves (see Sections 2.7.1 and 2.7.3). It is also recalled from Section 6.2.5 that users of a particular transport mode tend to be more opposed to measures that affect their transport modes and more supportive for measures that affect other transport modes.

In the dilemma survey respondents needed to indicate whether they thought that the measure would have consequences for them, and if so, which ones. The type and number of these consequences varied across the measures; they could be positive, negative or neutral. All consequences are listed in the questionnaire survey in Appendix A4 (questions P5a, P5b, etc.). Below we present some overall findings. The expected personal consequences will be discussed in Chapter 7 for six measures (ISA, HEL, RFL, ZER, SCR and PAY).

Figure 89 shows a breakdown by policy measure, gender and age group of the average number of consequences expected. Please note that it is not meaningful to compare the number of consequences between measures, because the number of consequences listed varied between 7 (LIC) and 17 (ALC); moreover the relative part of positive and negative consequences differed between measures. However, a

breakdown by subgroups remains meaningful for each measure separately. One can observe from the figure that men tend to mention more consequences than women, and younger respondents more than older ones.

Figure 89. Expected number of consequences by gender and age



6.5.2 Differences by region

Figure 90 and Figure 91 show how the number of expected personal consequences differ between measures and countries. For some measures, like INS, SCR, and PAY, the differences between countries are relatively small. The differences are largest for HEL, with on average three consequence ticked off in Flanders, but less than one in California, Greater London and Texas. These differences are likely related to differences in the prevalence of cycling in Flanders (high) and the UK and the United states (low). Other relatively high numbers are found in Greece for ZER and 30K, and in Nigeria for LIC and ALC. Overall, in Texas, California, and Greater London the lowest number of effects were ticked off; the highest numbers were in Greece, Flanders and Argentina.

Figure 90. Number of expected consequences by region (1)

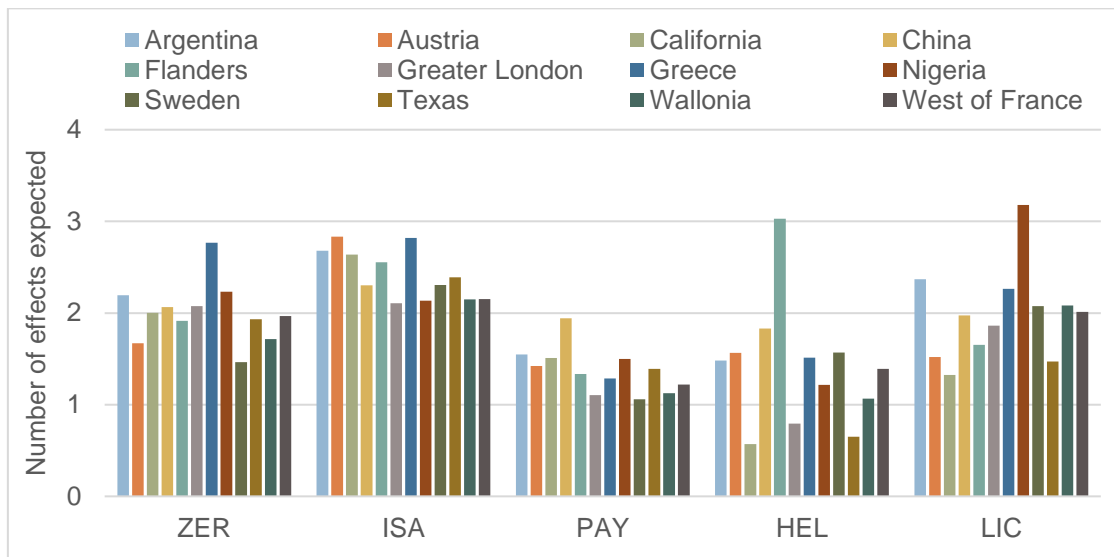
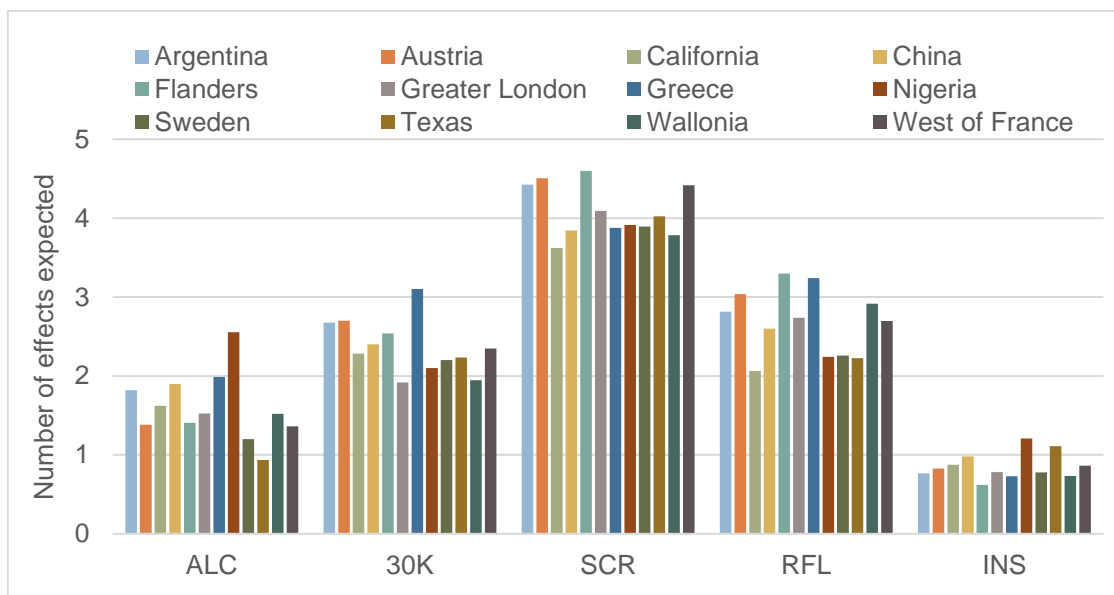


Figure 91. Number of expected consequences by region (2)



6.6 Summary

Chapter 6 presents key findings of an online survey undertaken in six European and four non-European countries. The focus of the analysis was on the perceived unfairness and on factors influencing support for ten policy measures. Findings from the literature and other parts of this thesis were confirmed such as the often broad public support for road safety measures, the higher support by females, the importance of beliefs and expected consequences, and the higher support in LMICs. Texas and California were the regions with the lowest support for the measures considered. The

highest variation in support was for making ISA compulsory. The education level of the respondents hardly influenced the level of support for the measures.

Respondents were asked whether they agreed with a number of counterarguments, which can be regarded as dimensions of unfairness. The distribution of the unfairness arguments varies across measures and societies, sometimes quite considerably. The argument used most is that the measure would be difficult to implement. It is the counterargument used most in all regions included in the survey. In general the measures were not felt to be discriminatory.

A range of factors influence people's views on policy measures. The social norm is strongly correlated with the level of support. People who believe a particular behaviour to be an important cause of road traffic injuries will be more supportive of policy measures meant to restrict this behaviour. Road users who engage in risky behaviour tend to be more opposed to measures restricting or penalizing that behaviour even more. The expected consequences are important as well in shaping people's views. If the consequences are perceived to be negative, people are more inclined to oppose the measure. People who are barely affected by a measure are more often in favour of it.

“If it's fair to let a 17-year-old expose themselves to risk with their set of skills, why isn't it fair then to the person at the other end of life have the same exposure?”

7. The perception of policy measures from different perspectives

7.1 Introduction

This chapter discusses the perceived fairness and the level of support for six policy measures: ISA, HEL, RFL, ZER, SCR, and PAY. The discussion for each measure follows the same logic.

I first recall the association with gender and age group, based on the country-level analyses (Section 4.3.2). This is followed by a comparison of the support for the measure between ESRA, the interviews and the dilemma survey. The comparison is made for the five countries which were covered in the interviews: the UK, France, Sweden, Austria and Greece. In view of maximising comparability between the three sources, the indicator for the level of support for measures in ESRA and the dilemma survey is based on respondents expressing full support for the measure (score 5 on the Likert scale), which is different from the indicators used in Chapters 4 and 6. Because of the restriction to five countries and the difference in the indicators used, the values in these comparisons differ somewhat from those presented earlier in this thesis.

I also compare the public support for the measure between cultural clusters of countries (47 countries in total). The Latin-American cluster is left out, because it includes only one country (Columbia). For some measures other associations at national level are also examined in the first part. For PAY and SCR no ESRA indicators are available at national level; for these measures I show differences between the twelve regions participating in the dilemma survey.

The second part of the discussion is based on the interviews. It starts with the perception of fairness and how this is related to the support for the measure. This is followed by a discussion of the arguments used by the interviewees. The section includes also examples of verbatim quotes to illustrate how the arguments were formulated. For every measure I choose two arguments areas; for each of these five quotes are given.

The last part of the discussion is based on the dilemma survey. It focuses on the differences between those supporting and those opposing the measure. Two perspectives are considered. The first is which unfairness arguments are used. The second perspective are the expected personal consequences. I show which arguments

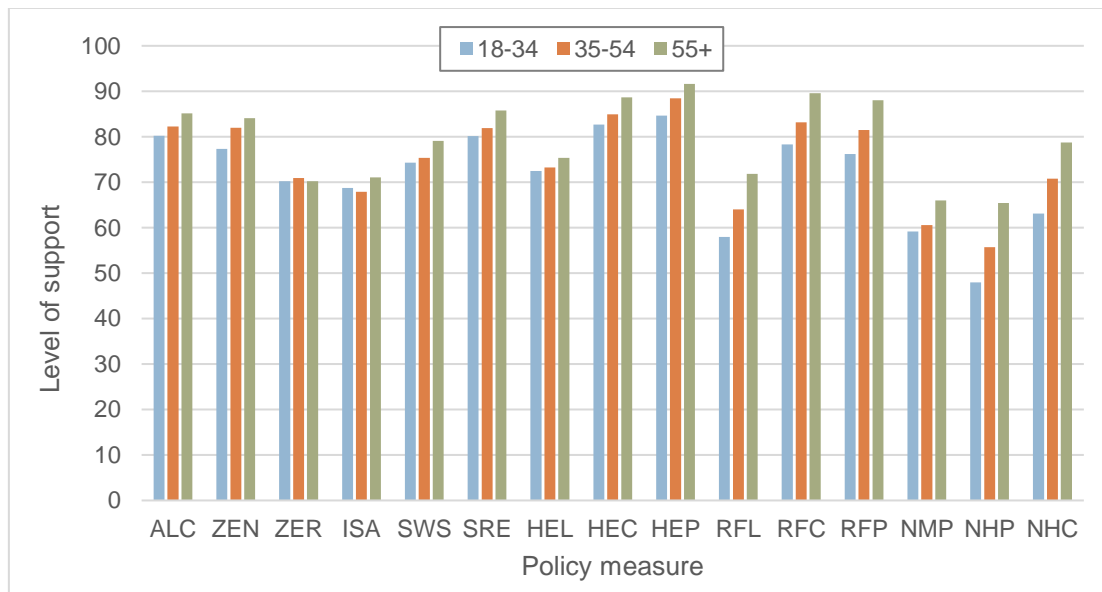
or consequences are most discriminating between supporters and opponents. For RFL and SCR I include an additional section with findings on associations between the unfairness arguments and other variables included in the dilemma survey.

7.2 ISA - Installation and use of ISA systems

7.2.1 Level of support for ISA

In Section 4.3.2 I showed that females are more supportive to ISA than men for the ESRA2 sample as a whole (Figure 29, p.162). This was also the case in the dilemma survey (Figure 57, p.218). In ESRA older respondents are on average more supportive than younger ones (Figure 30, p.163) but the opposite trend was observed in the sample of the dilemma survey (Figure 58, p.219). An analysis of the interaction between gender and age in the ESRA sample reveals that for ISA (and ZER), unlike for other measures, there is no systematic increase of support by age with male respondents – see Figure 92.

Figure 92. Level of support for ESRA2 measures of male respondents, by age



Data source: ESRA

Figure 93 compares the support for ISA for the five common countries (Austria, France, Greece, Sweden and the UK) combined. It is recalled that in the formulation of the ISA measure in the interviews and the dilemma survey, the ISA system could not be turned off by the driver; this was not the case in the ESRA survey. Hence, it is no surprise to see that in the dilemma survey the full support was lower than in the ESRA survey, where the measure was formulated less restrictively. One can also observe that the perceived social norm in relation to ISA (= whether respondents think their friends

would support the measure) is quite low in the five countries concerned. Interestingly, the experts interviewed are much more supportive for ISA than the population; moreover they also overestimated the public support.

Figure 93. Comparison of support for ISA for five countries combined

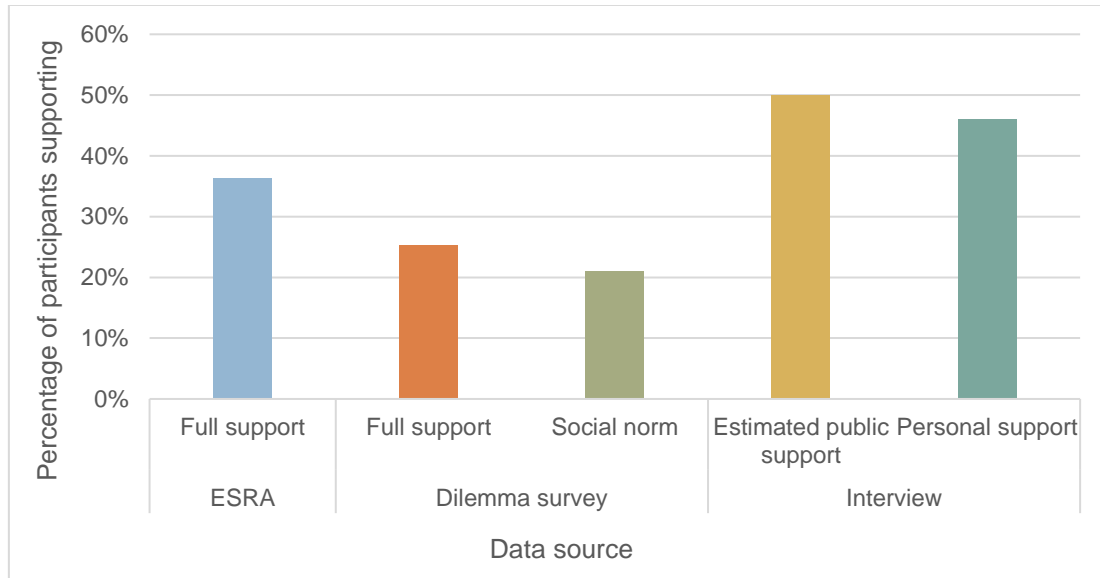
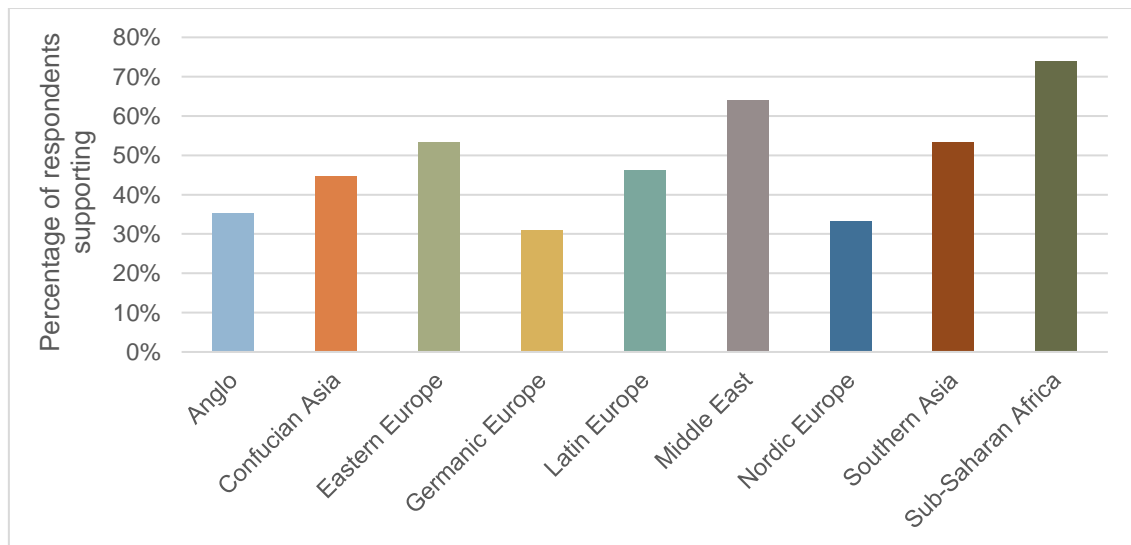


Figure 94 shows that support for ISA varies considerably across cultural clusters: the values are lowest in the Anglo world, Germanic and Nordic Europe; the highest support is found in Sub-Saharan Africa and the Middle East.

Figure 94. Support for ISA by cultural cluster

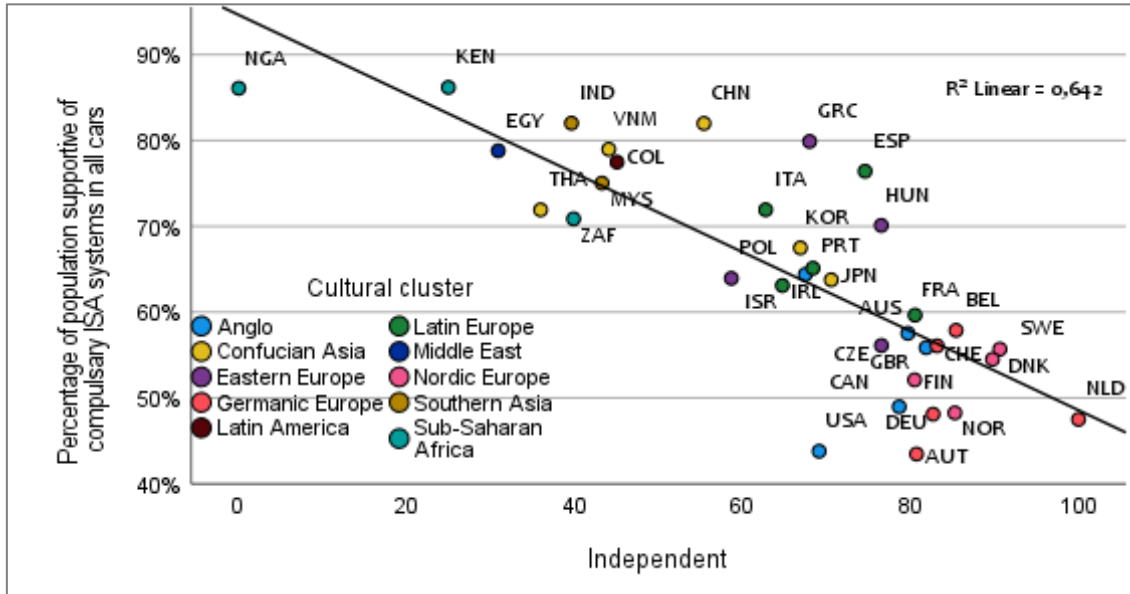


Data source: ESRA

Table 41 of Section 4.5.1 already showed that the support for ISA is (very) strongly associated with two key dimensions of national culture, Independent ($r = -0.801^{**}$) and

Confucianist ($r = -0.403^*$). Figure 95 is a scatterplot of the relationship between the support for ISA and the Independent dimension.

Figure 95. Support for ISA by Independent cultural dimension



Data sources: ESRA (support for ISA) and Hofstede Insights (culture)

It is noteworthy that 64% of the variation between countries can be statistically explained by the variable Independent. The figure shows that the highest level of support is found in LMICs, in which there is often a high degree of collectivism. But even after exclusion of such countries, the strong negative correlation between Independent and support for ISA persists. In other words, the more autonomous thinking is highly valued within a country, the higher the opposition against measures like ISA, which are believed to restrict autonomous decision making – in this case about speed choice.

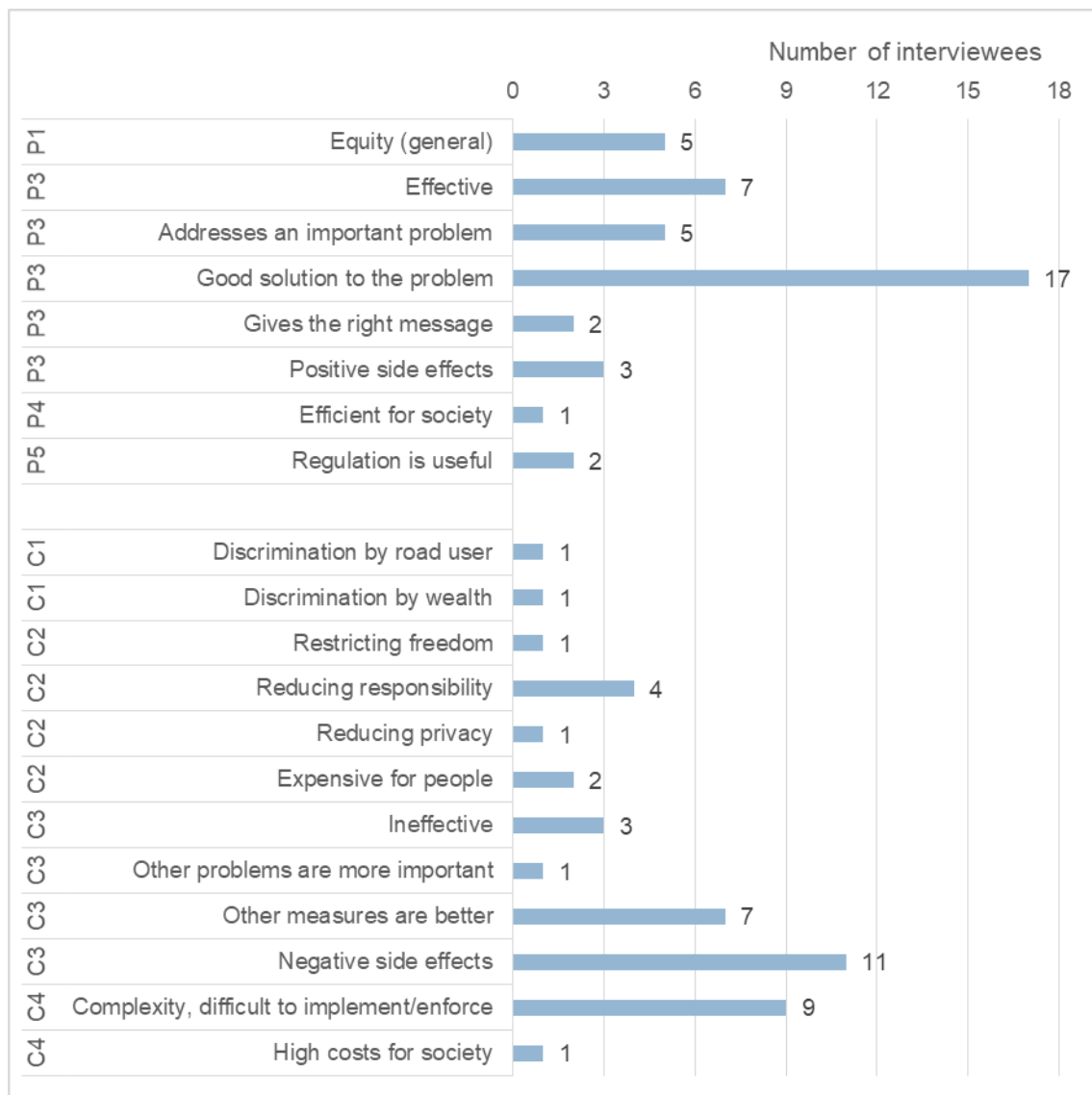
7.2.2 Fairness perception and arguments used by the interviewees

Twenty-five interviewees considered ISA to be a fair measure; ten perceived the measure as unfair. The question was not asked to five interviewees. Of the 25 interviewees who considered ISA to be fair, there were five who conditionally opposed the measure. This ratio (5 out 25) was the highest of all the measures discussed during the interviews. Thus, the interviewees did not perceive the measure as unfair, but they opposed it because of other arguments. Apart from these five cases, there was a strong association between support for ISA and its perceived fairness.

Figure 96 shows the number of interviewees that used a particular argument in relation to ISA. The arguments are grouped by argument area (see Table 44, p.179). To avoid cluttering, the names of the argument areas have been replaced by labels in this chart (and all similar charts in this chapter):

P1: Equity	↔	C1: Discrimination
P2: Preserving human liberties	↔	C2: Restricting human liberties
P3: Relevance	↔	C3: Limited added value
P4: Feasibility	↔	C4: Practical obstacles
P5: Political Arguments	↔	C5: Political considerations

Figure 96. Number of interviewees using particular arguments in relation to ISA



Data source: Interviews

Most arguments used for supporting ISA are within the 'Relevance' area (P3). The most frequently used prime arguments for supporting ISA are 'a good solution to the problem' (16 interviewees), followed by 'effective' (7) and 'addresses an important problem' (5). 'Equity (general)' was used as a supportive argument by 5 interviewees. The largest number of counterarguments are in 'Limited added value' (C3), which is the 'mirror area' of 'Relevance'. It concerns mainly 'negative side effects' (11 interviewees) and 'other measures are better' (7). Other arguments used against ISA are the practical obstacles, in particular 'complexity/difficult to implement/enforce' (9 interviewees) and human liberties, in particular to the reduction of responsibility (4). Interestingly, only one interviewee used the argument 'restriction of freedom'.

For each measure discussed in this chapter, quotes are included from two argument areas, to illustrate how the arguments were formulated. The selection of the argument areas varies between measures. For ISA, the boxes below include quotes from the interviews in relation to 'Relevance' and 'Practical obstacles'.

Quotes in relation to 'Relevance' (P3)

"It would significantly reduce fatal injuries on the road." (UK, Official, 37)

"We know that speeding increases, not just the risk but also the consequences of the crash." (Sweden, Academic, 35)

"I think we should use the inventions that we do in order to improve safety and then make them standard. It's not an option." (Sweden, Researcher, 4)

"Because speed is one of the main causes of accidents." (Austria, Researcher, 9)

"It would be a rather easy way to actually get people to acknowledge the speed limits." (Austria, Consultant, 16)

Quotes in relation to 'Practical obstacles' (C4)

"It's not easy to make it work because I see today, even in the GPS, in France they haven't updated the maps." (France, Parliamentarian, 30)

"The implementation of this system is very, very complicated." (France, Researcher, 15)

"It is about the maturity of the technology." (Austria, Official, 1)

"I think it's hard to get into all cars." (Sweden, Manager, 25)

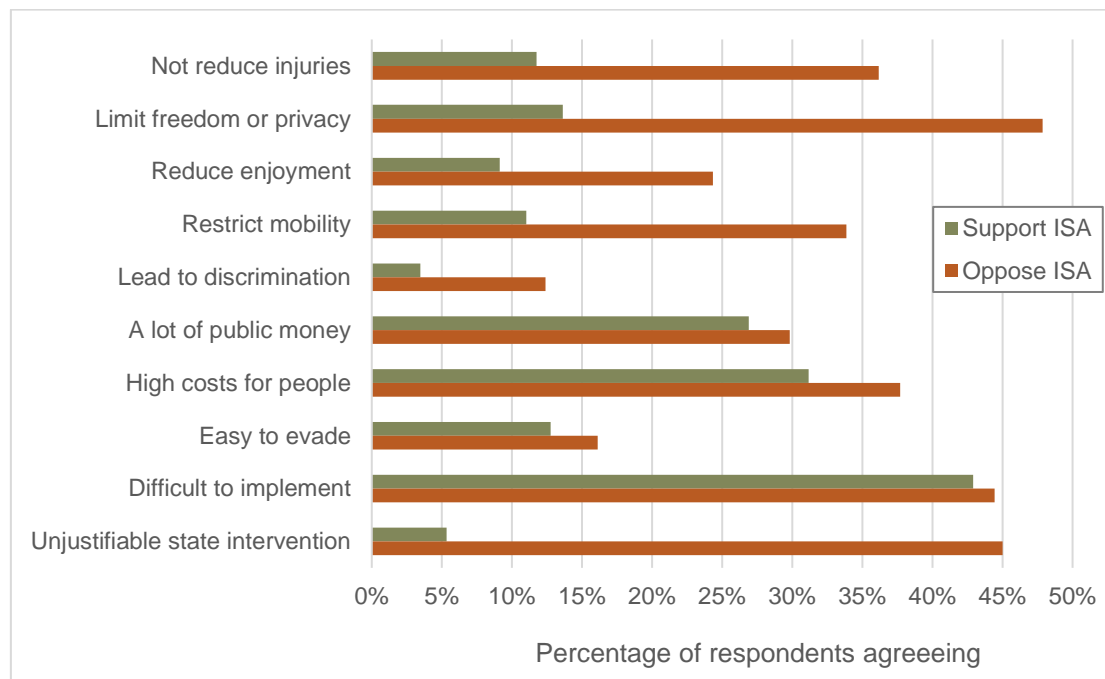
"The whole system needs to improve, including road signs and messages, so that it can gain momentum." (France, Parliamentarian, 30)

7.2.3 Differences in views between supporters and opponents of ISA

Figure 97 shows that the counterarguments for ISA differ considerably between those opposing and those supporting ISA. The findings are based on the twelve regions in the dilemma survey. Almost half of the respondents opposing ISA consider that this

would limit their freedom or privacy; this is only mentioned by about one in eight respondents supporting ISA. One can see similar big differences with the other arguments that refer to individual human liberties. However, the differences are much smaller and almost negligible for the more ‘practical’ and ‘financial’ considerations: ‘a lot of public money’, ‘high costs for people’, ‘easy to evade’, and ‘difficult to implement’. Therefore these arguments are not very important when it comes to supporting or opposing ISA. This finding is also supported by a correlation analysis showing a strong correlation between the level of support for ISA and ‘unjustifiable state intervention’ ($r = -0.435^{**}$), a moderate one with ‘limit freedom or privacy’ ($r = -0.347^{**}$) but no significant correlations with ‘a lot of public money’, ‘easy to evade’, and ‘difficult to implement’.

Figure 97. Differences in use of unfairness arguments between those supporting and opposing ISA

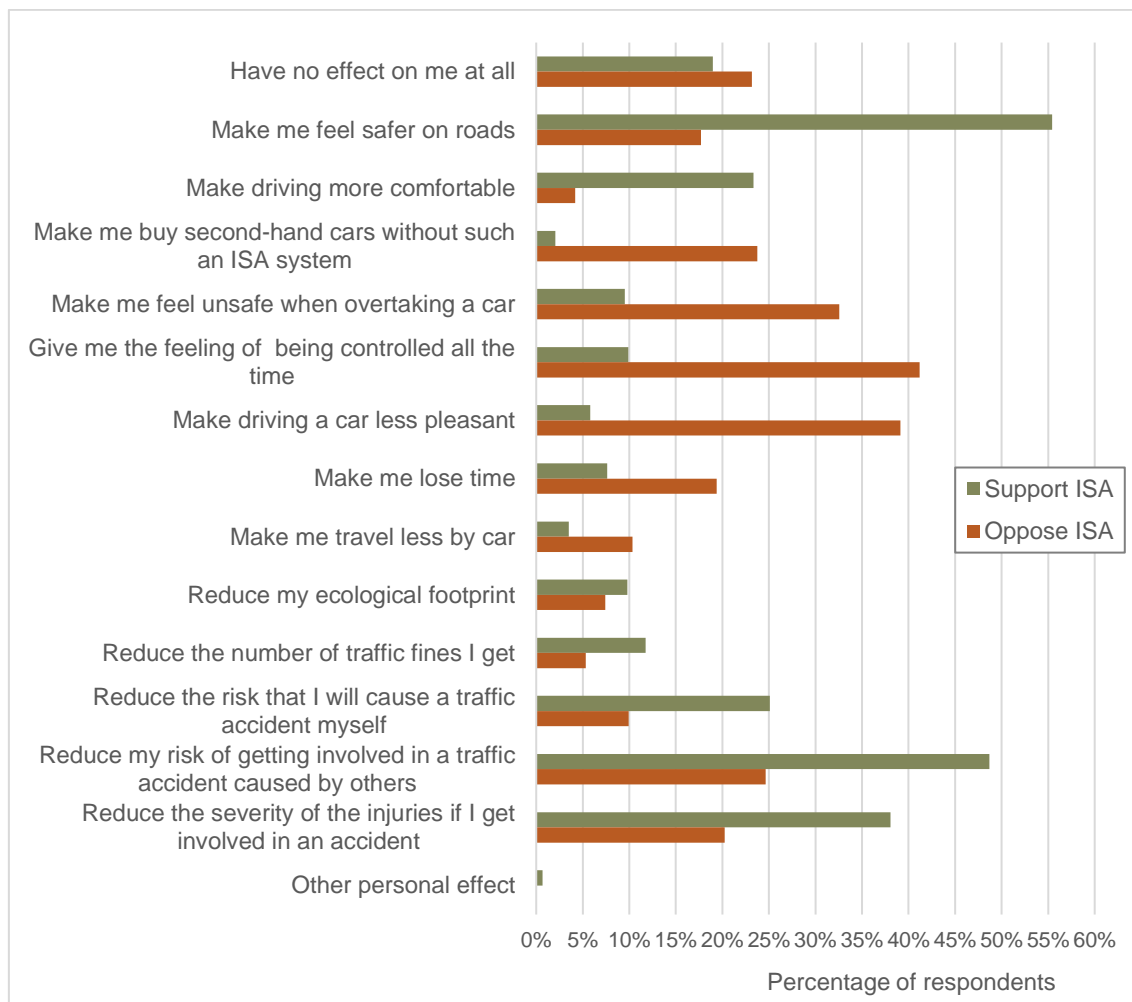


Data source: Dilemma survey

Figure 98 shows how the expected consequences differ between supporters and opponents of ISA. The supporters of ISA strongly believe in the effectiveness of the measure; in other words, that it will make them feel safer on the roads, reduce the crash risk, and make driving more comfortable. The highest positive correlations are for ‘make me feel safer on the road’ ($r = 0.348^{**}$), ‘make driving more comfortable’ ($r = 0.227^{**}$), and ‘reduce my risk of getting involved in a traffic accident caused by others’ ($r = 0.218^{**}$).

The opponents, on the other hand, fear ISA as a means of controlling and restricting their behaviour. They also think it would make driving less pleasant and even unsafe when overtaking a car. The highest negative correlations are for 'make driving a car less pleasant' ($r = -0.383^{**}$), 'make me buy second-hand cars without such an ISA system' ($r = -0.352^{**}$), 'give me the feeling of being controlled all the time' ($r = -,346^{**}$) and 'make me feel unsafe when overtaking a car' ($r = -,267^{**}$). In summary, it is obvious that the expected consequences of ISA are strongly associated with the acceptability of the measure. These results are in line with findings from the dilemma survey (Table 61, p. 225) and the literature review (Section 2.7.3) on the lower acceptability of ISA by people exceeding speed limits regularly (Garvill et al., 2003; Molin & Brookhuis, 2007).

Figure 98: Consequences expected by supporters and opponents of ISA



Data source: Dilemma survey

7.3 HEL – All cyclists should wear a helmet

7.3.1 Level of support for HEL

Section 4.3.2 showed that public support for HEL is quite high in most countries (Figure 29, p.162). This is remarkable, given that only in a few countries across the world all cyclists have to wear a helmet and that in most countries the majority of cyclists do not wear helmets. For the ESRA2 sample as a whole, females are more supportive of HEL than men. This was also the case in the dilemma survey (Figure 57, p.218). In ESRA younger respondents are less supportive than older ones (Figure 30, p.163) and this trend was also observed in the dilemma survey (Figure 58, p.219).

Figure 99 compares the support for HEL in the five common countries combined. The level of support does not differ much in the different perspectives considered, with around half of the people and experts being favourable to the measure. The lowest value is for the social norm in the dilemma survey and the highest value for the public support estimated by the experts. Contrary to ISA, the view of the experts does not differ a lot from that of the general population.

Figure 99. Comparison of Support for HEL for five countries combined

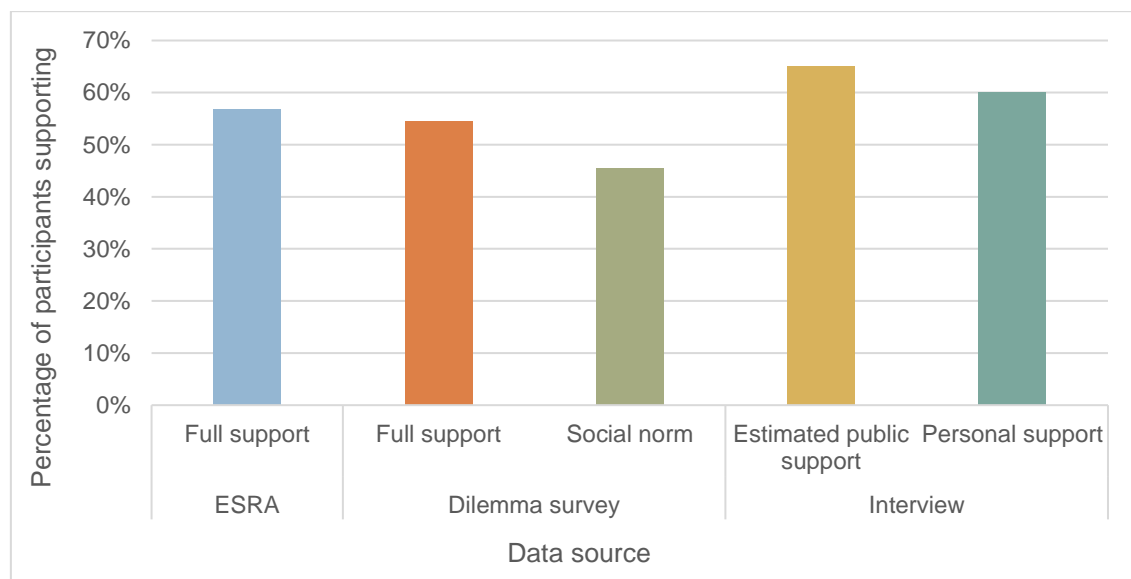
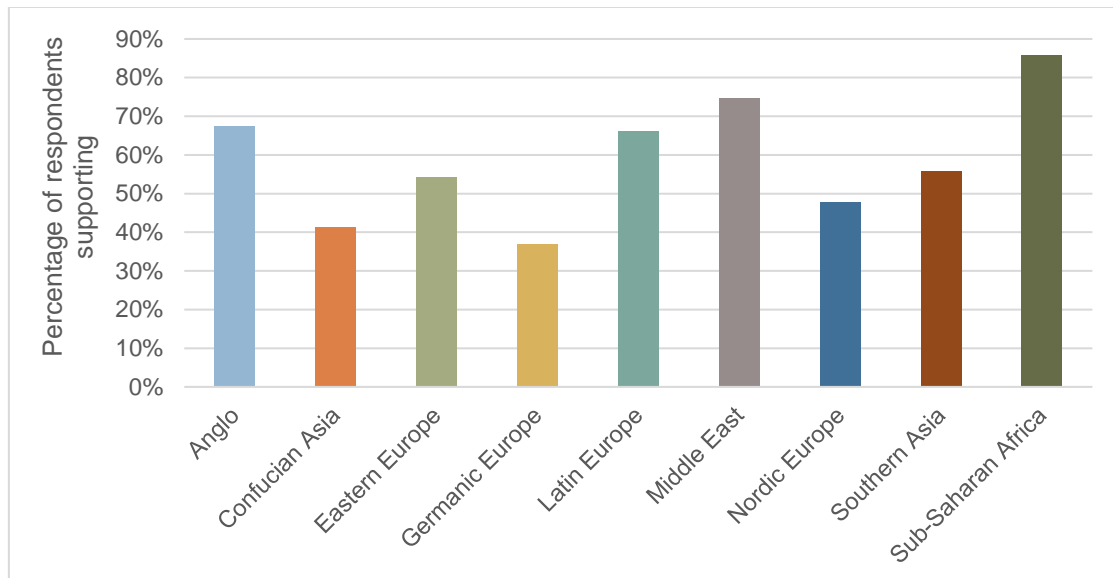


Figure 100 shows that the support for HEL varies considerably across cultural clusters: the values are lowest in Confucian Asia and Germanic and Nordic Europe; the highest support is found in Sub-Saharan Africa, the Middle East, the Anglo World and Latin America. These regional differences likely result from differences in ‘cycling culture’ and perceived safety of cycling, as well as difference in legislation: in many countries cycling helmets are compulsory for children until a certain age, which seems to make

helmet wearing more common and acceptable. Not surprisingly, public support for measures requiring cyclist children or motorcyclists to wear a helmet, is even higher than for requiring all cyclists to do so (Table 32, p.161).

Figure 100. Support for HEL by cultural cluster

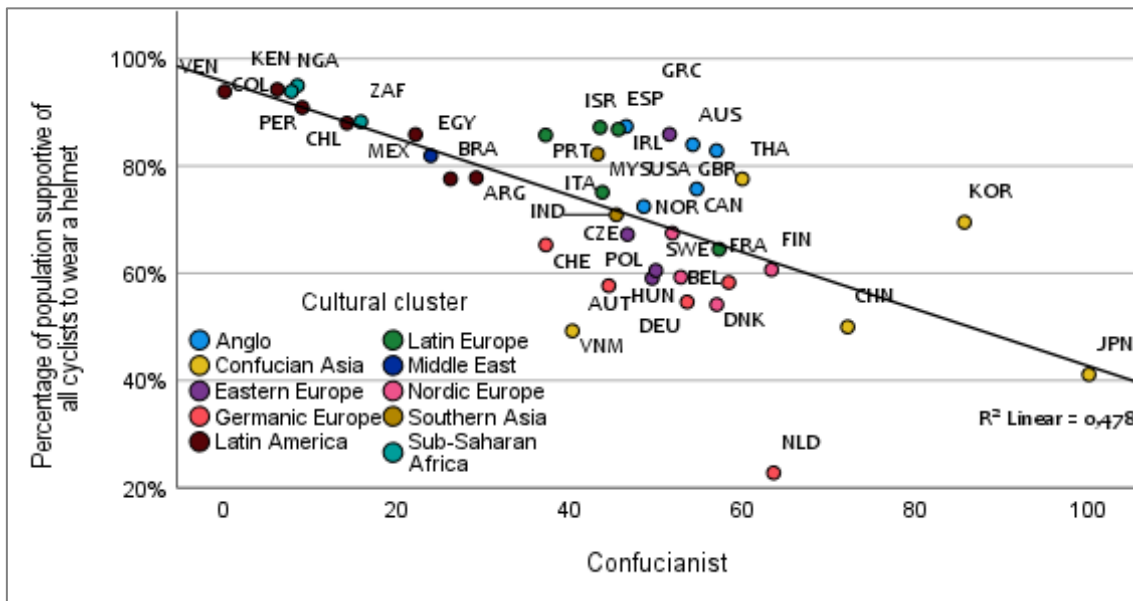


Data source: ESRA

Table 41 of Section 4.5.1 showed that public support for HEL is strongly associated with the two key dimensions of national culture, Independent ($r = -0.576^{**}$) and Confucianist ($r = -0.691^{*}$). HEL is the measure where the association with Confucianist is the strongest of all measures considered. Figure 101 is a scatterplot of the relationship between the support for HEL and Confucianist. The less Confucianist a country is, the more it tends to support compulsory wearing of helmets by cyclists. Almost half of the variation between countries can be explained by this cultural variable.

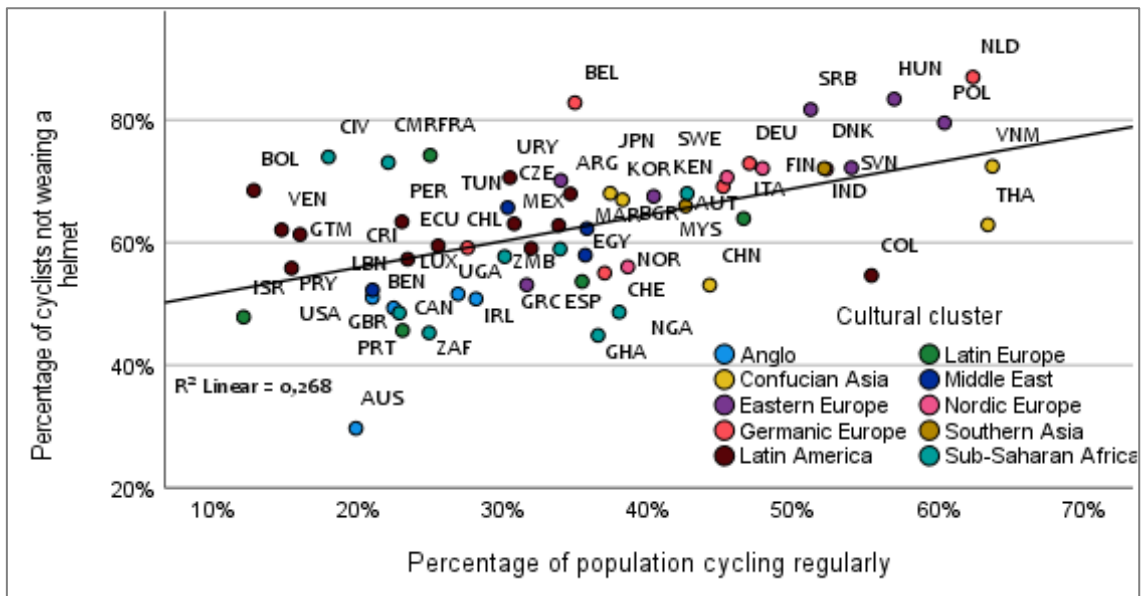
It should be noted that the percentage of people who regularly ride a bike differs strongly across countries. The main purpose of cycling can also differ a lot, in particular the relative importance of cycling for recreational, professional or other purposes. It is also apparent that the more people in a country ride a bike, the lower the percentage wearing a helmet (see Figure 102). This situation probably results from a combination of factors such as better cycling infrastructure, a different perception of injury risk, and a higher perceived safety. Hence cyclists feel less the need to wear a helmet.

Figure 101. Support for HEL by Confucianist cultural dimension



Data sources: ESRA (prevalence of cycling) and Hofstede Insights (culture)

Figure 102. Percentage of cyclists without a helmet by percentage of people cycling

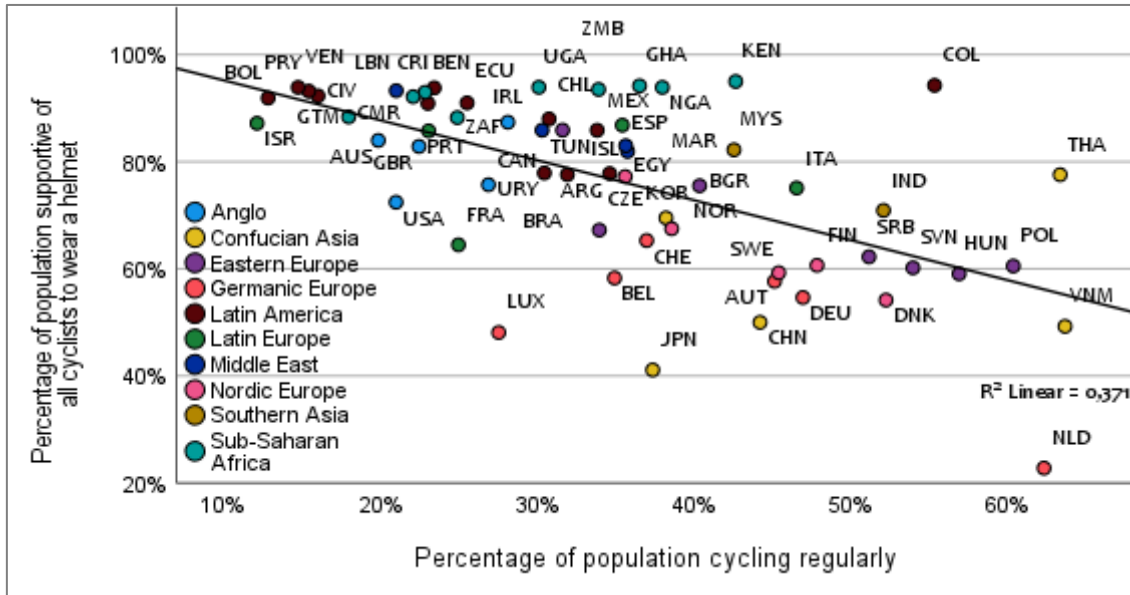


Data source: ESRA

When it comes to support for HEL, Figure 103 shows that the higher the prevalence of cycling in a country, the lower the public support for making cycle helmets compulsory. This is in line with findings from the dilemma survey that people who are barely affected by a measure are more often in favour of it – for example younger people are more in favour of SCR than older ones (Figure 58, p.219), and cyclists and users of public transport are more in favour of ISA and ALC than car drivers (Figure 62, p.224). Figure 103 illustrates that the majority of the Dutch regularly ride a bike and only a

small part of them wear a helmet. Since a long time, it is a controversial topic in the Netherlands, with many stakeholders opposing compulsory helmets for cyclists (Aarts et al., 2014).

Figure 103. Support for HEL by the prevalence of cycling in a country



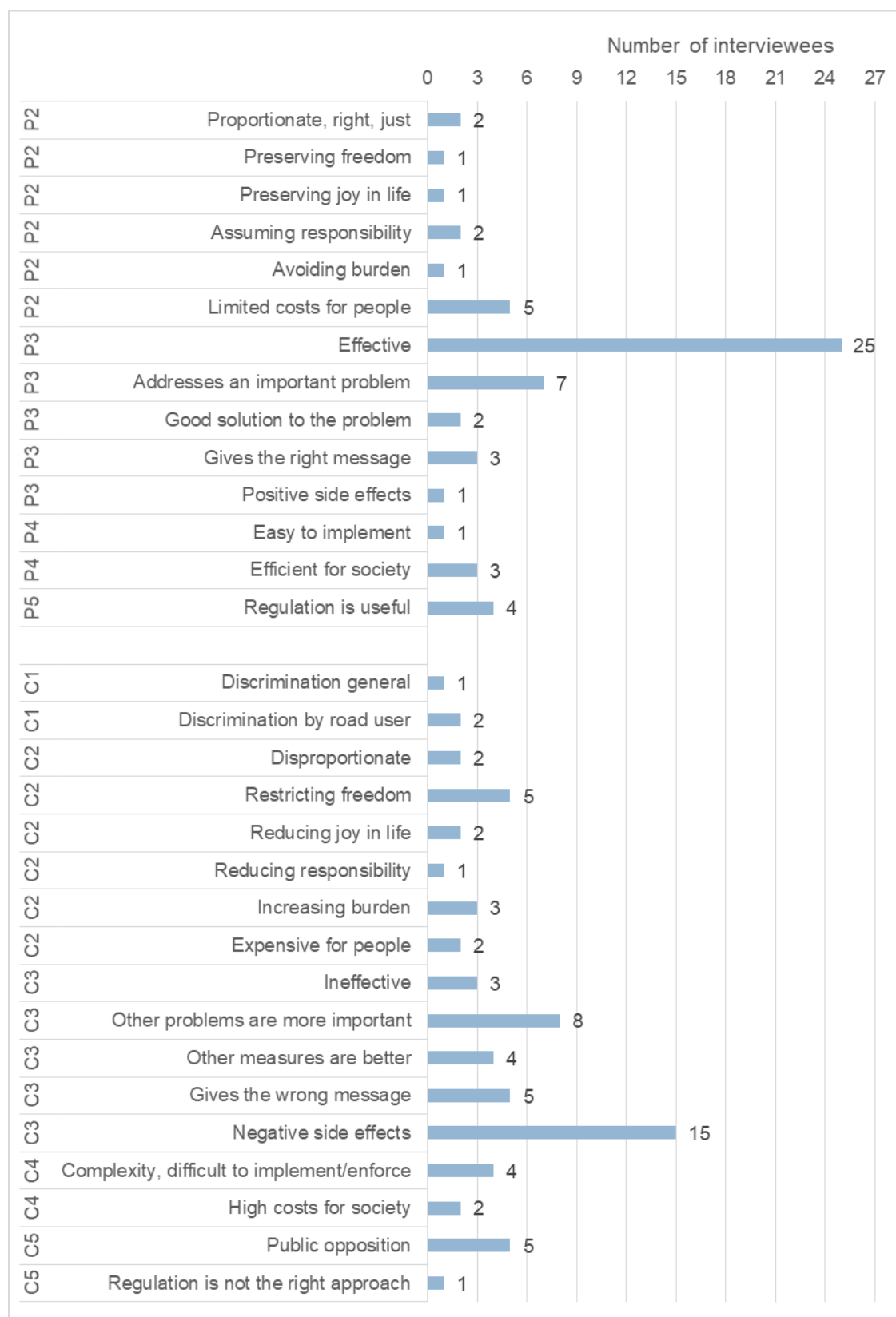
Data source: ESRA

7.3.2 Fairness perception and arguments used by the interviewees

Of the 40 people interviewed, 30 considered HEL to be fair. Eight interviewees perceived the measure as unfair, which is the lowest value among the measures discussed. One interviewee hesitated between fair and unfair; the question was not asked to one interviewee. Three of the 30 interviewees who perceived HEL as fair, nevertheless did not support the measure fully. But overall there was a strong association between support for HEL and its perceived fairness.

Figure 104 shows the distribution of the arguments used by the interviewees. When comparing with Figure 96, one can observe that a wider range of arguments is used than for ISA. As for all other measures discussed during the interviews, 'Relevance' (P3) is the argument area used most to justify support for HEL. Twenty-five interviewees considered the measure to be effective in reducing injuries and seven thought that HEL would adequately address an important problem. Five interviewees considered HEL a cheap measure (which I classified under 'Preserving human liberties'), four thought that regulation was needed, three said it would give a clear message and three that it would require much public resources.

Figure 104. Number of interviewees using particular arguments in relation to HEL



Data source: Interviews

Arguments for justifying opposition against HEL were mainly in the areas 'Limited added value' (C3) and 'Restricting human liberties' (C2). Fifteen interviewees expected

negative side effects, mainly referring to reduced cycling. Eight of them found that HEL was of lower priority compared to other measures for improving the safety of cyclists and five said it would give the wrong message, i.e. 'blaming the victim' or a false feeling of safety. Five interviewees found that the measure would restrict freedom of people too much and three that it would be a burden to people (such as having to carry the helmet when not cycling). Five interviewees expected strong opposition against HEL and four thought that the measure would be difficult to implement or enforce.

In order to illustrate the arguments given, the boxes below include some quotes in relation to 'Limited added value' and 'Preserving human liberties'

Quotes in relation to 'Limited added value' (C3)

"There's no evidence that it improves safety because it also reduces the numbers of cycling cyclists." (UK, Official, 8)

"It distracts attention from what are the greatest areas of risk on the road." (UK, Official, 27)

"It may actually prevent women cycling." (Sweden, Parliamentarian, 19)

"I would rather have real law enforcement, alcohol control, than helmet control" (France, Researcher, 6)

"It is not a measure that avoids accidents per se." (Austria, Official, 33)

Quotes in relation to 'Preserving human liberties' (P2)

"It is indeed irresponsible [not to wear a helmet]." (France, Researcher, 15)

"It does not cost that much" (France, Researcher, 24)"

"It's fair" (Greece, Parliamentarian, 39)

"If I choose to not wear a helmet and I have a crash and an injury, that this helmet could have reduced my rehabilitation cost." (Greece, Parliamentarian, 39)

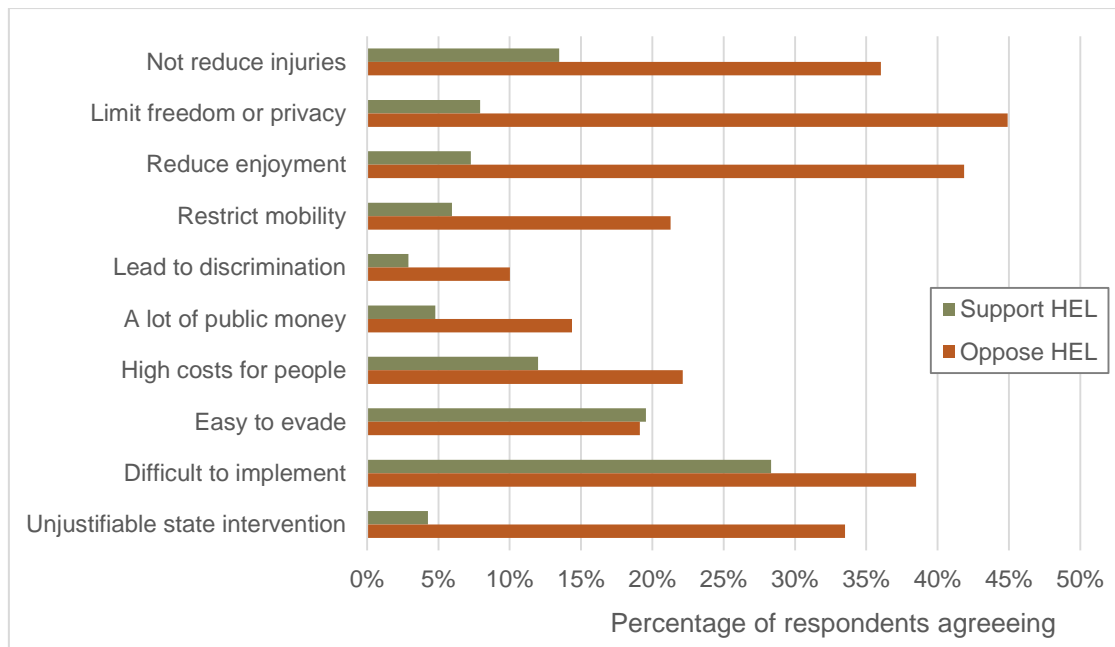
"To me it feels like a really, really low cost intervention" (UK, Researcher, 20)

7.3.3 Differences in views between supporters and opponents of HEL

Figure 105 shows how the fairness perspectives differ between those opposing and supporting HEL. The figures are based on the answers from the respondents of the 12 regions in the dilemma survey. It can be seen that the differences between the two groups are often very high. For instance, approximately four out of ten respondents opposing HEL consider that this measure would limit their freedom or privacy (correlation with support for measures: $r = -0.371^{**}$), that it would reduce enjoyment ($r = -0.351^{**}$) and that it would not reduce injuries ($r = -0.221^{**}$), while few respondents supporting the measure use these arguments. The disbelief in the effectiveness of cycle helmets in reducing injuries and the fear of reduced freedom and joy in life are clearly very important factors in the opposition to cycle helmets. Furthermore,

approximately one-third of the opponents think that HEL would be an unjustifiable state intervention ($r = -0.346^{**}$).

Figure 105. Differences in use of unfairness arguments between those supporting and opposing HEL

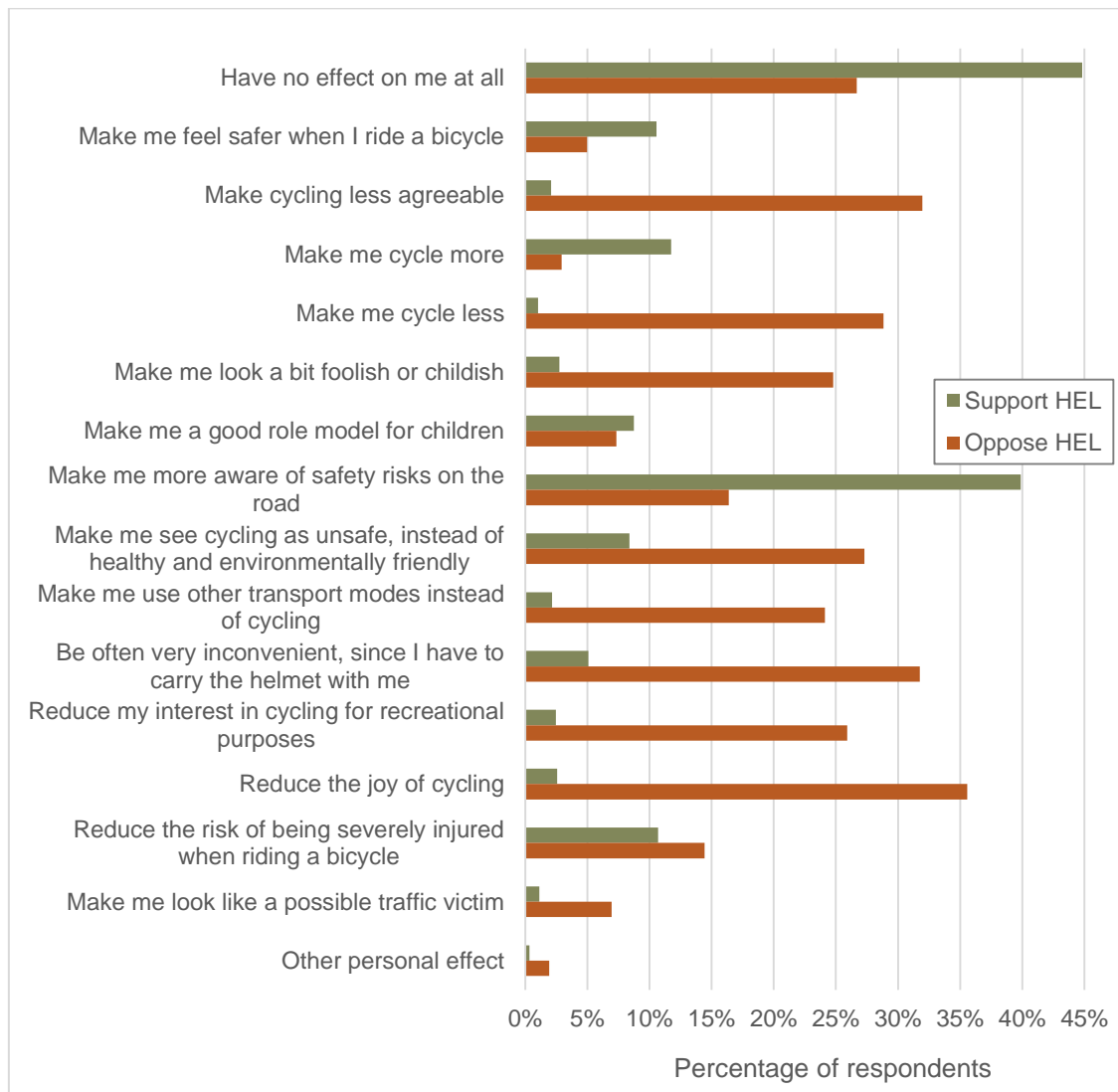


Data source: Dilemma survey

The differences between supporters and opponents of HEL are smaller or negligible for the more practical and financial considerations: ‘a lot of public money’, ‘high costs for people’, and ‘difficult to implement’ – and there is actually no difference in relation to ‘easy to evade’. Such arguments are not very important in influencing public support for HEL.

Figure 106 shows how the expected consequences differ between opponents and supporters of HEL. The supporters think that HEL would have no effect on them and would make them more aware of safety risks on the road. The opponents think that they would cycle less, that cycling would be less enjoyable and more inconvenient, and that they would look foolish or childish. Such arguments are hardly used by the supporters. Interestingly, the expected effectiveness (fewer injuries) is not a strong differentiating factor between opponents and supporters – meaning that even opponents realise that the personal risk of getting injured is higher without a helmet.

Figure 106: Consequences expected by supporters and opponents of HEL



Data source: Dilemma survey

The strongest negative associations between expected consequences and support for HEL are 'Reduce the joy of cycling' ($r = -0.376^{**}$), 'Make me cycle less' ($r = -0.367^{**}$), 'Make cycling less agreeable' ($r = -0.359^{**}$) and 'Be often very inconvenient, since I have to carry the helmet with me' ($r = -0.317^{**}$). It is recalled that certain of these answer options, such as 'Make me cycle less' could only be answered by respondents who ride a bike at least a few days a month (see Question T1 in Appendix A4). The correlations with the positive consequences are weaker; the strongest association with support for HEL is 'Make me more aware of safety risks on the road' ($r = 0.198^{**}$) and 'Make me cycle more' ($r = 0.118^{**}$).

7.4 RFL – Pedestrians to wear retroreflective clothing in the dark

7.4.1 Level of support for RFL

Figure 29 (p.162) showed that the level of support for RFL is lower than that for most of the measures considered in ESRA2. There is also no significant correlation between the fatality rate per capita and the support for the three measures in ESRA2 on reflective clothing (Table 35, p.166). Females are more supportive than males; support for RFL increases strongly with age (Figure 30, p.163). RFL was the measure which was supported the least by the interviewees (Figure 38, p.196). On the other hand, in the dilemma survey the level of support was similar to that of the other measures (Figure 58, p.219). The differences with the ESRA results can be explained by the fact that, on average, the measures in the dilemma survey were more controversial than those in ESRA, and the ESRA sample includes relatively more LMIC countries with a generic high support for road safety measures.

When comparing the level of support in ESRA2, the interviews and the dilemma survey for the five common countries together, the much lower support by the experts is immediately obvious (Figure 107). Also the experts' perception of public support is much lower than it actually is.

Figure 107. Comparison of support for RFL for five countries combined

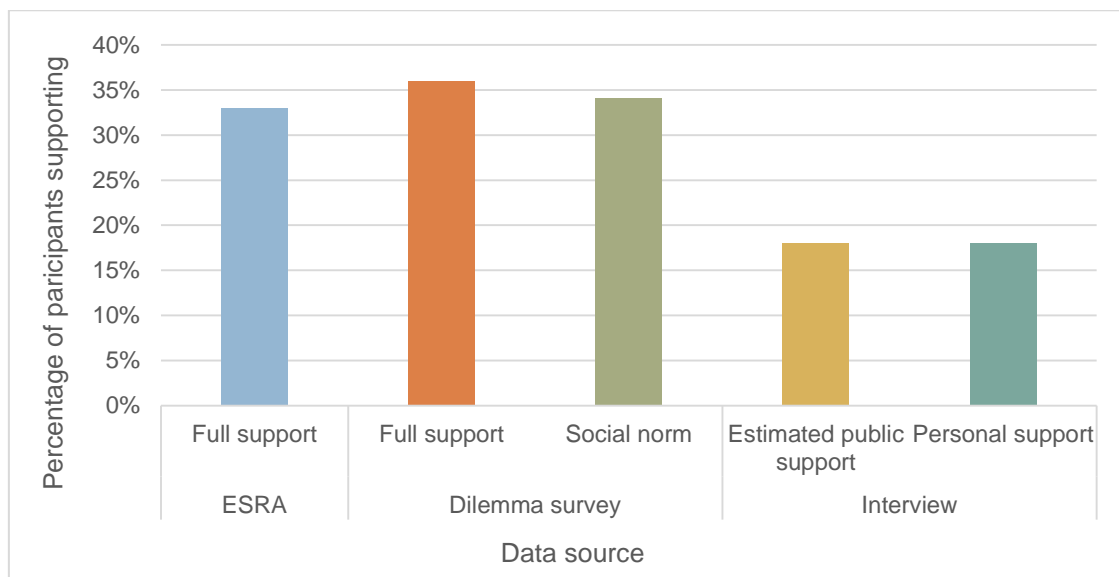
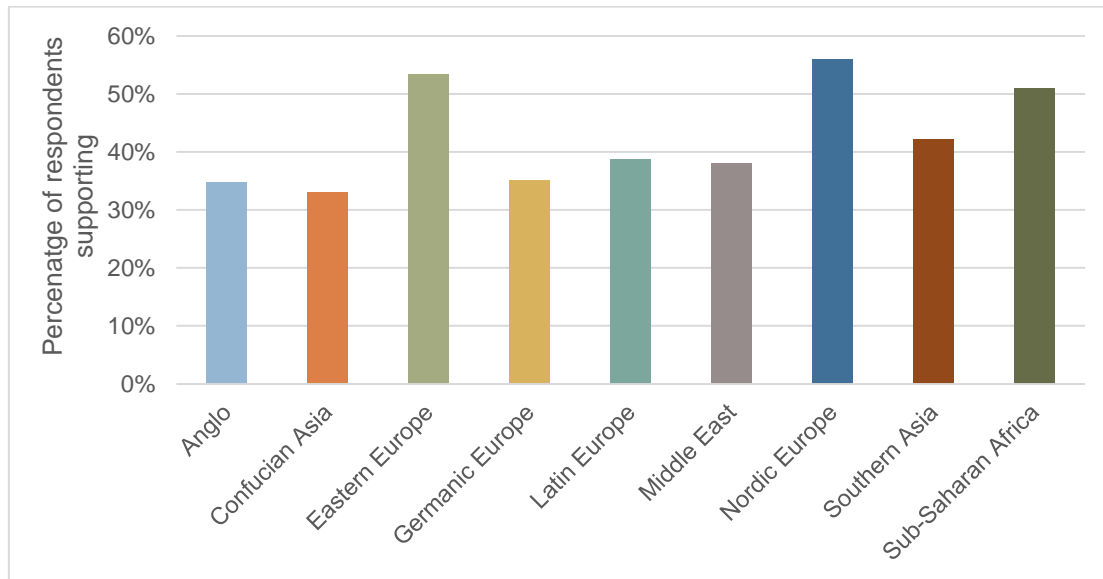


Figure 108 shows that in three cultural clusters about half of the population supports RFL: Nordic Europe, Eastern Europe and Sub-Saharan Africa. For Nordic Europe this could be related to the long winter nights and in Eastern Europe and Sub-Saharan

Africa to the large number of roads without lighting. In the other cultural regions, about one third of the population fully supports RFL.

Figure 108. Support for RFL by cultural cluster



Data source: ESRA

Table 41 (p.172) showed that the support for RFL is neither correlated with Independent nor with Confucianist. Thus, RFL is an example of a policy measure where national differences cannot be predicted by the two dimensions of national culture used in this thesis. It is also recalled that the support for RFL is much lower than the support for similar measures that target cyclists and motorcyclists (see Table 32, p.161). This is probably related to the perception that not wearing reflective clothing is a higher risk for these road users than for pedestrians; also, in some countries it is even compulsory in certain contexts.

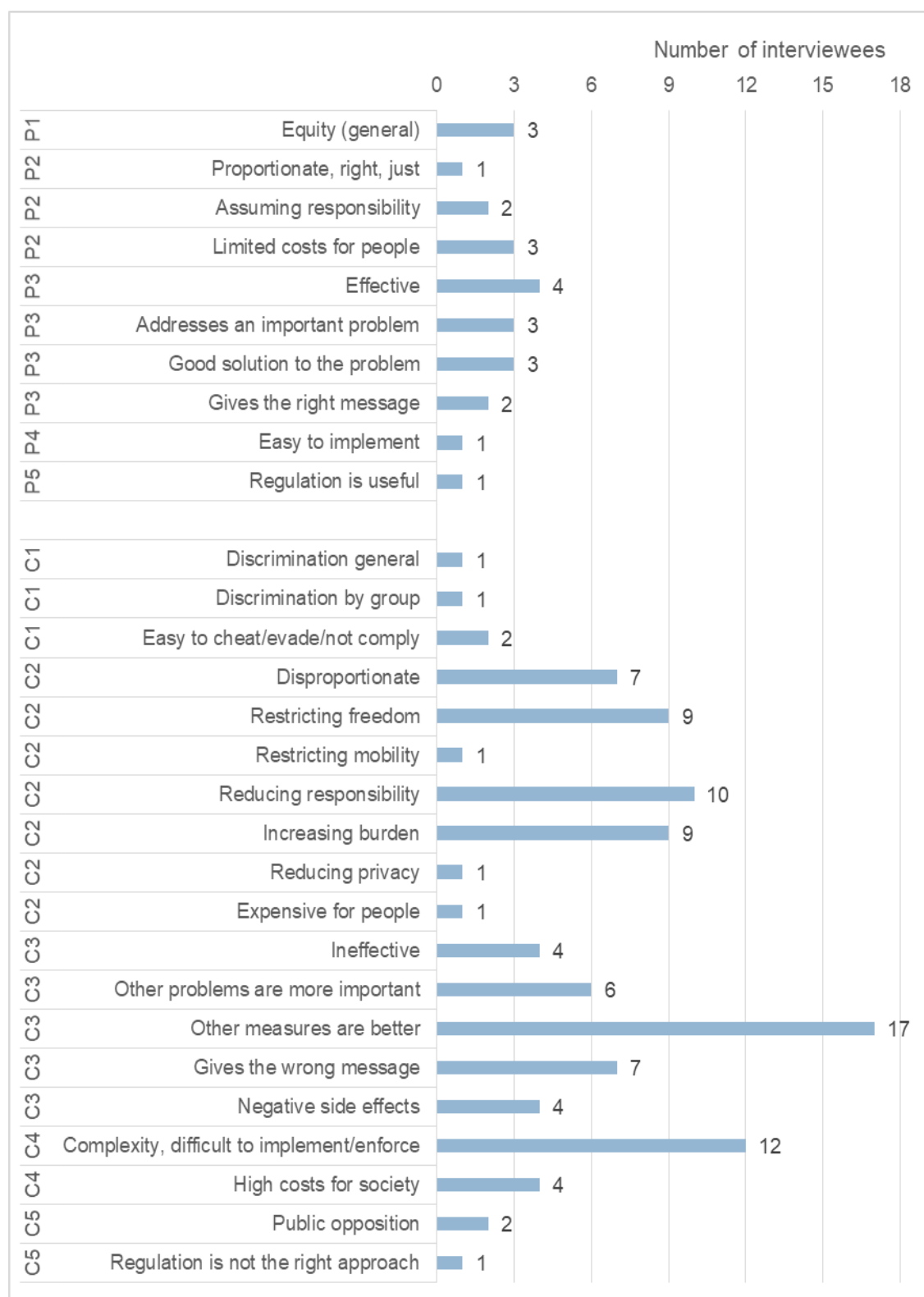
7.4.2 Fairness perception and arguments used by the interviewees

Of the 40 people interviewed, only ten considered RFL to be a fair measure; this was the lowest number of all the measures discussed. Twenty-one interviewees considered the measure as unfair, a similar number as for SCR. One interviewee insisted that the fairness concept was not applicable; five were not asked their opinion about fairness. Two interviewees who considered the measure as fair, nevertheless did not support it. There was a strong association between opposition to measures and the perceived unfairness of RFL.

7. The perception of policy measures from different perspectives

Figure 109 shows the distribution of the arguments used by the interviewees, grouped by argument area. It can clearly be seen that the number of negative arguments is much higher than the positive ones.

Figure 109. Number of interviewees using particular arguments in relation to RFL



Data source: Interviews

7. The perception of policy measures from different perspectives

The negative arguments are mostly from 'Restricting human liberties' (C2), 'Limited added value' (C3) and 'Practical obstacles' (C4). Seventeen interviewees thought that other measures were better to improve safety of pedestrians in the dark, seven thought it would give the wrong message (either 'blaming the victim' or giving a false feeling of safety), and six interviewees thought that other problems were more important. Ten interviewees were of the opinion that RFL would reduce responsibility (of motorists), nine that it would restrict freedom and nine that it would increase the burden for pedestrians. Seven interviewees found RFL to be disproportionate. Twelve interviewees thought that the measure would be difficult to enforce.

'Relevance' (C3) is again the argument area most used by the supporters of a measure, but for RFL it was used much less than for the other measures. Four interviewees justified their support for the measure because of the perceived effectiveness, three found that RFL addressed an important safety issue and three considered the measure to be a good solution to the problem. Three interviewees found the measure to be equitable and three supported the measure because of the low financial implications for people.

In order to illustrate the arguments, I include below some quotes in relation to 'Restricting human liberties' and 'Practical obstacles'.

Quotes in relation to 'Restricting human liberties' (C2)

"You blame the pedestrian." (Austria, Consultant, 16)

"There must be some flexibility and freedom in the system." (Sweden, Researcher, 21)

"It should be a rule. The question is: should it be a law?" (UK, Parliamentarian, 32)

"Because it overshoots." (Austria, Official, 36)

"You can regulate everything somehow under the disguise of road safety. And I think fashion in particular is something deeply personal." (Austria, Researcher, 9)

Quotes in relation to 'Practical obstacles' (C4)

"That would be very difficult to enforce." (Sweden, Academic, 35)

"It's unmanageable." (France, Parliamentarian, 30)

"It's very difficult to check, simply because the police are in very short supply." (France, Researcher, 6)

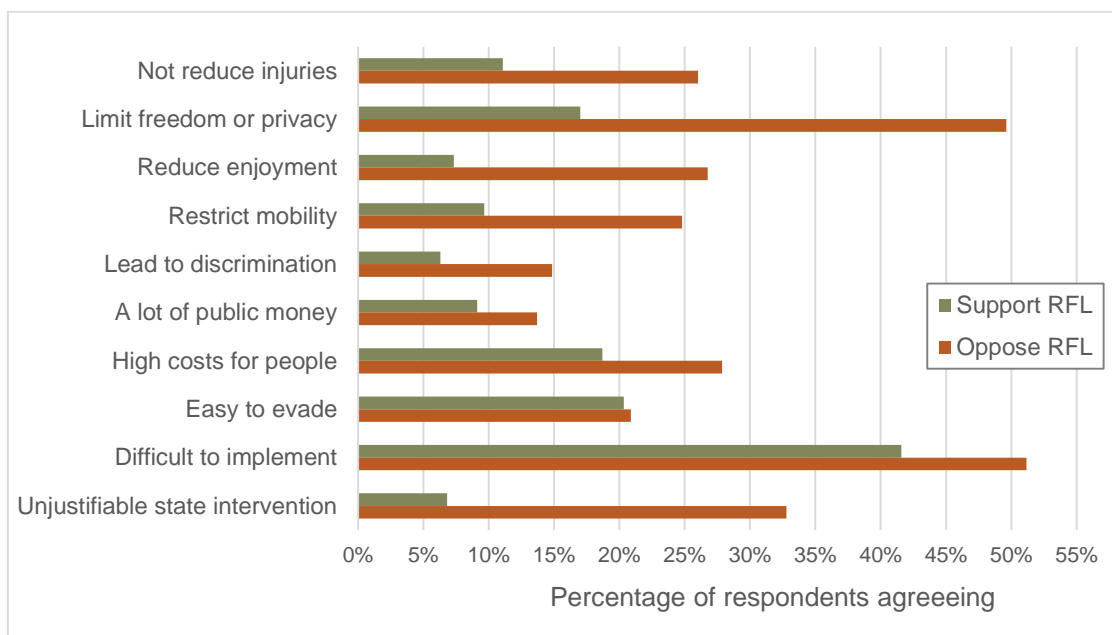
"Appropriate sanctioning and monitoring is very difficult to implement." (Austria, Official, 1)

"It won't happen, you know, it's completely unrealistic" (UK, Manager, 11)

7.4.3 Differences in views between supporters and opponents of RFL

Figure 110 shows how the fairness perspectives differ between those opposing and supporting RFL, based on the answers from the twelve regions in the dilemma survey. It can be seen that half of the opponents think that the measure would limit freedom or privacy and that it would be difficult to implement; about one third considers this to be an unjustifiable intervention of the state. The arguments of the opponents are similar as those of the experts (cf. previous section). The differences between the opponents and supporters are very high for most arguments, except for 'A lot of public money', 'High costs for people', 'Easy to evade' and 'Difficult to implement'. It is interesting to note that over 40% of the supporters for RFL nevertheless recognise that the measure would be difficult to implement. The negative association with support for measures is strongest for 'Limit freedom or privacy' ($r = -0.308^{**}$) and 'Unjustifiable state intervention' ($r = -0.302^{**}$).

Figure 110. Differences in use of unfairness arguments between those supporting and opposing RFL



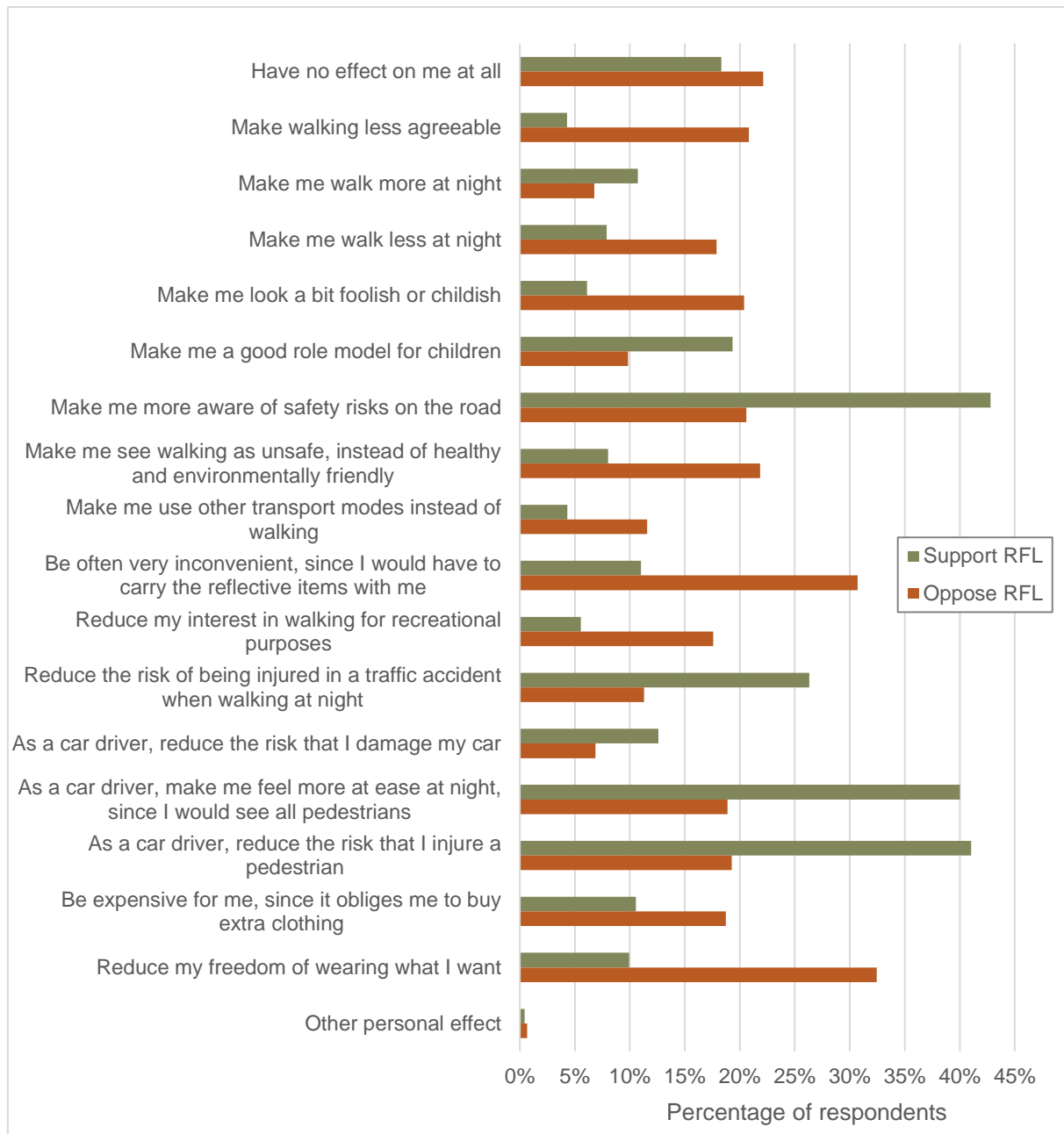
Data source: Dilemma survey

Figure 111 shows how the expected consequences differ between opponents and supporters of RFL. About 40% of the supporters think that such a measure would make them more aware of the safety risks on the road. The car drivers among the supporters would feel more at ease at night because of the visibility of pedestrians, and think that their risk to injure a pedestrian would be reduced. Other arguments used by the supporters include the reduction of the risk of being injured in traffic (as a pedestrian) and to be seen as a good role model for children.

7. The perception of policy measures from different perspectives

Eleven negative consequences of the implementation of RFL were ticked off by at least 15% of the opponents. The highest frequency (about 30%) is for 'Reduce my freedom of wearing what I want' and 'Be often very inconvenient, since I would have to carry the reflective items with me'. This is in line with the findings on the unfairness arguments and the views of the experts.

Figure 111: Consequences expected by supporters and opponents of RFL



Data source: Dilemma survey

7.4.4 Relation between unfairness arguments and pedestrian behaviour

Table 64 shows the significant correlations between pedestrian behaviour and the arguments used against RFL. Pedestrians admitting to have ignored at least once the red light over the last 30 months, and, to a lesser extent, those who ignored a pedestrian crossing, tend to use more unfairness arguments. The three strongest associations are between pedestrians ignoring the red light and ‘Easy to evade’ ($r = 0.143^{**}$), ‘Reduce enjoyment’ ($r = 0.138^{**}$) and ‘Limit freedom or privacy’ ($r = 0.132^{**}$). One might have expected that pedestrians already wearing reflective clothing use the counterarguments for RFL less than the others, but this is actually only the case for the arguments ‘Reduce enjoyment’ ($r = -0.074^*$) and ‘Difficult to implement’ ($r = -0.081^*$).

Table 64. Significant correlations between pedestrian attitudes and behaviour and the arguments used against RFL

	Pedestrians ignoring red light	Pedestrians ignoring pedestrian crossing	Pedestrians wearing reflective clothing	Subjective safety feeling of pedestrians	Pedestrians feeling unsafe at night because a car drove very close
Limit freedom or privacy	.132**	.099**			.086**
Reduce enjoyment	.138**		-.074*		
Restrict mobility					.125**
Lead to discrimination		.083**			.130**
A lot of public money		.073*			
High costs for people					.127**
Easy to evade	.143**	.084**			.067*
Difficult to implement	.090**		-.081*	.073*	
Unjustifiable state intervention		.072*		.065*	

Data source: Dilemma survey

There are two significant correlations between the subjective safety feeling of pedestrians and the use of the unfairness arguments for RFL: with ‘Difficult to implement’ ($r = 0.073^*$) and ‘Unjustifiable state intervention’ ($r = 0.065^*$). The signs of the correlations are positive, meaning that these arguments are used more by those feeling most safe. Surprisingly maybe, pedestrians who feel unsafe at night because car drivers drove very close to them without noticing them, use also more counterarguments than those who didn’t experience this. This counterintuitive result might be explained by the fact that this might concern pedestrians who are used to walk in the dark – or possibly even are obliged to. This speculation is to some extent supported by the type of arguments used most: ‘Lead to discrimination’ ($r = 0.130^{**}$),

'High costs for people' ($r = 0.127^{**}$), 'Restrict mobility' ($r = 0.125^{**}$). Having to wear reflective clothing is seen as unfair, even if it is recognised that it decreases the crash risk.

I conclude this section on RFL with the finding that there is no association between car drivers who had not seen pedestrians in the dark, and any of the unfairness arguments, except 'Easy to evade' ($r = 0.074^*$). Also, those agreeing with the statement 'Not being seen by vehicle drivers is a major cause of pedestrian accidents' don't use fewer unfairness arguments than those who disagreed, except 'Restrict mobility' ($r = -0.053^*$) and 'High costs for people' ($r = -0.056^*$). Thus, somewhat unexpected, personal experience of car drivers with limited visibility of pedestrians is not a factor explaining support or opposition against RFL.

7.5 ZER - Zero tolerance for driving under the influence of alcohol

7.5.1 Level of support for ZER

Section 4.3.2 showed that the level of support for ZER is quite high in most countries. It should be noticed that such a zero BAC limit (or 0.02, which in terms of enforcement almost comes down to the same) exists already in some countries (e.g. Sweden) but this is a minority in both ESRA and the dilemma survey. For the ESRA2 sample as a whole, females are more supportive for ZER than men (Figure 29, p.162). This was also the case in the dilemma survey (Figure 57, p.218). In ESRA the younger respondents are less supportive than older ones (Figure 30, p.163) but this trend was not observed in the dilemma survey (Figure 58, p.219).

Figure 112 compares the support for ZER for the five common countries. It does not vary considerably between the different perspectives considered, with around 40% of the people and experts being in favour. The highest value is for the full support in ESRA. Contrary to ISA and RFL, the (average) view of the experts does not differ much from that of the general population.

Figure 112. Comparison of support for ZER for five countries combined

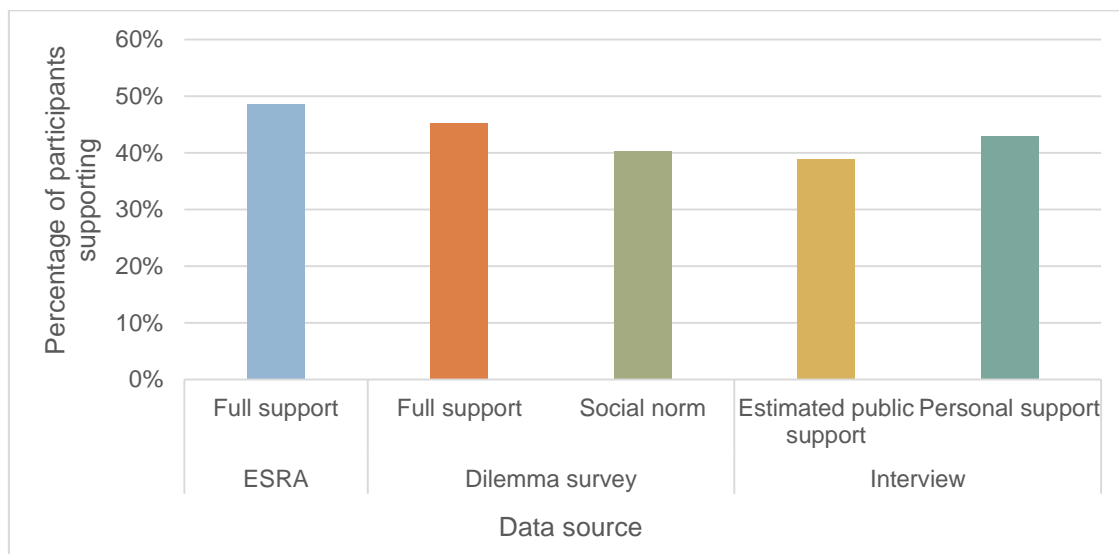
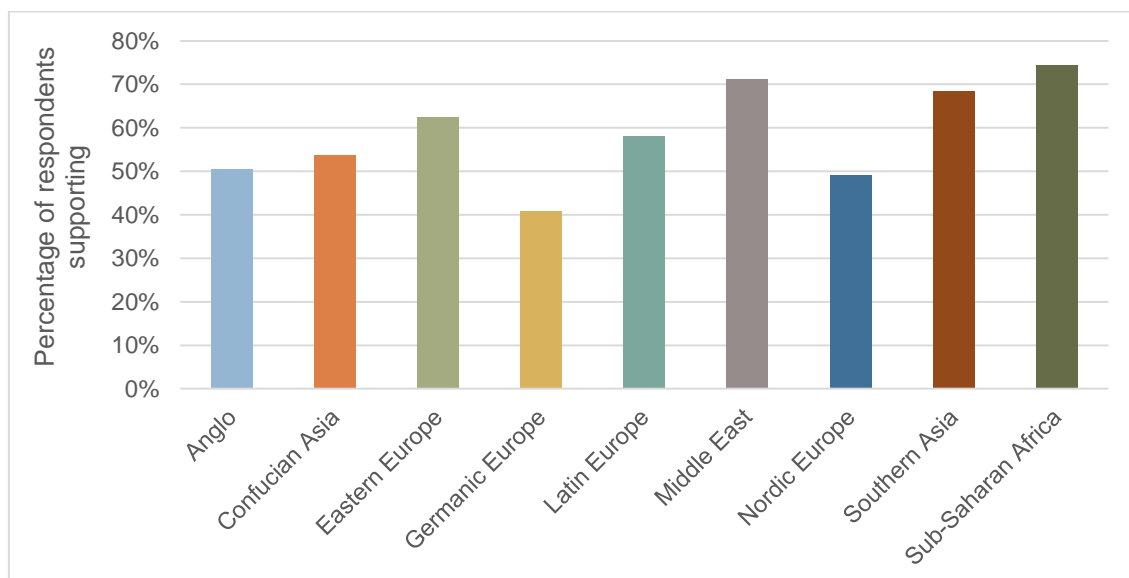


Figure 113 shows the considerable variation of public support for ZER across cultural clusters: the values are lowest in Germanic and Nordic Europe; the highest support is found in Sub-Saharan Africa, the Middle East, and Eastern Europe. The relatively high figure for Eastern Europe can be explained by the long tradition of zero BAC limits and strict DUI alcohol enforcement practices in these countries. In the Middle East the high support is likely related to alcohol restrictions in the Muslim world. The high support in Sub-Saharan Africa can be related to the 'generic' high level of support for road safety measures in these areas.

Figure 113. Support for ZER by cultural cluster



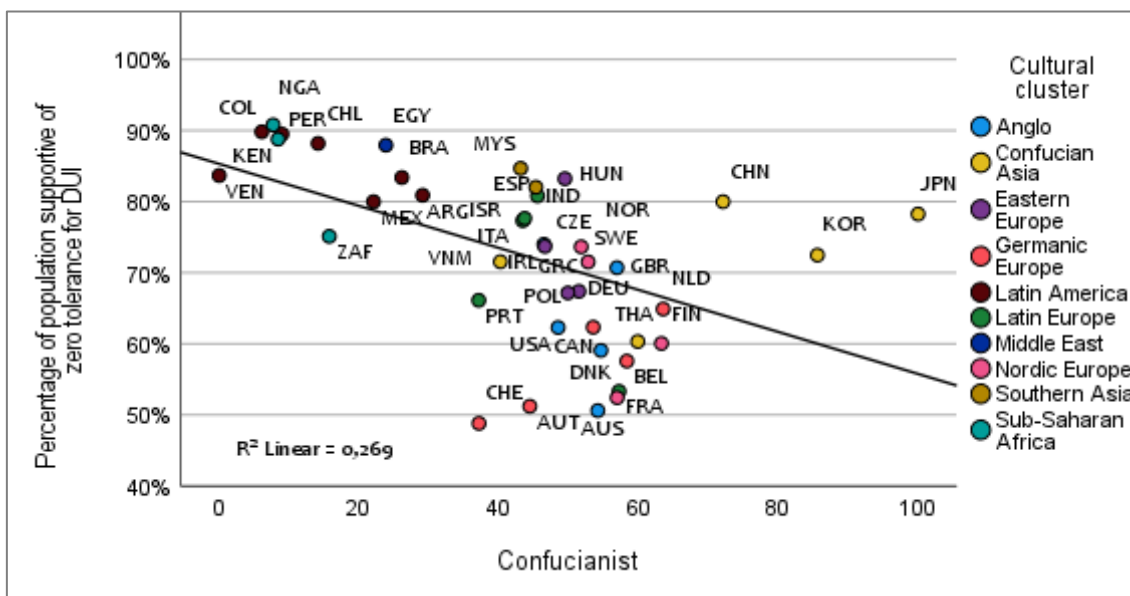
Data source: ESRA

Table 32 (p.161) showed that support for ZEN (a measure that forbids novice car drivers to drive after drinking alcohol) is higher than for ZER (which targets all drivers). This is not surprising since such an obligation actually exists already in many countries and it is broadly known that novice drivers have a higher crash risk than average.

Cestac et al. (2016) refer to Southern European countries as ‘wet’ countries, with cultural norms that are more positive towards moderate alcohol consumption than in Northern European ‘dry’ countries. My results, however, do not allow to extrapolate these differences in behaviour to differences in support for measures. As Figure 113 shows, support for ZER is higher in Latin Europe than in Nordic Europe.

Table 41 of Section 4.5.1 already showed that the support for ZER is (very) strongly associated with the two key dimensions of national culture, Independent ($r = -.673^{**}$) and Confucianist ($r = -0.519^{**}$). The strong negative association with Independent does not come as a surprise, given the ‘intrinsic’ opposition against paternalism. The strongly negative correlation with Confucianist may appear counterintuitive at first, since one may expect Dionysian cultures to be against measures restricting alcohol use. However, these are in general LMICs with high numbers of fatalities, many of which are related to alcohol. This situation probably tends to increase public support for measures such as ZER. Figure 114 shows a scatterplot of the relationship between the support for ZER and Confucianist. It can be observed that in South Korea and Japan, two ‘very’ Confucianist countries, the support for ZER is actually fairly high.

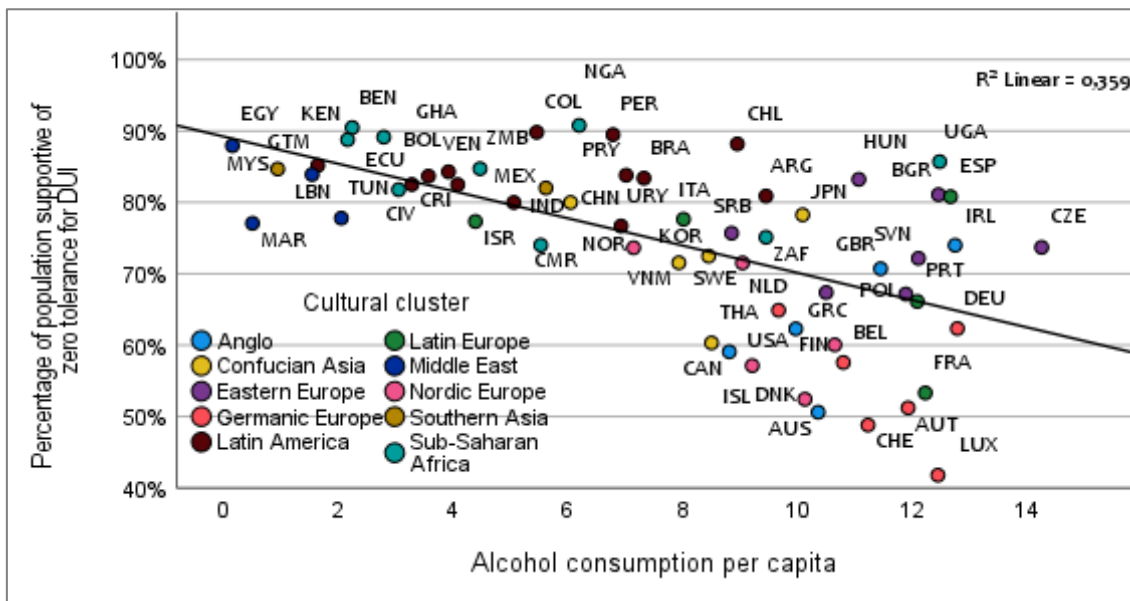
Figure 114. Support for ZER by Confucianist cultural dimension



Data sources: ESRA (Support for ZER) and Hofstede Insights (culture)

Another factor which plays a role in explaining differences between countries is the alcohol consumption per capita. The relationship is displayed in Figure 115 ($r = -0.599^{**}$). Obviously, the higher the alcohol consumption in a country, the higher the opposition against ZER. This being said, even within Europe there are large differences in support for ZER between countries with a similar level of alcohol consumption; for example note the differences between Spain, Bulgaria, France and Austria.

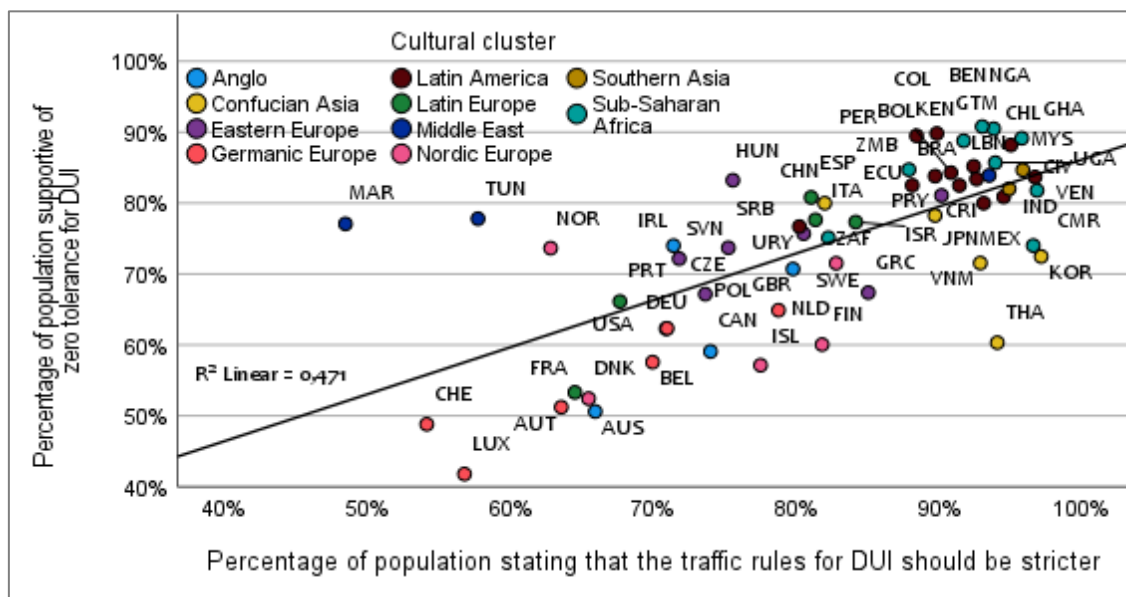
Figure 115. Support for ZER by alcohol consumption per capita



Data sources: WHO (alcohol) and ESRA (support for ZER)

So 'drinking culture' in a country does not suffice to explain country differences in public support for ZER. It is more the social acceptance of the combination of drinking and driving as well as the (expected) level of enforcement of regulation in relation to DUI. It is recalled from Section 4.4.3 that adequate control on DUI is linked to lower support for strict measures in that area ($r = -0.408^{**}$) for ZER. The correlation between ZER and 'The traffic rules for DUI should be stricter' is 0.686^{**} if outlier Egypt is left out. Figure 116 shows a scatterplot.

Figure 116. Support for ZER by agreeing 'The traffic rules for DUI should be stricter'



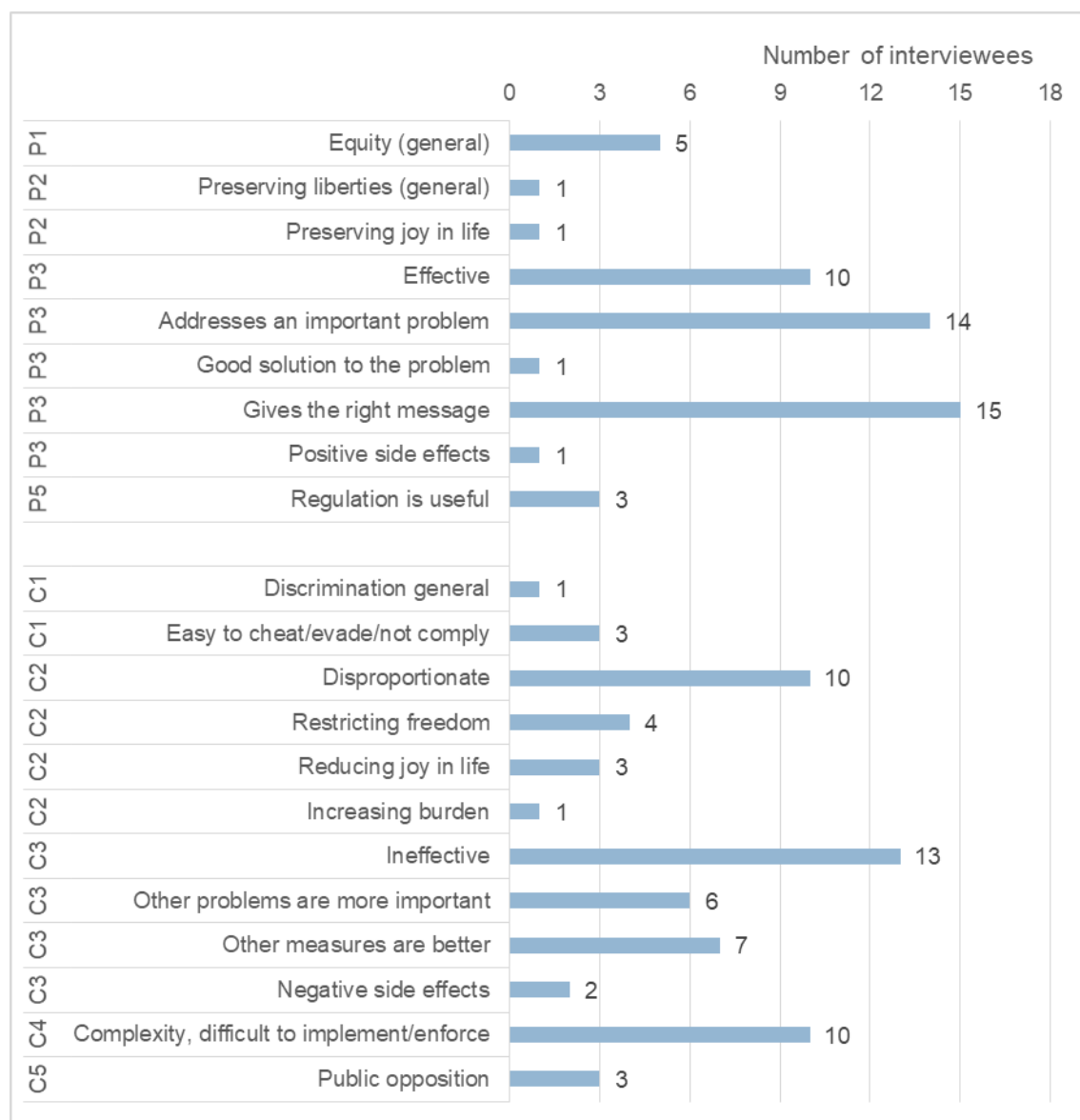
Data source: ESRA

7.5.2 Fairness perception and arguments used by the interviewees

Twenty-four interviewees considered ZER to be a fair measure; nine perceived the measure as unfair. These figures are very similar to those for ISA. Five interviewees hesitated between fair and unfair and one considered that the fairness concept was not applicable to ZER. The question on fairness was not asked to one of the interviewees. Two interviewees who considered the measure to be fair, nevertheless did not support it. Overall, there was a strong association between support for measures and perceived fairness of ZER.

Figure 117 shows the distribution of the arguments used by the interviewees, grouped by argument area. Again, 'Relevance' (P3) is by far the most used supportive argument area. Fifteen interviewees said that ZER would give the right message, fourteen that the measure addresses an important problem, i.e. road crashes caused by drunk driving, and ten that it would be effective. Five found ZER equitable and three considered that regulation was necessary for addressing the problem. The negative arguments are mostly from 'Limited added value' (C3) and 'Restricting human liberties' (C2). Thirteen interviewees justified their opposition by labelling ZER as ineffective, seven that other measures would be more suitable and six that other road safety risks were more important to address (this referred to the low crash risks for people with a low BAC). Ten interviewees considered the measure to be disproportionate and four that it would restrict freedom too much. There were also ten interviewees who thought that ZER would be difficult to enforce.

Figure 117. Number of interviewees using particular arguments in relation to ZER



Data source: Interviews

In order to illustrate the arguments used, I include below some quotes in relation to 'Relevance' and 'Practical obstacles'.

Quotes in relation to 'Relevance' (P3)

"It would save many lives and serious injuries and consequences." (UK, Official, 37)

"It would make it clear that as soon as you've been drinking, you don't drink and drive." (France, Official, 14)

"It would have a general preventive effect." (Austria, Researcher, 23)

"The risk of killing yourself or someone else or hurting someone else." (Sweden, Manager, 28)

"It's easier to communicate if you have non-tolerance." (Sweden, Manager, 25)

Quotes in relation to 'Practical obstacles' (C4)

"It is an unrealistic measure. Something like this can only be introduced gradually over a long period of time." (Austria, Official, 33)

"This measure is not feasible unless you have an alcohol ignition interlock." (France, Researcher, 6)

"It's good if people are not drunk, but I don't think it's practical with the zero you have. So I think 0.2 is OK" (Sweden, Researcher, 21)

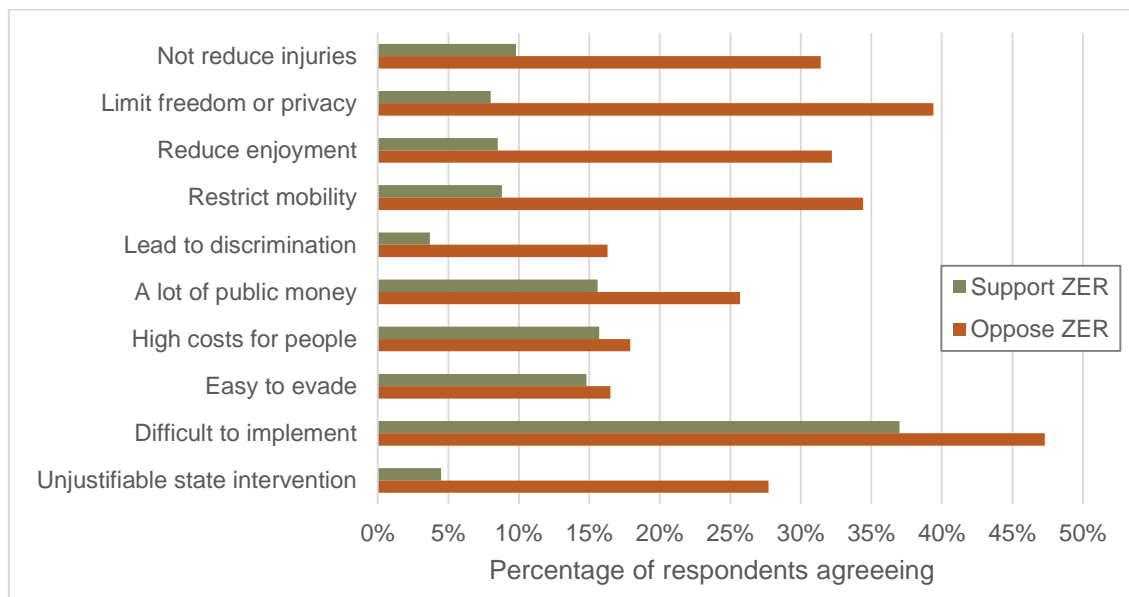
"You need to have very strong enforcement means to try to impose it." (Greece, Researcher, 3)

"If you go from 0.5 to 0.25 and then you one day to zero, then you could implement it correctly. So if you go progressively one day it could happen." (Greece, Academic, 18)

7.5.3 Differences in views between supporters and opponents of ZER

Figure 118 shows how the fairness perspectives differ between those opposing and supporting ZER, based on answers of the respondents from the twelve regions in the dilemma survey. Again, differences between the two groups are often very high. About one-third of the opponents to ZER do not believe it will reduce injuries and think it will limit freedom or privacy, reduce enjoyment in life and restrict mobility. About a quarter of the opponents consider ZER to be an unjustifiable intervention from the state. Less than 10% of the ZER supporters agree with these five statements. The results are also supported by a correlation analysis showing a moderate to strong correlation between the level of support for ZER and 'Limit freedom or privacy' ($r = -0.352^{**}$), 'Unjustifiable state intervention' ($r = -0.304^{**}$), 'Reduce enjoyment' ($r = -0.282^{**}$) and 'Restrict mobility' ($r = -0.280^{**}$).

Figure 118. Differences in use of unfairness arguments between those supporting and opposing ZER



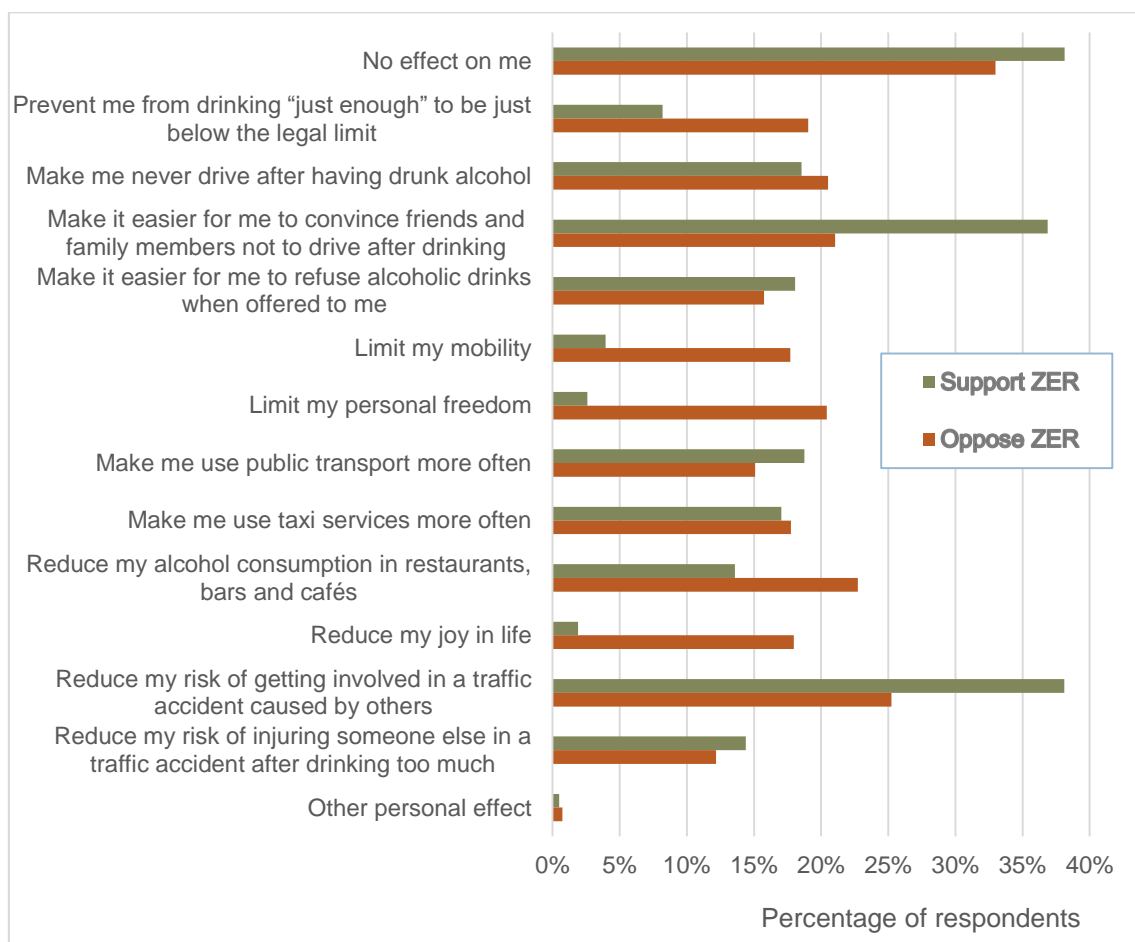
Data source: Dilemma survey

7. The perception of policy measures from different perspectives

Like for other measures, the differences between opponents and supporters are much smaller for the practical and financial arguments: ‘a lot of public money’, ‘high costs for people’, ‘easy to evade’ and ‘difficult to implement’. Such arguments appear not to be decisive for supporting or opposing the level of support for ZER.

Figure 119 illustrates that the expected consequences differ between supporters and opponents; but the differences are often smaller for ZER than for other measures. The highest differences are seen for ‘Limit my personal freedom’, ‘Reduce my joy in life’ and ‘Limit my mobility’. About a third of both the opponents and supporters of ZER think that it would have no effect on them – probably because they don’t drink and drive and/or live in an environment where few road crashes are related to alcohol consumption. This percentage is much higher than for other measures.

Figure 119: Consequences expected by supporters and opponents of ZER



Data source: Dilemma survey

About one-third of the supporters of ZER think that the measure would make it easier for them to convince friends and family members not to drive after drinking alcohol and that it will reduce their risk of getting involved in a road crash (this is also agreed with

by a quarter of the opponents). Another observation is that all consequences listed, with few exceptions, are agreed with by between 15% and 20% of the opponents. This suggests that there is not a single predominant counterargument to ZER, but rather a varied range of arguments. The opponents also recognize some positive effects of ZER.

7.6 SCR – Regular screening of elderly on driving ability

7.6.1 Level of support for SCR

The SCR measure was not included in ESRA, so the discussion in this section is only based on an analyses of data from the interviews and the dilemma survey. Table 57 (p.220) shows that the level of support for SCR is fairly high in the twelve regions included in the survey. On average females are more supportive of SCR then men (Figure 57, p.218). Not surprisingly, the support for SCR decreases with age (Figure 58, p.219).

Figure 120 compares the support for SCR for the five countries that are common in the dilemma survey and the interviews. It can be seen that the level of support does not vary considerably between the different perspectives considered, with full support levels varying between 30% and 40%.

Figure 120. Comparison of support for SCR for five countries combined

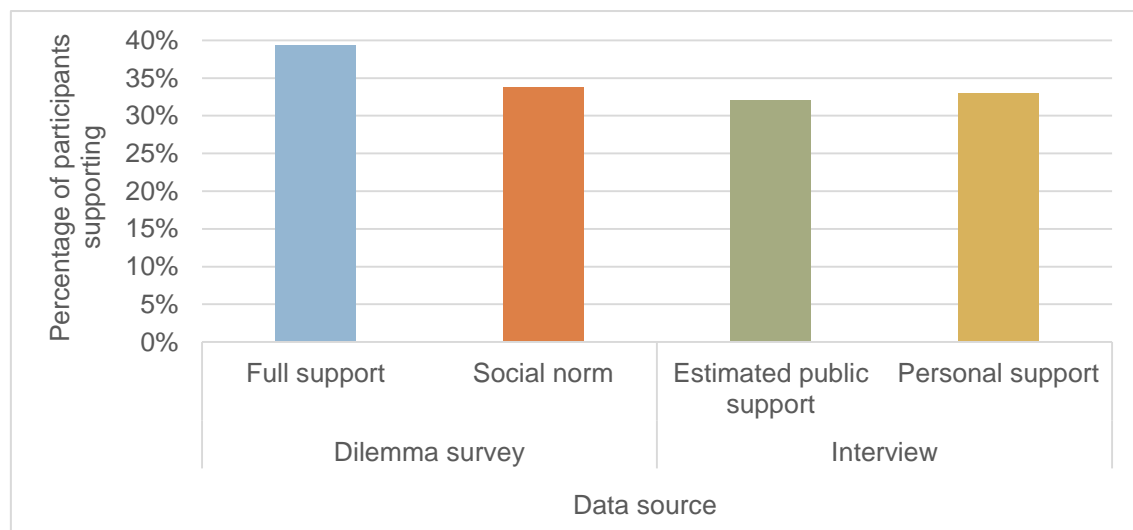
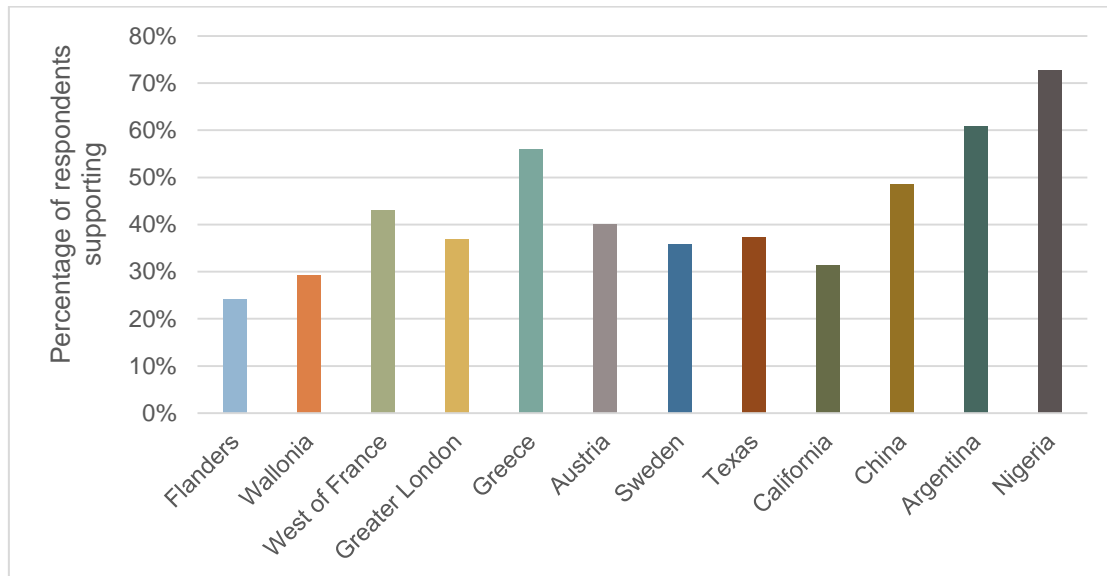


Figure 121 shows that the support for SCR varies considerably across the 12 regions considered. It is lowest in Belgium (Flanders and Wallonia) and highest in Nigeria. The high value in Nigeria is consistent with support for road safety measures often being very high in Sub-Saharan Africa. Amongst the European countries included, the

strongest support is seen in Greece; this is not surprising since a measure similar to SCR already exists in that country.

Figure 121. Support for SCR by region



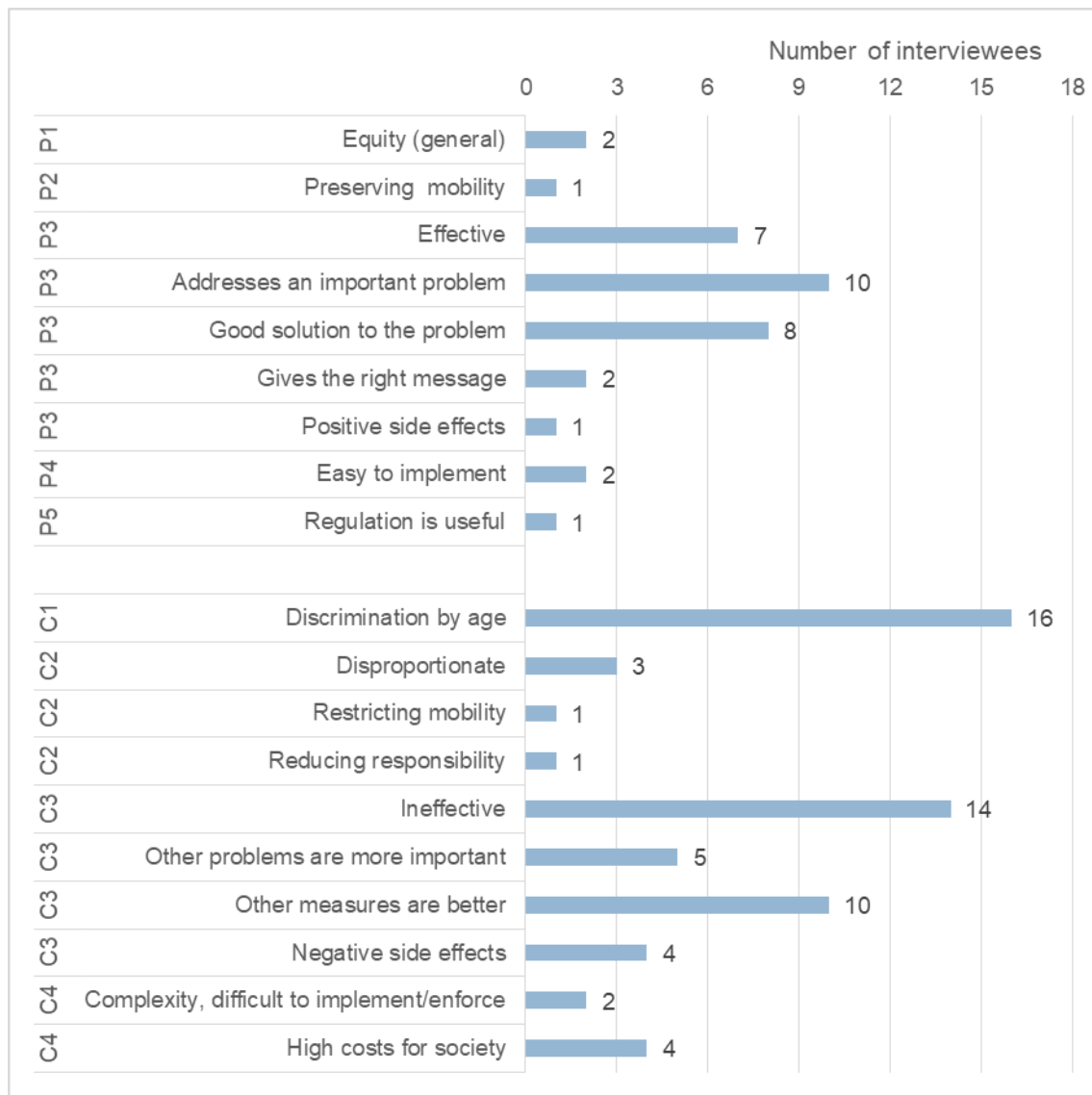
Data source: Dilemma survey

7.6.2 Fairness perception and arguments used by the interviewees

Only 14 of the 40 people interviewed considered SCR to be a fair measure. Twenty-three interviewees perceived SCR as unfair, the highest number across all measures. Two had mixed feelings; the question was not asked to one interviewee. There was a strong association between the opposition to SCR and its perceived unfairness.

Figure 122 shows the distribution of the arguments used by the interviewees, grouped by argument area. Again, the argument area 'Relevance' (P3) was used most for justifying support for the measure. It covered the more specific arguments 'addresses an important problem' (ten interviewees), 'is a good solution to the problem' (8) and 'effective' (7). The negative arguments were much more numerous. Sixteen interviewees used discrimination of older people as an argument to oppose the measure. SCR was the measure with the highest percentage of interviewees using an argument in relation to discrimination. Many used arguments in the area 'Limited added value' (C3) too: fourteen stated that ZER was ineffective, ten felt that other measures were better to address the increased crash risk of seniors, five believed that other issues were more important to address and four expected negative side effects, in particularly reduced mobility and quality of life of older people. Four interviewees considered the costs of ZER to be too high for society and three said it was disproportionate.

Figure 122. Number of interviewees using particular arguments in relation to SCR



Data source: Interviews

It should be noted that several interviewees were not aware that because of the current ways of implementing measures like SCR in some countries, such measures are often not very effective and may even have the opposite effect, i.e. more seniors becoming involved in crashes (Martensen, 2017; Martensen & Diependaele, 2014; Siren & Meng, 2012). When I presented this information and also explained why this was the case, several interviewees who were initially in favour of SCR changed their opinion during the interview.

In order to illustrate the arguments used by the interviewees, I include below some quotes in relation to 'Discrimination' and 'Relevance'.

Quotes in relation to 'Discrimination' (C1)

"If you assess risk on age basis, you would restrict the young drivers, not old drivers." (UK, Manager, 11)

"It singles out a group." (Sweden, Researcher, 4)

"This is clearly age discrimination. Even at 35, some people can't drive a car." (Austria, Parliamentarian, 2)

"Because it affects exactly one group, and there is no scientific basis for exactly this group." (Austria, Consultant, 34)

"Health state is very variable and age is absolutely not a criterion." (France, Researcher, 13)

Quotes in relation to 'Relevance' (P3)

"I don't want people driving on the road who can't see what [happens]." (UK, Parliamentarian, 5)

"It is necessary. Also for your own safety, also for your own conscience. That you know whether you are still roadworthy or not." (Austria, Researcher, 9)

"A medical neurologist could really find out those outliers." (Greece, Researcher, 3)

"The ability of people, mostly of age 70 and above, can deteriorate very rapidly." (Greece, Academic, 10)

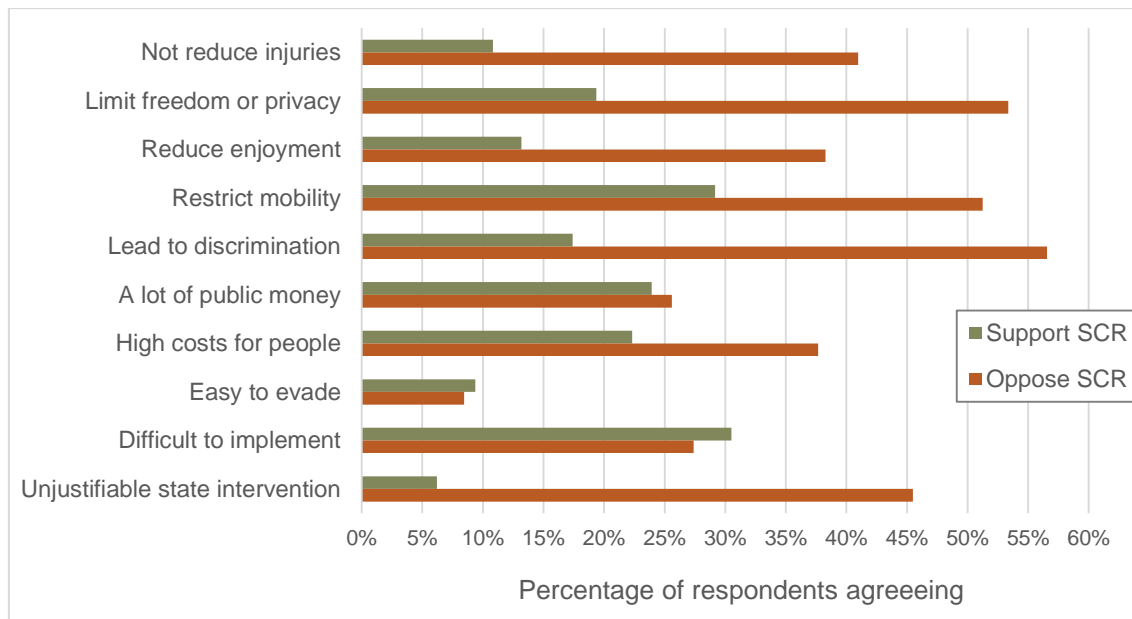
"They essentially endanger others." (UK, Official, 37)

7.6.3 Differences in views between supporters and opponents of SCR

Figure 123 shows the differences in the counterarguments used between those opposing and those supporting SCR, based on the dilemma survey. The differences between the two groups are very high for six arguments. Over half of the opponents considered that SCR would limit freedom or privacy and would lead to discrimination, while less than one-fifth of those in favour used these arguments. Other important arguments for those opposing SCR were the restriction of mobility, the unjustifiability of state intervention, the lack of effectiveness and the high costs for people. For none of the other measures in the survey did opponents use so many unfairness arguments.

The strongest negative correlations with support for measures, and hence the best predictors for opposing the measure, are for 'unjustifiable state intervention' ($r = -0.391^{**}$), 'lead to discrimination' ($r = -0.349^{**}$), 'not reduce injuries' ($r = -0.306^{**}$) and 'limit freedom or privacy' ($r = -0.292^{**}$). Interestingly, even respondents who are in favour of the measure recognise its unfair implications: one in five recognizes the limitation of freedom or privacy, and one in four recognizes the restriction of mobility that would be caused by the measure.

Figure 123. Differences in use of unfairness arguments between those supporting and opposing SCR



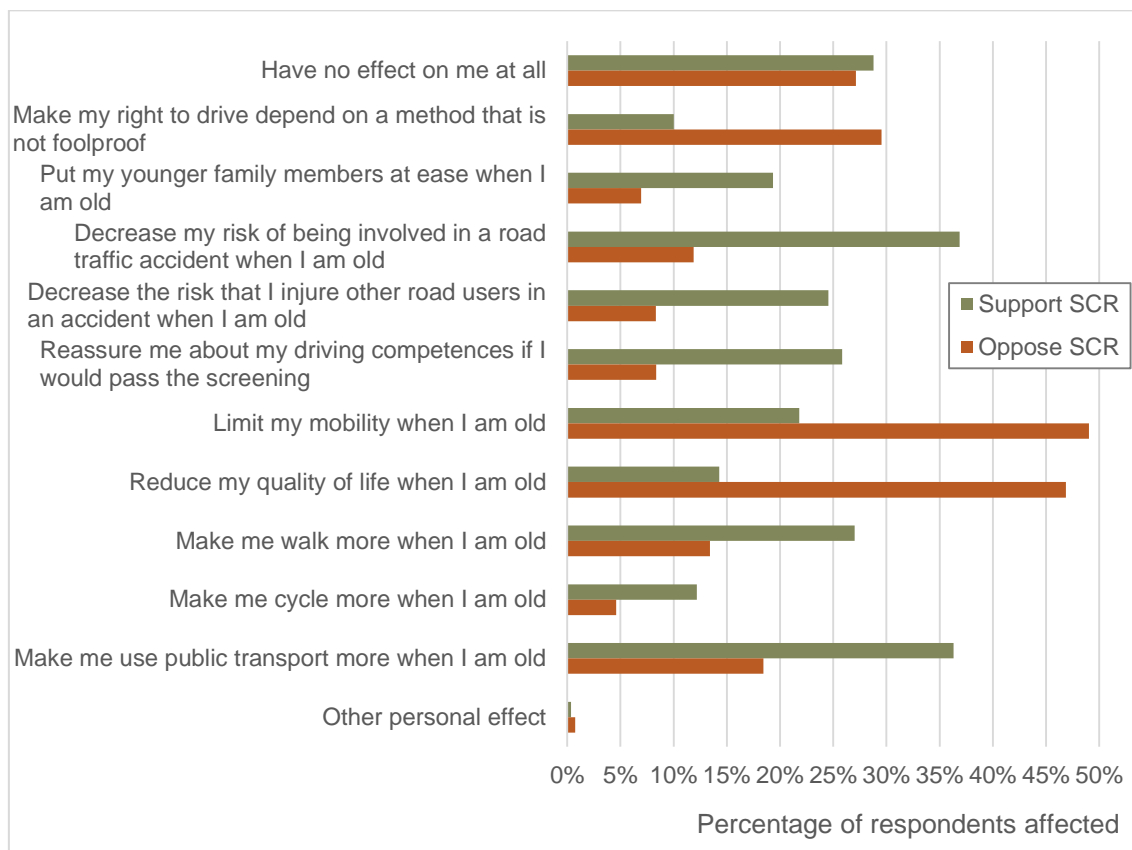
Data source: Dilemma survey

Figure 124 (p.287) shows how the expected consequences differ between supporters and opponents of SCR. Those supporting SCR believe much more in the effectiveness of the measure and the reduction of road safety risks. They also think that SCR will make them walk, cycle and use public transport more when they are old. People opposing SCR fear that it would reduce their mobility ($r = -0.294^{**}$ with support for measures) and quality of life ($r = -0.234^{**}$). In other words, the prospect of having to use other transport modes instead of driving a car, feeds the opposition to SCR. Another counterargument used by opponents is that they don't want their mobility to depend on a screening that is not fool proof in their eyes.

7.6.4 Relation between beliefs and use of unfairness arguments

Table 65 (p.287) shows the significant correlations between the unfairness arguments and the agreement with four statements about road safety issues. People who think that speeding and drunk driving are major causes of road crashes tend to see SCR less unfair than people who disagree with this. The table also shows that people who consider that the penalties for driving faster than the speed limit are too severe, use also more arguments against SCR. Not surprisingly, people who believe that older car drivers are often a danger to themselves and other road users in traffic, are more supportive for SCR. They agree less with the counterarguments – as is illustrated by the negative sign of the correlations in Table 65.

Figure 124: Consequences expected by supporters and opponents of SCR



Data source: Dilemma survey

Table 65. Significant correlations between agreement with some statements and the arguments used against SCR

	Driving after drinking alcohol is a major cause of accidents	Speeding is a major cause of accidents	The penalties for driving faster than the speed limit are too severe	Older car drivers are often a danger to themselves and other road users in traffic
Not reduce injuries	-,049*	-,083**	,111**	-,179**
Limit freedom or privacy	-,112**	-,121**		-,148**
Reduce enjoyment	-,094**	-,090**	,098**	-,117**
Restrict mobility	-,105**	-,125**		-,057*
Lead to discrimination	-,064**	-,096**	,081**	-,175**
High costs for people	-,067**	-,049*		-,101**
Difficult to implement		,058*		,052*
Unjustifiable state intervention.	-,061*	-,063*	,090**	-,212**

Data source: Dilemma survey

7.7 PAY – Fines for traffic offense are proportional to income

7.7.1 Level of support for PAY

Because PAY was not included in ESRA, the discussion in this section is only based on the data collected during the interviews and the dilemma survey. In Chapter 6 (Table 57, p.220) it was already shown that the level of support for PAY is moderate in the twelve regions included in the survey. PAY and INS are also the only measures considered for which men are more supportive than women (Figure 57, p.218) – although this is not the case in all countries. The support for PAY decreases with age (Figure 58, p.219), maybe because older people (in the sample) tend to be a bit richer than the other respondents.

Figure 125 compares the support for PAY for the five countries that are common in the dilemma survey and the interviews. The level of support varies considerably for the different perspectives considered: it is higher amongst the experts, and they also think that public support is higher than it actually is.

Figure 125. Comparison of support for PAY for five countries combined

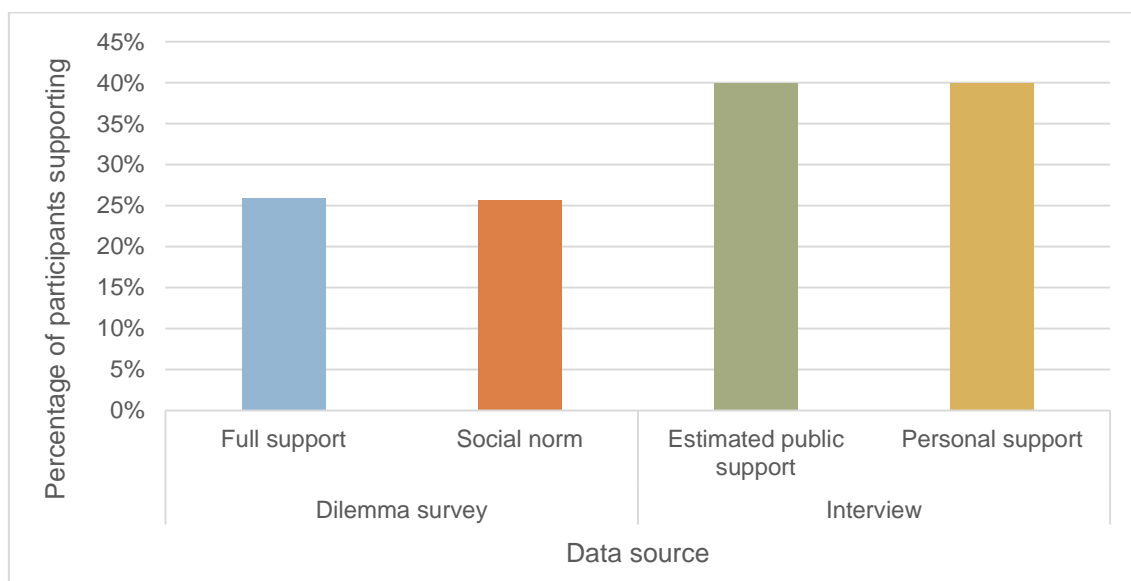
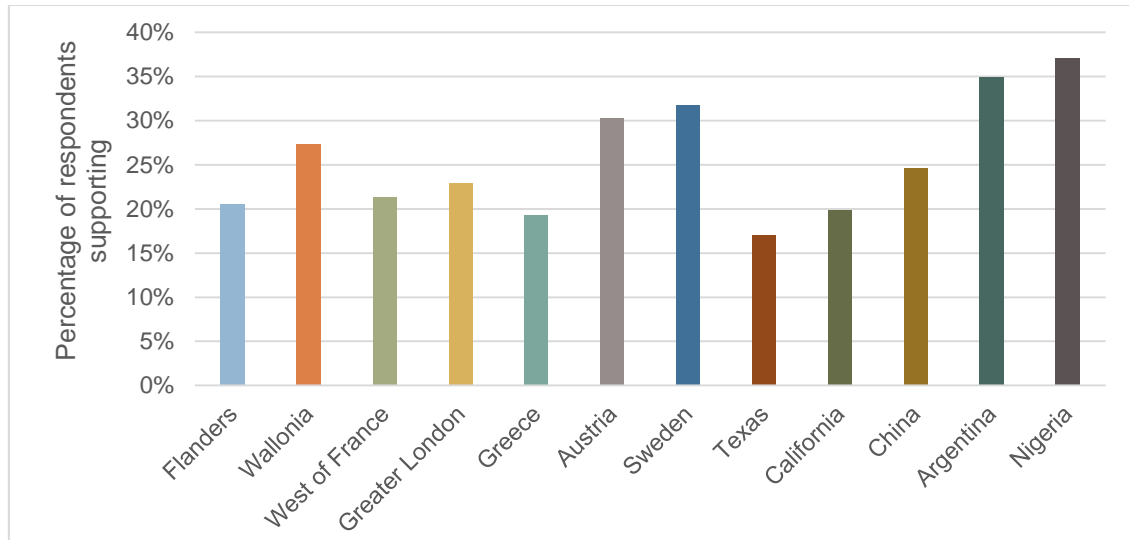


Figure 126 shows that the support for PAY varies considerably across the 12 regions considered, even within Europe: one-third of the Swedes are in favour, compared to one-fifth of the Greek. The lowest support is found in Texas (about one in six respondents) and the highest in Nigeria and Argentina (over a third). It should be noted that although PAY is not implemented in any of the countries (except to some extent in Sweden) sometimes judges in these countries tend to take income into account when they determine the severity of the penalty for a traffic crime. Please also note that

during the early stage of my PhD research, the Greek government considered to make fines for traffic offenses proportional to income, but eventually this was not pursued after the change of government (information provided by Greek interviewees).

Figure 126. Support for PAY by region in the dilemma survey



Data source: Dilemma survey

7.7.2 Fairness perception and arguments used by the interviewees

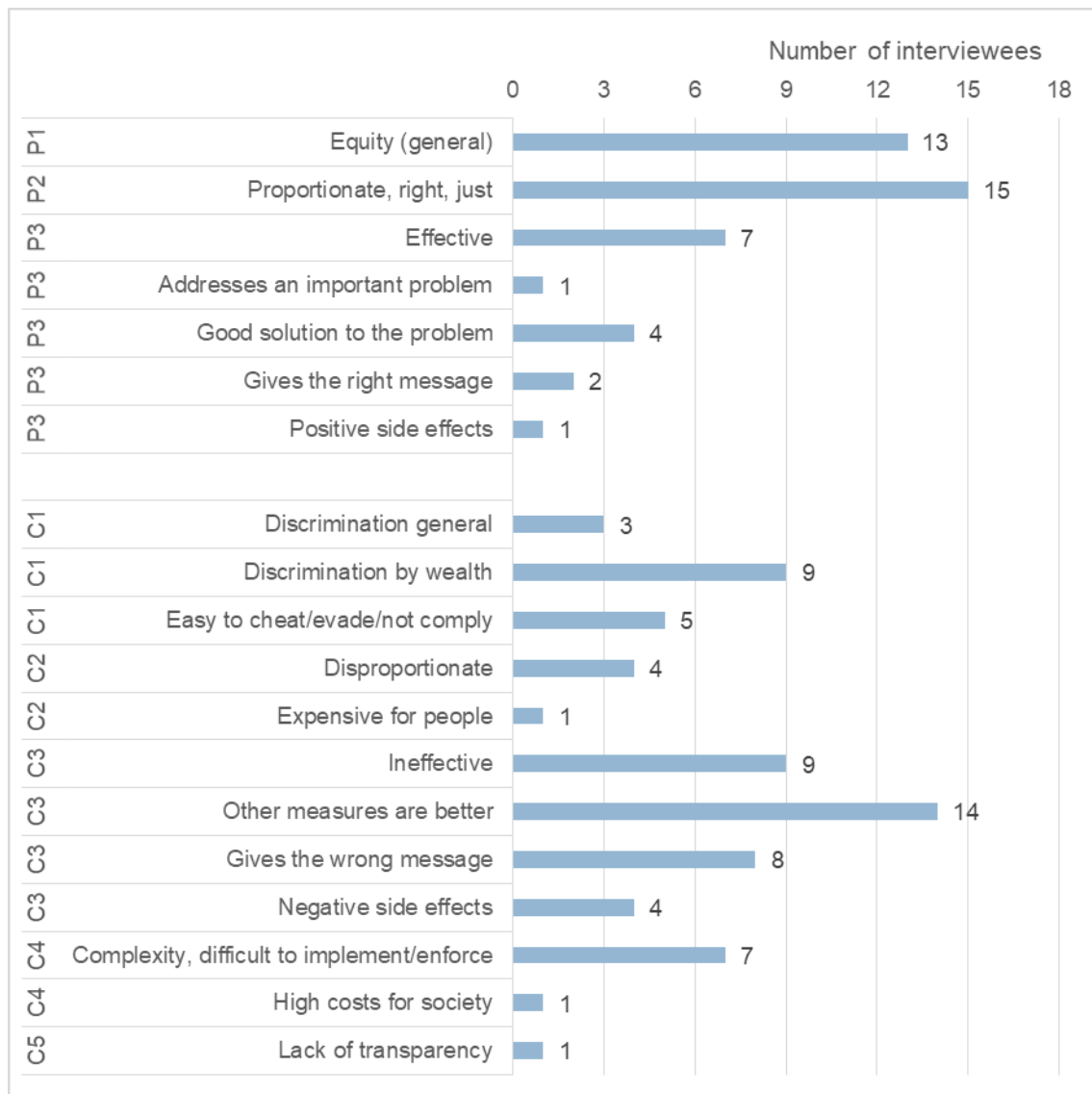
Of the 40 people interviewed, twenty-one considered PAY to be a fair measure, and six hesitated between fair and unfair. Ten interviewees perceived PAY as unfair. The question on fairness was not asked to three interviewees. There was a strong association between support for PAY and its perceived fairness.

Figure 127 (p.290) shows which arguments the interviewees used. The three areas 'Equity' (P1), 'Preserving human liberties' (P2) and 'Relevance' (P3) include a similar number of arguments. Fifteen interviewees saw PAY as a proportionate and just measure and thirteen considered the measure to be equitable and non-discriminatory. Seven interviewees believed that the measure would be effective, i.e. changing the risky behaviour of richer people; four believed it was a good solution to the problem because some people don't bother much about traffic fines because they can easily pay the amount.

A broad range of arguments was used against the measure. Fourteen interviewees didn't believe that PAY was appropriate and thought that other measures would be more effective than fines (e.g. withdrawal of driving licence, prison, confiscation of car, training courses, carry out community service). Nine interviewees did not believe in the

effectiveness of RFL and eight thought that it would give the wrong message, i.e. that you could pay yourself out of a traffic offence. Twelve interviewees stated that it would be discriminatory, in particular for richer people; some also added that it would be unfair that the fine for poor people would be low. Thus, PAY is considered discriminatory by some interviewees but others perceive the measure as equitable. For four interviewees, PAY was seen as disproportionate. Several interviewees believed that it would not work in their country since some traffic offenders could hide their income or wealth (5 interviewees), that it would be complex and difficult to implement such a measure correctly (7) and that it would have negative side effects (4), such as ‘trading’ of offenses.

Figure 127. Number of interviewees using particular arguments in relation to PAY



Data source: Interviews

In order to illustrate the arguments used, I include below some quotes in relation to 'Discrimination' and 'Equity'.

Quotes in relation to 'Equity' for PAY

"This is a fairness question. You should not be able to sort of pay yourself out when breaking the law." (Sweden, Researcher, 21)

"Because the punishment will be the same for all." (Sweden, Official, 27)

"I think it's fair because the amount of the fine is a deterrent for some and not for others." (France, Official, 14)

"At least it will have an impact on the rich, which it doesn't have for the moment." (Austria, Consultant, 16)

"It allows to take into account for their small income and make it acceptable, considering that the fine is not negligible as it can be today." (France, Official, 40)

Quotes in relation to 'Discrimination' for PAY

"It is important that you are treated equal." (Sweden, Manager, 28)

"If only rich people are receiving fines, then it can be an extreme implementation. Totally unfair." (Greece, Academic, 18)

"Because everybody cheats on his income taxes." (Greece, Manager, 7)

"You can't trust actually the kind of official income statements." (UK, Official, 12)

"My main argument is that I see many traffic infractions, they're low income." (Sweden, Academic, 35)

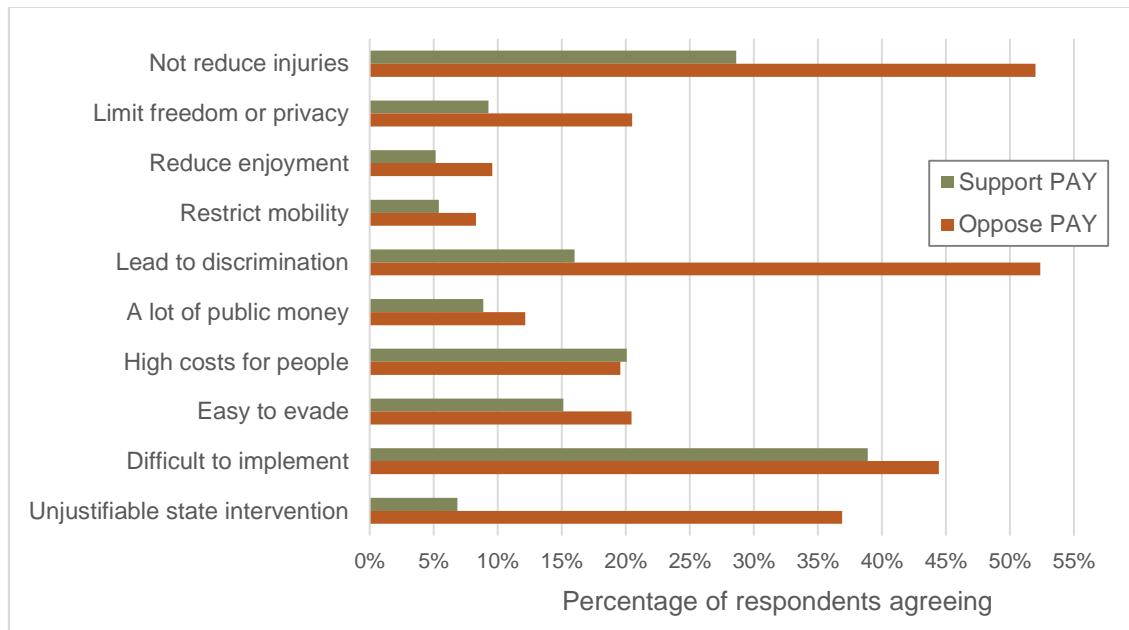
7.7.3 Differences in views between supporters and opponents of PAY

Figure 128 provides data on the differences between the unfairness arguments used by those opposing or supporting PAY, based on the dilemma survey. Half of the opponents of PAY use the arguments included in the areas 'Not reduce injuries' and 'Lead to discrimination'. Almost half of them think that the measure would be difficult to implement and over a third considers this to be an unjustifiable state intervention. Interestingly, almost 30% of the supporters agree that PAY would not reduce injuries and almost 40% that it would be difficult to implement the measure. Actually, with the exception of 'Lead to discrimination' (correlation with support for measures is -0.344**) and 'Unjustifiable state intervention' ($r = 0.329^{**}$) the opponents and supporters of PAY do not differ a lot in terms of the unfairness arguments used.

Thus, despite agreeing with one or more counterarguments some people are in favour of PAY anyway. Equity is a more important consideration for PAY than for the other measures. One out of four interviewees used equity as an argument in favour of the measure. Only 15% of supporters in the dilemma survey consider the measure as

discriminatory, and probably many among those 15% considered such a discrimination to be justifiable in this case.

Figure 128. Differences in use of unfairness arguments between those supporting and opposing PAY

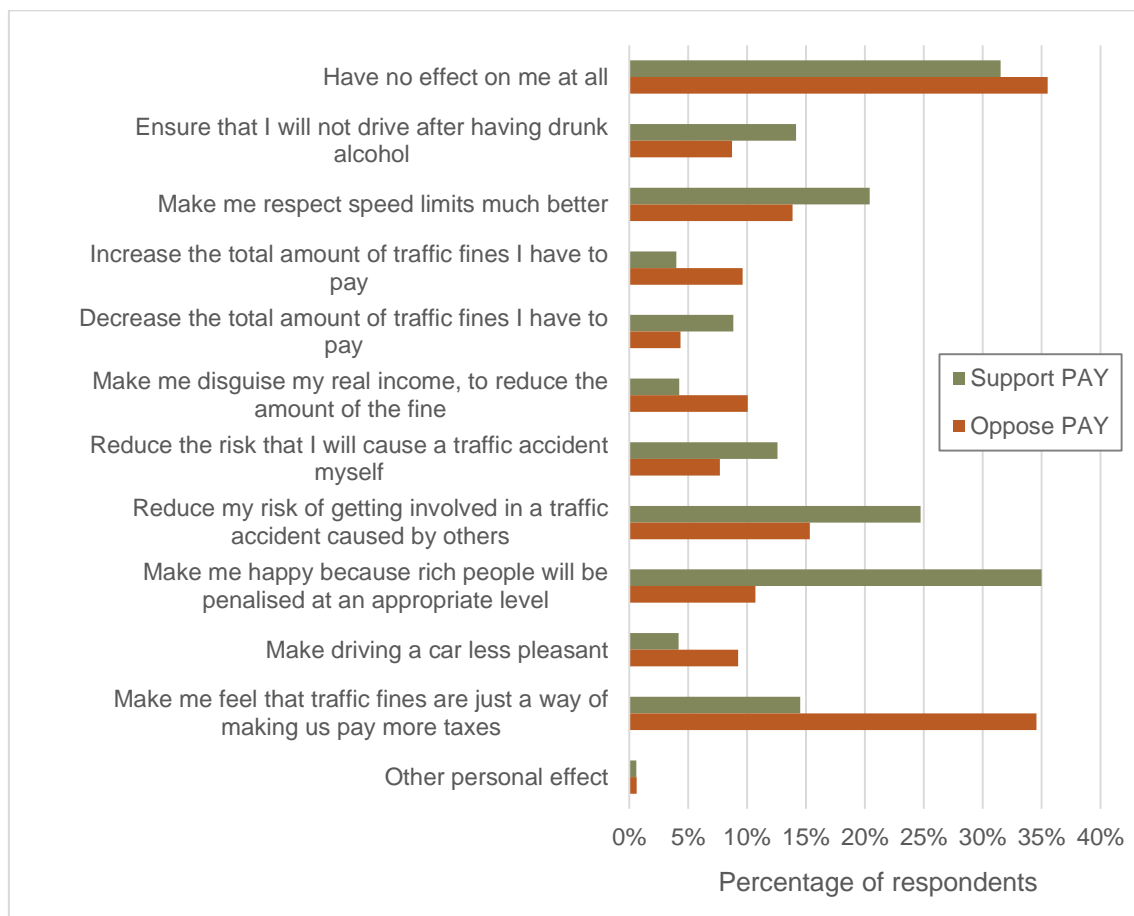


Data source: Dilemma survey

Figure 129 shows how the expected consequences differ between supporters and opponents of PAY. About one-third of respondents did not expect that the measure would affect them; this figure applies both to opponents and supporters. About one-third of the supporters of PAY stated that the measure would make them happy because rich people would be penalised at an appropriate level. About a quarter of the supporters believe that PAY would reduce their risk of getting involved in a traffic accident caused by others. In other words, they think that proportional fines would change the behaviour of the richer traffic offenders. This expectation is lower among the opponents of PAY.

The argument most used by the opponents is that PAY would be a mechanism for the government to make them pay more taxes. It is interesting that none of the experts interviewed had mentioned this argument. Apart from this argument and the one on equitability towards rich people, the expected consequences do not differ a lot between opponents and supporters.

Figure 129: Consequences expected by supporters and opponents of PAY



Data source: Dilemma survey

7.8 Summary

Chapter 7 discusses public support for six policy measures. It integrates some results already reported on in previous chapters and adds other findings, such as the specific arguments used by the interviewees, the distribution of counterarguments used by opponents and supporters from the dilemma survey, and the personal consequences expected by the survey sample. Results from different data sources are compared for the five countries in which interviews had been undertaken. Due reference is also made to some findings of the literature review.

The influence of national culture, in particular the Independent dimension, is (very) strong for a number of measures, but this should not be generalised to all of them. The analyses support the findings of other authors that when a measure, or a similar one, is already in operation, the opposition tends to diminish. Triangulation showed that sometimes experts and policy-makers have a good idea of the level of public support but for other measures they may under- or overestimate it. The nature and distribution of the arguments used in relation to a measure is also different between the

7. The perception of policy measures from different perspectives

interviewees and the sample of respondents in the survey: 'Relevance' is mentioned most by the interviewees, but 'Feasibility' most by the survey respondents.

Often opponents and supporters of a particular measure differ strongly in relation to the expected consequences, in particular when it has to do with a limitation of freedom: opponents fear a strong restriction of freedom, very much more than those who are supportive of the measure. On the other hand, there are hardly any differences in the use of the counterarguments in relation to feasibility and cost; such beliefs seem not very important for determining the level of support of citizens for particular measures.

*“You can see it in many examples.
First everyone shouts no, and then when it is there,
everyone is happy or most people are happy.”*

8. Discussion

8.1 When is a road safety measure fair?

8.1.1 Fairness dimensions of policy measures

The review of the literature on fairness (Section 2.3) showed that fairness is a multifaceted concept and that there are different types of fairness such as distributional, procedural and interactional fairness (Section 2.3.3). Many different words can be used to describe a particular aspect or dimension of fairness (Table 5, p.55). My findings reported in Chapters 5, 6 and 7 support the multidimensional nature of fairness. This makes it challenging to assess the fairness of policy measures.

In order to operationalise fairness, more specifically in the context of policy measures, a classification scheme was developed which groups dimensions of fairness and unfairness into five areas (Table 44, p.179). The analyses in Chapter 5 have shown that the area ‘Political arguments’ and its mirror area ‘Political considerations’ were not used a lot and some of these dimensions, for instance ‘transparency’, are more related to procedural fairness, which is beyond the scope of this thesis. With hindsight, it might have been better to include the elements of these areas under ‘Relevance’, ‘Feasibility’ and their mirror areas. Overall thus, I conclude that there are four key dimensions of fairness to be considered when assessing the content and objectives of policy measures. These are shown in Table 66 below, together with the mirror areas.

Table 66. Key dimensions of fairness and unfairness when assessing policy measures

Dimensions of fairness	Dimensions of unfairness
Equity	Discrimination
Preserving human liberties	Restricting human liberties
Relevance/effectiveness	Limited added value/negative side effects
Feasibility	Practical obstacles

Sometimes, for example when assessing the fairness of a particular situation, the meaning of fairness is mainly restricted to considerations on equity and, to a lesser extent, the preservation of human liberties. This could be considered as the **narrow** definition of fairness. But when considering the fairness of a policy measure, in particular its anticipated consequences, relevance and feasibility need to be considered too. The incorporation of these four dimensions could be considered as the **broad**

definition of fairness, that can be used as a basis for discussing and assessing the fairness of policy measures and interventions.

It may appear somewhat counterintuitive to associate 'Relevance' and 'Feasibility' with fairness. Actually, the link with fairness is mainly indirect. If a measure is seen as irrelevant, its implementation will be perceived as an unjustified investment and/or a waste of resources. People may also feel that the negative consequences of the measure cannot be justified in the light of the limited benefits expected. Thus, implementing measures perceived as irrelevant is perceived as an unjustified restriction of liberties. An example is installing speeding cameras at locations with no history of crashes; this may give citizens the feeling that the main reason for doing this is to increase revenue for the town. A similar indirect association exists between feasibility and fairness. When a measure cannot be implemented correctly, applied universally and/or enforced adequately, people will perceive this as unequal treatment. An example of such a measure is ZER (zero tolerance for driving under the influence of alcohol).

Thus, a (road safety) policy measure will be perceived as fair if it is seen as equitable, not restricting human liberties too much (in relation to the expected gain), relevant and/or effective (in reducing harm) and feasible to implement. People who believe that a policy measure violates one of these criteria, will in general perceive the measure as unfair.

When comparing the interviewees' initial perspectives on fairness (Figure 37, p.194), their assessments of the different measures (e.g. Figure 45, p.203) and the unfairness arguments used by the survey respondents (e.g. Figure 64, p.227), one can observe the difference between

- on the one hand, the ethical and theoretical view on the concept of fairness, which is strongly linked to equity and to a lesser extent human liberties – in other words, the 'narrow' definition of fairness, and
- on the other hand, the 'practical' perspective when the fairness of 'real' policy measures is analysed, where the dimensions 'relevance' and 'feasibility' are often the most important perspective of fairness to be considered – illustrating the need for a broader definition of fairness.

8.1.2 *The importance of equity in road safety policy*

When asked about examples of unfairness in road safety, almost three quarters of the interviewees quoted examples of discrimination; one quarter gave examples of restrictions of freedom. As shown in Section 5.2.4, most of the spontaneously mentioned examples of discrimination concerned vulnerable road users (VRUs). Many interviewees were of the opinion that VRUs were given insufficient priority to in road safety policies compared to drivers of motor vehicles. In the literature, the type of inequality discussed most is that between car occupants and pedestrians – or more general, between motorized vehicles and VRUs (e.g. Fahlquist, 2009; van Wee, 2016). Several interviewees also gave examples of discrimination in enforcement practices, in particular unequal treatment by the police, and mentioned that fines can more easily be paid by rich than by poor people.

Yet, discrimination did not emerge from the literature review as an important source of opposition against policy measures in road safety. For most of the measures discussed during the interviews and included in the dilemma survey this was the case neither. For none of the ESRA measures which had been included in the survey and interviews (ZER, ALC, ISA, RFL, HEL), the argument ‘lead to discrimination’ was used by more than 10% of the survey respondents (Figure 77, p.238). For these five measures, only a few interviewees considered that they were discriminatory (Table 72, p.389). Only for the measures PAY, SCR and INS, included on purpose because of the expected perception of discrimination, the counterargument discrimination was actually used a lot, both by the interviewees (Table 72, p.389) and the survey respondents (Figure 77, p.238).

Interestingly, only two interviewees mentioned an example of discrimination by gender; only one of these was actually related to road safety (using male dummies in crash tests). This may suggest that, at least in Europe, very few existing and potential policy measures differentiate or discriminate between men and women. The measure to allow different insurance premiums for men and women (INS) was rejected massively by the respondents of the dilemma survey because of the perceived discrimination (Figure 77, p.238).

Apart from the ‘selected’ measures PAY, SCR and INS, the perception that policy measures are unfair appears to be associated most with their perceived limited added value, restriction of human liberties and/or low feasibility. The interviewees who opposed the measures argued that the measures were not appropriate, ineffective, had

negative side effects, were disproportionate, restricted freedom too much and would be complex and difficult to implement (Table 72, p.389). The respondents of the dilemma survey used 'Difficult to implement' as the most relevant counterargument. This differs with the interviewees who used more counterarguments related to 'Limited added value'. In the dilemma survey the limited added value, operationalised as 'Will not reduce injuries', only came second.

Of course, the distribution of fairness dimensions that was shown in Chapters 5, 6 and 7 cannot be considered as 'representative' for existing or planned road safety measures in a country. My analyses are based on a particular set of contentious measures, which are not representative for any national or regional road safety policy. Another set of measures would have yielded different distributions of fairness dimensions. Most ESRA measures are about giving up some freedom in view of reducing crashes and injuries. So it is not surprising that for such measures in the interviews and the dilemma survey, the restriction of human liberties was often seen as an issue – but much less so was discrimination.

8.1.3 *Ethical trade-offs*

Several interviewees were willing to support certain measures, even though they recognised that these would restrict their freedom. Part of the respondents of the dilemma survey were willing to support a measure even if it meant a reduction of freedom or required a change in their current behaviour. Examples of such measures are HEL, ISA, RFL and SCR. In other words, if a measure is seen as (highly) effective in reducing road crashes, people may accept some restriction of human liberties and/or even some discrimination.

These results supports findings reported in the literature that the most prevalent ethical dilemma in road safety policy is the trade-off between reducing injuries in society overall and protection of individual liberties (Bateman-House, 2014; Elvebakk, 2015; Grill & Fahlquist, 2012; Jones & Bayer, 2007). The strongest feeling of unfairness emerges when the restriction of freedom is considered as disproportionate in comparison with the expected reduction of harm. Often interviewees justified their opposition against policy measures with the argument that the measure was not effective enough, that the problem did not require such a strict measure or that other measures would be more appropriate. Underlying such arguments is a perception of disproportionateness and unwarranted reduction of freedom.

Such perceptions may evolve over time, however. Even if a situation itself has not changed, a measure may become more accepted (Kahneman et al., 1986; Xia et al., 2012). For instance, in Europe, wearing the seatbelt is no longer seen as a strong limitation of freedom, and certainly not as something that is disproportionate in relation to the expected protection against injuries.

In some cases there are ethical value conflicts within the same fairness dimension. For example, Section 7.7.2 showed that some people consider PAY to be (very) equitable while others considered it to be (very) discriminatory. Many people recognized both positive and negative consequences of HEL. Whether in such cases an individual perceives the measure to be fair or unfair depends on his/her assessment of the relative importance of the positive and negative aspects. For some, the positive aspects outweigh the negative ones and the measure is seen as fair; for others the opposite holds and the measure is considered to be unfair.

8.1.4 *Subjectivity of fairness perceptions*

Fairness assessments are inherently subjective. For example, people differ in what they believe to be a fair speed limit on a particular road. During the interviews, some measures were seen as unfair by some but were felt as fair by others. Some experts considered different rules for particular road users to be equitable (e.g. screening of elderly), but others considered this to be discriminatory. Making speeding fines proportional to income was seen as equitable by some but discriminatory by others. In the dilemma survey, almost half of the respondents who opposed ISA stated that the measure would limit freedom or privacy, but this argument was only used by one in seven of the respondents who were supportive of the measure (Figure 97, p.257).

Thus, people differ in what I call their '**unfairness threshold**' for a particular dimension of fairness, such as discrimination. With 'unfairness threshold' I mean a virtual, even vague norm from which onwards a measure is considered unfair. A speed limit reduction of 10 km/h on a particular road is acceptable for some, but not for all. For many, screening seniors for driving capability is seen as unfair at the age of 65, but as fair at the age of 85.

My analyses have also shown that the average unfairness thresholds can differ between countries and cultures. For instance, the justifiability of state intervention is much lower in the USA than in China (Section 6.4.10). The perceived reduction of joy differs between countries (Figure 74, p.236). Among the European respondents in the

dilemma survey, Austrians seem to be most sensitive to the preservation of freedom and privacy (Figure 72, p.234). National differences in fairness perceptions are the result of a range of factors, including ideological/cultural differences (e.g. extent of individualism and libertarian attitudes in the country), experience and habits (when people are already used to the measure or a similar one, they perceive it more as fair, e.g. ZER in Sweden and SCR in Greece) and social norms about driving behaviour.

Another element of subjectivity is caused by the fact that in general several fairness dimensions are at play. People may consider a measure unfair for different reasons. One might oppose compulsory cycle helmets because of the expected restriction of freedom or because one believes it will reduce the amount of cycling. Both during the interviews and within the dilemma survey, some participants used particular unfairness arguments while others did not. For example, RFL was the measure which was seen as most unfair by the interviewees (21 out of 35 called the measure unfair). Negative arguments were mostly from 'Restricting human, liberties', 'Limited added value' and 'Practical obstacles'. Yet interviewees who considered RFL to be unfair did not use all of these arguments.

8.1.5 *Measuring the perception of fairness*

When reviewing the literature, I had found very few publications that showed how (un)fairness could be measured (e.g. Braveman & Gruskin, 2003). The review also showed that fairness 'measurements' most often should be interpreted as subjective assessments, based on individuals' comparisons between the characteristics of a situation and their personal norms. An additional complication for measuring fairness is that 'fairness' and 'unfairness' are conceptually different constructs (Asaria et al., 2014; Xia et al., 2012).

My view is that *unfairness* and its different components can be graded on a scale, e.g. from '*somewhat unfair*' to '*very unfair*', but such a grading does not make much sense for '*fair*'. The best approach seems to me to use a one sided scale where 'fair' is the zero point – or maybe a small positive value to accommodate for the fact that there could be some limited gradation in positive fairness. Decreasing values on the scale would reflect increasing perceptions of unfairness. The range of the scale could be expressed as $]-\infty; 1]$ in mathematical terms. The zone $[0, 1]$ would reflect small differences in positive fairness, e.g. the zero point being 'OK' and the 1 referring to 'fair'. Ordinal scales could be developed for use in surveys, both for the overall fairness

perception as for each of its dimensions; examples of how this could be done are given in Table 67.

Table 67. Possible scales to measure perceived fairness and its dimensions

	Fairness overall	Equity/discrimination	Individual freedom
1	Extremely unfair	Extremely discriminatory	Extreme reduction of freedom
2	Very unfair	Very discriminatory	High reduction of freedom
3	Unfair	Discriminatory	Some reduction of freedom
4	Not unfair / OK	Not discriminatory	No change in freedom
5	Fair	Equitable	Increase of freedom

In Section 3.5.5 I pointed out the limitations of simply asking people whether they find a measure to be fair or unfair. Moreover, when a situation is perceived as fair, people do not tend to break down fairness in its different dimensions. But when a situation is seen as unfair people tend to be more specific, for example to restrict freedom disproportionately. During my interviews more ‘unfairness arguments’ were given by opponents of measures than ‘fairness arguments’ by supporters.

When measuring fairness, one should take into account that inherently non-linear relation between the perception of the different fairness dimensions and the overall fairness perception. If a measure is considered unfair for just one dimension, the overall perception will be one of unfairness, even if the measure is considered fair for the other fairness dimensions. This non-linear relationship is also found in other situations such as the quality perception of services (see e.g. Ladhari, 2009).

8.2 Which factors determine the support for road safety policy measures?

8.2.1 The meaning of ‘supporting a policy measure’

From the findings of the literature review (Sections 2.7.4 and 2.7.5) and the results reported in Chapters 5, 6 and 7, it emerges that public support for the policy measures considered is often high, and even very high in LMICs. But this observation of high support requires some nuance.

The first reason is related to how survey respondents interpret a question on ‘support for a measure’, even if it is explicitly stated that it would become a legal obligation. Foad et al. (2021) warn that results from surveys may hide the ambivalence people feel around particular policies. People who support a measure may recognise significant

side effects. I made similar observations when undertaking the interviews and analysing the dilemma survey. For some participants 'support' implies that they would consider the regulation as legitimate and adhere to it. But for other respondents, especially in more collectivistic cultures, it may mean that they find such a law relevant, particularly for others, but not necessarily that they would always comply with it. As one interviewee said in relation to public support for 30K: *"They are in favour, the Greeks, although they don't believe in measures because in the back of their mind, they think that they will skip"* (Greece, politician, 28). This phenomenon is linked to findings from ESRA showing that many people think that the 'others' engage in unsafe traffic behaviours more readily than they do themselves – so there is less need of regulation for themselves. Pires et al. (2020) refer to this as belief of road users of moral superiority over others.

This doubt on the willingness to adhere to rules, even if they are considered useful or even necessary, has been observed in the past. For example, Toy et al. (2014) found a mismatch between people's apparent support for 20 mph limits and their actual driving behaviour. Analyses based on ESRA data have also found a difference between what people found to be acceptable behaviour and what their actual behaviour was. For example, the percentage of people considering drunk driving acceptable is much lower than the percentage of those who that actually drink and drive (Achermann-Stürmer, Meesmann, & Berbatovci, 2019).

Thus, people who state that they support a measure have certain assumptions on how it will be implemented in their country, to what extent it will affect them and how easy it will be to not comply with it. Such a perception is likely linked to their experience with the implementation of other regulations, or even with their general attitude towards respecting a law – e.g. for some people a regulation is sacrosanct whilst for others it is more a guiding principle which one can deviate from.

Another reason to be careful in stating that particular measures are supported by a large part of the population is linked to the assessment scale that was used for the level of support. In ESRA and the dilemma survey, the variable 'support' has been recoded as a dichotomized variable, including scores of 4 and 5 on a Likert scale from 1 to 5. If only 'full support' (score 5) would be used as a proxy for the level of support, the value would decrease. Often, this would imply that the number of people 'supporting' the measure would drop from a majority to a minority of the population (Figure 56, p.218).

8.2.2 *Fairness versus support for measures*

In none of the cases where interviewees had stated that a measure was unfair, they fully supported it; only once for ZER and SCR there was conditional support (Section 5.6.4). When a measure was considered fair, the association with supporting the measure appears to be somewhat weaker: in ten cases a measure was perceived as fair by the interviewees but yet the measure was opposed; in 18 more cases there was conditional opposition. Thus, in such cases fairness was not the decisive factor to consider. Thus, perceiving a measure to be fair is indicative for supporting it (but not sufficient), but it is very rare that people support a measure which they perceive as unfair.

The dilemma survey led to similar findings. For each measure there was a negative and statistically significant ($p < .01$) correlation between the level of support for that measure and the number of counterarguments agreed with. Opponents to a measure used systematically more unfairness arguments than those who support the measure (Figure 65, p.228). One can argue that not all the counterarguments in the dilemma survey are really “unfairness” arguments – this depends on whether one uses a broad or a strict meaning of fairness (see Section 8.1.1). But also when using the strict meaning of fairness, one obtains similar results. This is illustrated by the negative correlations between support for measures and the arguments related to equity and human liberties displayed in Table 63 (p.229).

Another illustration of the close relationship between perceived fairness and public support for measures, are the different argument patterns of supporters and opponents of a measure. The differences were discussed for six measures in Chapter 7, and I will recall some results for two of these measures. Figure 110 (p.271) showed how the fairness perspectives differ between the survey respondents opposing and supporting RFL, a measure which was seen as unfair by a majority of interviewees. Half of the opponents thought that the measure would limit freedom or privacy and that it would be difficult to implement; about one third considered the measure to be an unjustifiable intervention of the state. The differences between the opponents and supporters are very high for the arguments that fall within the strict meaning of fairness. In the case of ZER, only a minority of the interviewees perceived this measure as unfair. Section 7.5.3 showed the moderate to strong correlations (around 0.3) between the level of support for ZER and ‘Limit freedom or privacy’, ‘Unjustifiable state intervention’,

‘Reduce enjoyment’ and ‘Restrict mobility’. Similar correlation coefficients were also found for most of the other measures considered.

Thus, in general, measuring the level of public support for a measure is a very good predictor for the perceived fairness of a measure, and the opposite holds as well. This also implies that the results of the analyses based on national indicators for support for measures (Section 4.3 and subsequent sections) would very often still apply if ‘support for measures’ would be replaced by ‘perceived fairness’.

8.2.3 *Meta-results*

Analysing the nature and distributions of arguments used by the interviewees and the survey respondents leads to a number of ‘meta-results’, which can probably be generalised to many other measures and contexts, even beyond road safety. The first meta-result is the asymmetry in the nature of arguments used. When arguments are used to justify opposition to a measure, they often belong to different areas than the arguments used in favour. A common situation is where one interviewee used the argument ‘Relevance’ to support a measure and another interviewee ‘Practical obstacles’ to oppose it. In the dilemma survey, the expected consequences were often very different for the opponents and the supporters. For example, supporters of ISA strongly believe that the measure would be effective, i.e. make them feel safer on the roads, reduce the crash risk and would make driving more comfortable (Figure 98, p.258). The opponents, on the other hand, fear ISA as a means of controlling and restricting their behaviour. They also think it would make driving less pleasant and even unsafe when overtaking a car.

Another interesting meta-result is that the number of negative arguments used by interviewees when opposing a measure, was much higher than the number of positive arguments when supporting it (Figure 44, p.202). Moreover, when opposing a measure interviewees rarely recognised positive arguments; those who supported a measure more frequently mentioned counterarguments. Similar patterns were found in the dilemma survey. For example, over 40% of the supporters for RFL recognised that the measure would be difficult to implement (Figure 111, p.272). Respondents who were in favour of SCR recognised its unfair implications: one in five recognised the limitation of freedom or privacy, and one in four even the restriction of mobility that would be caused by the measure (Figure 123, p.286).

Analysis of the arguments and expected consequences also showed that for some measures, like ZER and RFL, one particular argument was used much more than the other ones, such as 'difficult to implement' for RFL. However, more often a range of arguments and/or consequences were put forward, in particular when one opposed the measure. For example, all negative consequences listed for ZER were, with few exceptions, agreed with by between 15% and 20% of the opponents (Figure 119, p.281).

8.2.4 The influence of culture and ethical values

As shown in Chapters 4 through 7, the level of public support for road safety policy measures often differs considerably between countries. At global level, these differences are often linked to the level of human economic development (Table 33, p.164 and Figure 31, p.164), which is highly correlated with dimensions of national culture (Table 25, p.147). LMICs are in general more collectivistic and tend to support road safety measures more than people from HICs. And although the dilemma survey only covered ten countries, a similar 'structural' difference was found between respondents from the LMICs in the sample (Argentina, Nigeria and China) and the other countries (Table 57, p.220).

Table 41 (p.172) showed that, for the sets of countries considered, all correlations between the cultural dimensions Independent and Confucianist and support for the 15 ESRA2 measures are negative. There is a statistically significant and strong negative correlation between Independent and the measures related to alcohol (ALC, ZER), speeding (ISA, SWS), distraction (NMP, NHC); seatbelt (SRE) and cycle helmets (HEL). Thus, the more independent thinking in a society, the higher the opposition against measures that restrict freedom of action. As mentioned in the literature review (see Section 2.5.3 and the publications from Hofstede et al. (2010) and Minkov (2011, 2018)), people in individualist societies have a strong desire to determine themselves which rules to follow (e.g. whether to wear a helmet or not) but also let others decide for themselves – as long as it does not affect themselves negatively. They think of the whole society rather than only of their in-group, which is generally more typical of collectivistic societies. They also trust other people to exercise good judgment and feel less need than their collectivistic peers to regulate society for avoiding chaos. Collectivist societies, on the other hand, don't think that people should be left to decide for themselves as they are afraid that this would result in chaos. One of the striking findings in this thesis is that 64% of the variation between countries in the public

support for ISA can be statistically explained by the cultural dimension Independent (Figure 95, p.254).

National 'Traffic safety culture' (TSC – see Section 2.6.3) can be seen as a 'translation' or a 'projection' of national culture on behaviour in traffic. TSC can be operationalised by road users' behaviour in traffic. People engaging in risky behaviour are more opposed to measures restricting that behaviour even further (see e.g. Van den Berghe et al., 2020). This relationship is valid at individual level but for speeding and cycle helmet use I have shown that such relationships also exist at national level. For example in countries with higher numbers of speeders, there is more opposition against speed limiting measures such as ISA (Table 38, p.169). However, for other types of risky behaviour, such as distraction and driving under the influence of alcohol, no correlations were found at the national level.

Road safety researchers have found a strong relationship between people's behaviour in traffic and how they perceive the social norm on such behaviour (see e.g. Sagberg et al., 2015). My analyses have shown that such a relationship also exists when it comes to support for policy measures: individuals' support for a particular measure appears to be strongly linked with the belief that their friends would support it (Figure 63, p.227). This social norm can be considered as an indicator of national road safety culture.

The social norm also influences the dominant ethical perspectives on traffic in a country, i.e. on what is considered right or wrong. Several of the counterarguments for measures used in the dilemma survey can be considered as perceived violations of core ethical principles, in particular 'unjustifiable state intervention', 'limit freedom or privacy' and 'lead to discrimination'. Agreement with such statements is often moderately correlated with the opposition to that measure, for example the correlation between 'Limit freedom or privacy' and support for ISA is -0.347** (Table 63, p.229). In the discussions with the interviewees, 'Restricting human liberties' was the second largest group of counterarguments, used in almost 25% of cases. Interestingly, the experts interviewed used negative arguments in relation to 'Restricting liberties' more frequently than positive arguments under the 'mirror area' 'Preserving liberties'. This echoes my comment in Section 8.1.4 that people are often more explicit in labelling situations as unfair but are less explicit when these are perceived as fair.

I also showed in this thesis that the association between the perceived violation of ethical principles and the level of public support varies across countries (Section 6.4).

For instance, much more than the other respondents the American ones considered the policy measures to be an unjustifiable state intervention. The opposite was the case for the Chinese. In China the respondents often considered the proposed measures less as a restriction of freedom and privacy or as leading to discrimination than in the other countries considered. Such national differences are linked to differences in national culture and organisation of society.

8.2.5 *The influence of beliefs*

Section 2.7.1 of the literature review showed that the beliefs of people shape their opinion and also their support for measures; this has also been observed in relation to road safety (e.g. Eby et al., 2017; Eriksson & Bjørnskau, 2012; McCartt et al., 2010).. My analyses support the importance of beliefs in influencing public support for policy measures. I will discuss three groups of beliefs: (1) belief in the relevance of the measure; (2) confidence in the feasibility of implementing the measure; and (3) the expected consequences of the measure.

An important factor influencing the support for measures is their perceived **relevance**. People who feel safe when using a particular transport mode, are somewhat less likely to feel the need for additional or stricter measures affecting that transport mode (Table 58, p.220). More generally, people will tend to support a measure if they believe that the problem which the measure is intended to address, warrants an intervention. Secondly, people need to believe that the measure proposed would be effective. This is illustrated by several findings in this thesis. During the interviews, the arguments within the argument area 'Relevance' were the most numerous (about 60% of all arguments) for supporting the measure and the arguments within the area 'Limited added value' (about 50%) were the most numerous for opposing it (Figure 45, p.203). In the dilemma survey, the second most used generic counterargument was 'will not reduce injuries', which was moderately correlated with opposition to measures (Table 63, p.229).

With the exception of RFL, respondents who believed that a particular phenomenon (e.g. speeding or drunk driving) is an important cause of road traffic injuries were more supportive of policy measures meant to reduce this phenomenon (Table 59, p.221). Respondents who believed that older car drivers are often a danger to themselves and other road users in traffic, appeared to be more supportive for SCR. An argument used against PAY in the dilemma survey was that it was seen as a mechanism for the government to make them pay more taxes (Figure 129, p.293).

But appreciating the relevance of a measure is not enough to support a policy measure. People need also to believe in its *feasibility*, i.e. that the measure can be adequately implemented. Respondents of the dilemma survey stated in almost 40% of cases that the measure would be difficult to implement. It was the counterargument used most in all regions involved in the survey. However, there were hardly any statistically significant difference in the use of the counterargument 'difficult to implement' between the opponents and supporters of the measures (cf. Chapter 7). The same finding applies to the other 'practical' and 'financial' counterarguments: 'a lot of public money', 'high costs for people', and 'easy to evade'. Such beliefs seem not very important for determining the level of support of citizens for particular measures.

Yet for the interviewees they were more decisive. Practical obstacles, in particular in relation to enforcement, were often decisive for opposing a measure, based on the conviction that is useless or even counterproductive to vote a law that cannot be adequately implemented or enforced. Interviewees who opposed a measure used arguments related to 'Practical obstacles' almost four times more than the argument 'Feasibility' was used by those supporting a measure. A tentative conclusion is that the belief of experts and policy-makers in the feasibility of the implementation of a policy measure is much more decisive for their support for the measure than it is for the general population.

My findings support those of the literature (e.g. Molin & Brookhuis, 2007; Toy et al., 2014; Watling & Leal, 2012) that support for policy measures in road safety is strongly linked to the **expected effects and consequences**. The discussion of six measures in Chapter 7 also revealed the strong association between the anticipated personal consequences and the support for the measures. Not surprisingly, if the perceived consequences are negative, people are more inclined to oppose the measure. Road users that engage in risky behaviour tend to be more opposed to further measures restricting or penalizing that behaviour (Section 6.2.5). Car drivers who speed regularly are more opposed to speed-limiting measures and cyclists not using bike helmets are less supportive of HEL. Chapter 7 has illustrated that very large differences exist between the opponents and supporters of a measure, suggesting that such different expectations are decisive for the willingness to support a policy measure. Often it concerns expectations in relation to perceived reductions of freedoms.

The analysis of the dilemma survey data showed that people who are barely affected by a measure are more often in favour of it. For example, younger people are more supportive of SCR than older ones (Figure 58, p.219). Cyclists and users of public transport are more in favour of ISA and ALC than car drivers; cyclists are less supportive of HEL than car drivers and users of public transport (Figure 62, p.224).

It should be noted that arguments against measures may actually be a protective claim, i.e. people seeking to use 'acceptable' arguments if they don't like a measure. For instance, when fearing the negative personal consequences of a measure, people may state that the measures is difficult to implement because it helps them 'justifying' their opposition. I tried to reduce this phenomenon by labelling the statements as a remark on the measures, rather than as an 'argument' to justify their support or opposition.

My analyses also support the findings of other authors that when a measure, or a similar one, is already in operation, the opposition tends to diminish (e.g. CEREMA, 2020; Elvebakk, 2015; Schuitema et al., 2010; Wolff, 2019). For example support for ZER is much higher in Eastern Europe than elsewhere in Europe (Figure 113, p.275). This can be explained by the long tradition of low or zero BAC limits and strict DUI alcohol enforcement practices in these countries. HEP (PTWs to wear a helmet) is an existing measure for motorcyclists in most countries while the opposite holds for HEL; not surprisingly support for HEP is higher than for HEL (see e.g. Figure 30, p.163). Other examples of the lower opposition to existing measures can be observed from the dilemma survey, such are the relatively high support for SCR in Greece and for PAY in Sweden (Table 57, p. 220); in these countries similar measures already exist.

8.2.6 The influence of road safety performance and traffic law enforcement

The attitudes to road safety policy measures are influenced by the road fatality rate and the compliance with traffic regulation. The country-level analyses showed that when the **fatality rate** is relatively high, in general the opposition against new measures is also high (Table 35, p.166). A partial explanation is that a high level of road safety might reduce people's need to improve road safety and/or might cause apprehension that the expected additional gains would come at an excessively high burden or cost. For example, cyclists who feel safe on the road support HEL somewhat less (Table 58, p.220). Another part of the explanation is that road safety performance is much higher in HICs than in LMICs; since HICs are more individualistic societies their inhabitants are more opposed to regulation (Section 4.5.2).

In terms of **enforcement**, the analysis of national indicators showed a strong association at global level between the national assessment of enforcement practice and road safety performance (Section 4.1.5). Positive assessment of traffic law enforcement in a particular area (e.g. speeding or DUI) is associated with more opposition against new policy measures in that area (Section 4.2.6). There is also a positive correlation between the likelihood of being checked by the police and support for measures. It is recalled that these findings refer to global analyses and may not necessarily apply within a certain region of the world, or at individual level within a country. This can explain why in the dilemma survey for most measures the satisfaction with the current traffic enforcement practice was not or weakly negatively correlated with support for measures (Table 60, p.222).

Thus the relationship between the level of enforcement and support for measures is somewhat ambiguous. This may be related to the internalisation process of regulation, in particular in more individualistic societies: once laws have become internalised enforcement becomes less necessary (Kelman, 1958). A good example is countries where seatbelts were introduced a generation ago. Today most people would continue to wear seatbelts even if it is no longer required by law. Another example is that in Germany there are fewer alcohol checks per capita than in Austria and Belgium, yet DUI of alcohol is lower (Meesmann, Martensen, & Dupont, 2015). This could be explained by a stronger social norm on DUI in Germany, requiring less police checks. These complex relationships between enforcement practice and behaviour are also reflected in the associations between the level of enforcement and support for policy measures.

8.2.7 The influence of age and gender

The review of the literature in Sections 2.7.3 and 2.7.5 showed that almost universally, women are more supportive of road safety measures than men (e.g. Munnich & Loveland, 2011; Shults & Bergen, 2012; Van den Berghe, Sgarra, et al., 2020). This pattern was also observed in the dilemma survey. For eight out of ten measures, support was higher with females than with males (Figure 57, p.218). Only for PAY and INS men were slightly more supportive than women. Both measures have a financial component and whether they would actually reduce crashes is questionable. This also applies to LIC, for which the gender difference is very small. Figure 66 also shows that men use more counterarguments than women, which is consistent with their higher level of opposition. The biggest gender differences are observed for ZER, ISA, HEL, ALC, 30K, which are measures restricting risky behaviour.

The literature review already showed that the patterns are less systematic when comparing age groups (Robertson & Vanlaar, 2008; Runyan & Earp, 1985; Van den Berghe et al., 2020). In the dilemma survey I also found different age related patterns (Figure 58, p.219). The support decreases with age for PAY, LIC, ALC, 30K, SCR, and INS. The decrease is most pronounced for SCR, which is not surprising given the fact that this measure targets older people. For HEL and RFL the support increases with age and for ZER and ISA no age gradient can be observed. Other analyses conducted on the effect of age, for instance on the unjustifiability of intervention by the state (Figure 87, p.245) illustrate that the association of age with support for measures, and the factors contributing to it, is less predictable and consistent than the effect of gender. Moreover, the effect of age on support for measures can differ between countries, which is hardly the case for gender.

Of course, these gender and age patterns are not independent from the other factors that have been discussed. For instance, if the correlation between gender or age and the support for a particular measure would be controlled for particular beliefs in relation to that measure, gender or age group differences may disappear. I have not undertaken such analyses systematically in this thesis, since it was not my intention to develop a statistical model.

8.2.8 Other factors influencing support for measures

In addition to the factors discussed so far – culture, ethical values, beliefs, road safety performance, traffic law enforcement and demographics – other factors may influence public support for measures. These may be linked to the nature of the measure, to a specific national context or to a combination of both. For example, I recall the negative association between the amount of cycling in a country and the support for wearing cycle helmets (Figure 103, p.262). A second example is that reflective clothing seems to be more accepted in Nordic countries with their long winter nights (Figure 108, p.268). A complete listing of such factors is beyond the scope of this thesis.

8.3 Limitations of the research

8.3.1 Limitations of the overall approach

The most optimal sequence of data collection and analyses would have been (1) literature review, (2) country-level analyses, (3) interviews and (4) dilemma survey, whereby findings of each stage would feed into the next stage:

- (a) the literature review would help selecting the national indicators to be considered for the country-level analyses and the predictor variables of the dilemma survey
- (b) the literature review and country-level analyses would assist in formulating the most relevant questions for the interviews
- (c) the analysis of the interviews would contribute to the formulation of the questions in the dilemma survey, in particular those related to the support for policy measures, the unfairness arguments and consequences.

The intended sequence of stages was followed, but there was some overlap between stages (2), (3) and (4): when the interviews started the country-level analyses had not yet been completed, and when the dilemma survey was launched the interviews were still going on and had not yet been analysed. This timing was related to a range of factors including the late availability of certain country level data (in particular the full ESRA2 and WVS/EVS files that were only accessible in December 2020) and the long preparation and logistics necessary for the interviews. With hindsight, some unfairness arguments in the dilemma survey should have been formulated somewhat differently and a few consequences should have been added for some measures.

8.3.2 Limitations of the country-level analyses

It can be criticised to use an entire country as the unit for analysis, as was done in the country-level analyses (Chapter 4), because often heterogeneous cultural groups coexist within one country and road safety performance can differ a lot. Hofstede (2001) found that the German-speaking regions of Switzerland were culturally closer to Germany than to the French-speaking part of Switzerland. And from Belgian road safety statistics it is well known that road safety behaviour and performance is often better in Flanders than in Wallonia (Schinckus et al., 2021). However, for the type of analyses presented in Chapter 4, the very large majority of international statistical indicators are only available at national level, virtually excluding the ability to undertake analyses at regional level.

Despite the limitations mentioned, however, the country level has proven to be a good base for measuring national culture and road safety performance. People within a country tend to share the same educational system, legal system and institutions (Herk & Torelli, 2017). Traffic laws and enforcement are often identical or very similar across the whole country. Goszczynska, Tyszka, & Slovlic (1991) also showed that there was greater variance in risk perception between countries than between different regions in

one country. The concept of national culture has even been demonstrated to be meaningful in African countries where borders were drawn more or less arbitrarily, and for a country like Malaysia that has only existed for about 50 years (Minkov & Hofstede, 2012b).

Another limitation of the country-level analyses is that the set of countries often differed across different correlation analyses; caution is needed when comparing findings that are based on different country sets. The smaller the number of countries involved in the correlation analyses, the higher in general the relative number of high income countries – and hence the lower the possibility to generalise the findings globally.

8.3.3 Limitations of the interviews

When only eight persons are interviewed in a country, one cannot claim that this group is 'representative' for the country or even the sub-groups they represent (experts and policy-makers). The distribution of profiles also differed across countries. For example, there were relatively more Members of Parliament in the UK than in the other countries, and relatively more experts in Greece than elsewhere. There was an overrepresentation of interviewees with a PhD and fewer 'active' politicians than was initially hoped for. Thus, while the interviews were extremely valuable in identifying the scale and nature of arguments used and getting insight in national road safety systems and culture, the opinions recorded are not a sound base to compare countries.

A second limitation was that coding of the interviews was only done by myself and not checked by a second person. This inherently leads to some subjectivity and possibly undetected errors in codifying the interviews, in particular when answers were very short or two types of arguments were mixed. Also, the classification scheme for the coding of arguments was novel and may need further adaptation in the future. For instance, I allocated 'Proportionate' and 'Assuming Responsibility' to the argument area 'Preserving human liberties' and 'High costs to society' to the area 'Practical obstacles' (Table 44, p.179). It can be argued to allocate these arguments to other areas. With hindsight, I could also have dropped the areas on political concerns and moved the arguments to other areas. Another concern is that arguments in the classification scheme are not fully independent from each other. For example, an interviewee may use 'practical obstacles' because he or she fears that the imperfect implementation of the measure may lead to discrimination.

8.3.4 Limitations of the dilemma survey

The data for the dilemma survey and the ESRA data are based on web-based surveys using online internet panels. However, self-report and online data are vulnerable to a number of biases, including desirability bias (the tendency of respondents to provide answers which present a favourable image of themselves), bias through misunderstanding of questions, and recall errors, i.e. unintentional faulty answers due to memory errors (af Wåhlberg, Dorn, & Kline, 2010; Choi & Pak, 2005; Krosnick & Presser, 2010; Lajunen & Özkan, 2011; Lajunen & Summala, 2003). I expect however such biases to be relatively low when it comes to expressing support for policy measures. Moreover, self-administered web surveys are less prone to social desirability in responses compared to interviewer-administered surveys (Baker et al., 2010; De Leeuw et al., 2008; Goldenbeld & De Craen, 2013).

I recognize that the samples surveyed in the dilemma survey are not fully representative for the countries and regions they represent. Internet penetration is still only about 70 % in Greece, China and Nigeria (www.internetworldstats.com/stats.htm). This applies in particular to the older population, and to a lesser extent to women. In particular in Nigeria it proved difficult to recruit respondents in the highest age group, and this group had to be abandoned. Also, as was shown in Section 6.1.4, in some countries people with higher education degrees are overrepresented in the sample. This being said, I recall that in relation to support for policy measures, I did not find considerable differences between respondents with different education levels.

8.4 Recommendations for further research

8.4.1 Data collection and analysis

In several respects this thesis was an explorative journey that examined the associations between public support, fairness, culture, countries and road safety performance. Existing databases were linked and new data sources were created. Several findings from the literature were confirmed but also many new insights were gained. Much remains to be done, however, to understand better these associations and to contribute to better policy making in the field of road safety.

A first area for further research is the use and **exploitation of the data sources** that were developed through the PhD activities. Only part of the analyses undertaken has been reported here and further analyses of the data collected could lead to deeper insights in the associations between the variables that are available. Moreover, most of

the statistical analyses conducted on the national indicators were quite basic; there is considerable scope for undertaking more **advanced statistical methods** such as regression analyses, clustering and non-linear modelling. This also applies to the type of data used in the dilemma survey. Some examples of areas for further research are designing regression models for perceived fairness and level of support, based on a range of predictor variables, creating cultural clusters of countries based on subjective safety, behaviour in traffic and/or support for measures and comparison of such clusters with existing cultural groupings of countries.

It seems also relevant to understand what factors influence or are associated with **changes in public support**. Some clues have been identified already, such as the importance of beliefs, and identifying methods to change beliefs can easily be imagined, e.g. through education and awareness campaigns. However, more knowledge would be welcome on the characteristics of people and the context in which methods for influencing support for measures are most effective. This also applies to other factors that determine public support (e.g. trust in authorities and the police) that may affect different groups of people in different ways.

8.4.2 Theoretical and conceptual developments

It was beyond the scope of the study to develop a **theoretical model** with cause-effect relationships for public support, but elements to create such models have been identified in this thesis. Creating such a model will be challenging given the different nature of policy measures that can be envisaged. For instance, from the analysis undertaken it has become clear that the collectivistic nature of a society is related to the level of support for policy measures, but the strength of the association appears to vary considerably between policy measures.

Also, the effect of **social norm** is well known in relation to risky behaviour in traffic (see e.g. Geber et al., 2021); my results suggest that the social norm also influence public support for measures (Figure 63, p.227). However, there is still much to explore on how this interaction works and to what extent it differs from the influence of the social norm on behaviour in traffic.

One of the important findings of this thesis is the strong association between **national culture**, and in particular the Independent dimension, and support for policy measures. More research is needed to understand this relationship. One example is the observation that in countries with higher levels of individualism there is more opposition

to road safety measures, but nevertheless such measures get implemented more or earlier than in more collectivistic societies. Is this just a matter of economic resources or are other mechanisms at play as well? Further research would also be useful in order to understand in which contexts and for which types of measures national culture is not a useful predictor of support (e.g. RFL), and why this is the case. An interesting question is also how to explain the very high correlations between the cultural dimension Independent, the Human Development Index (HDI) and the Inequality Index (Table 26, p.149), constructs that are based on very different data sources.

Another useful conceptual development would be the creation of a typology of (road safety) policy measures on the basis of the **trade-offs** they include. One may expect that public support for a particular measure is similar to that for a measure with similar value conflicts. It would be useful to research to what extent measures with similar dilemmas and trade-offs also receive similar levels of support.

My research has also shown that one should be careful in interpreting the answers to question in surveys on **support for policy measures**, in particular in international surveys. I feel such questions should best be accompanied by questions on relevance/effectiveness, human liberties, equity and feasibility, in order to understand correctly the meaning of the respondent. Further research is needed on the best ways to formulate such additional questions and on whether these four perspectives suffice. A first step has been taken already, with the planned reformulation of questions in relation to support for road safety measures in the international ESRA3 survey, which will be launched in spring 2023.

Such developments are also useful for the further development of the **classification scheme** that I developed for arguments against or in favour of measures. It appears useful to also test it out on 'ordinary', non-contentious measures, either by undertaking surveys or by reanalysing results of past studies on support for policy measure in road safety, such as those mentioned in Section 2.7. It would also be useful to examine what modifications would be needed in order to use it in other policy areas.

In Section 5.7.3 it was shown that the type of arguments used by the interviewees were strongly associated with the perceived fairness of the measures. I believe it is possible to develop statistical models that can **predict** whether a policy measure is perceived as **fair** or unfair, based on the arguments used in favour or against a measure. This would require a sufficiently large dataset.

Another area for further research concerns the operationalisation of the concept of **fairness** and of its relationship with public support. It would be useful to arrive at a broader international consensus amongst researchers about what dimensions of fairness should be considered in policy-making (not just in the field of road safety). When does the division between the strict and the broad definition of fairness make sense? And what is an appropriate scale for fairness, given the observation that ‘unfair’ or ‘not fair’ is actually not exactly the opposite of ‘fair’. Such developments should lead to a better theoretical foundation of fairness in policy making, and also would facilitate ways of measuring and comparing fairness.

8.4.3 Research on appropriate models and frameworks for LMICs

Some authors have observed that existing models and frameworks in relation to road safety that had been developed in HICs may not be adequate for LMICs. For example, King et al. (2019) have argued that the logics underlying Traffic Safety Culture are not fully transferable to low and middle income countries (LMICs). Nordfjærn et al. (2011) found that their predictive model of driver behaviour was poorly fitted for the African countries they considered. Lund & Rundmo (2009, p. 552) stated that ‘*social cognition models claiming that attitudes are significant predictors of behaviour are less suitable in low-income countries*’.

Such observations have also emerged during the analyses for this thesis, for example on the relationship between alcohol consumption and the fatality rate (Figure 9, p.139) and between speeding and the fatality rate (Figure 10, p.141). The support for policy measures in road safety is also considerably higher in LMICs than in HICs (Figure 31, p.164). As discussed in Section 8.2.1, ‘supporting a policy measure’ has not the same meaning in collectivistic and individualistic societies, and collectivistic societies are more found in LMICs. Within Europe, confidence of the population in their police, government, legal system, etc. is highly correlated with lower fatality rates (correlations around 0.7); however such strong relationships are not found and sometimes even reversed when considering the global level. Another example is that within an economic and cultural homogeneous cluster of countries (e.g. Western Europe), higher exposure to traffic is correlated with higher fatality rates. But the relationship does not apply when a global perspective is taken. In Europe, the percentage of people in a country driving above the speed limit is correlated with the fatality rate, but this association disappears when correlations are calculated at global level (Section 4.1.5).

My view is that all of this stems from the “triple” difference between HICs and LMICs: (1) culture (2) road safety performance, and (3) wealth. The cultural differences impact on behaviour in traffic and hence on the fatality rate, while the economic difference determines the capability to implement (expensive) measures. The combined effects of these differences lead to quite different ‘road safety contexts’, in which some of the models and concepts traditionally used in road safety thinking, developed in the Western world, become less appropriate.

Thus, associations between variables that exist within Europe or other HICs may no longer hold when also LMICs are included in the analysis. Given the importance of the road safety challenge in LMICs, more research is needed to develop models and frameworks that are more appropriate and fit better the road safety context in LMICs. It is important to come to a better understanding about when concepts/ methods in road safety are applicable for both LMICs and HICs and when they are not.

8.4.4 Research on broader perspectives of fairness

In this thesis I focused on the fairness of the (expected) consequences of interventions. This is not the only perspective on fairness that could be considered; I see at least three other ones. The first of these perspectives is **procedural fairness**, which I briefly touched upon in the Literature review (Section 2.3.3.3). In this perspective the transparency of stakeholder involvement and the evidence-base of the decision-making process are key aspects of fairness. Several researchers have found that the fairness of the design and decision-making processes will positively influence the acceptability of the outcome of the policy measure (Leung, Tong, & Lind, 2007; Moorman, 1991; Skitka & Mullen, 2002; Tyler, 2000; Visschers & Siegrist, 2012). In the field of road safety, this research area has not been analysed systematically.

Another perspective that was not included in this thesis is **the fair choice between measures** – including the choice between a road safety measure and a measure from another policy area. It could be seen as unfair when measures in road safety require a lot of resources which might better be used for other measures in other policy areas. For example, as shown in this thesis, ZER is in general considered as a fair measure in itself, but the level of police resources required for enforcement might be better used for other traffic enforcement activities or for fighting criminality. Another example is PAY: one could see this to be a fair measure in itself, but consider it unfair that linking the severity of sanctions to the income level would only apply to traffic offences and not to other offences. Although publications exist that discuss priority setting in road safety

and mobility policy measures that go beyond 'traditional' cost-benefit approaches (Elvik, 2014; Martensen, 2017; van Wee et al., 2014) still much more needs to be done to understand when a choice between measures can be considered as fair.

It should finally be noted that when broadening the dimensions and perspectives on fairness, these perspectives may lead to conflicting fairness perceptions. Thus, a measure that is perceived as fair when using a single fairness perspective, may no longer be seen as fair when a much **broader perspective or scope** is taken. This has been observed in other policy areas. Kverndokk, Frisch, & Rose (2008) observed that different perspective of fairness in reducing CO₂ emissions are conflicting and actually were used as excuses for not ratifying the Kyoto Protocol Treaty. Another well-known conflict between fairness dimensions is affirmative action, with conflicts between distributive and procedural fairness (Braveman, 2006; Peterson, 1994). This raises research questions on the link between the fairness of a situation and its scope or coverage, and in particular the ethical question about which scope or coverage should be considered when assessing fairness.

8.5 Recommendations for policy making

8.5.1 *Increasing public support for road safety policy measures*

Policymakers are notoriously reluctant to issue new regulations for improving road safety when public support is low. When a large group of people opposes a particular measure, it is likely that this group will organize itself and will instigate a movement against the measure taken (Goldenbeld, 2002). Increasing support for a policy measure can thus be seen as a political strategy for increasing social acceptance. High public support for a measure increases the willingness to support it actively (Goldenbeld, 2002).

Persuasion strategies can be based on either highlighting the attractive consequence or on decreasing the importance of the negative features (Knowles & Riner, 2007). The authors mention three basic sources for resistance: reactance (resistance to the attempt to influence norms/habits/behaviour), scepticism (resistance to the content/approach of the measure), and inertia (resistance to change). Policy-makers need to understand the type of resistance against a policy measure if they want to increase public support for it (Aarts et al., 2014).

My research has shown that even people who recognize that a measure would be effective might oppose the measure because they think it is not justified from at least one perspective, for instance, an excessive restriction of freedom. Thus, a first step for increasing public support is understanding people's beliefs and, when these are believed to be incorrect or incomplete, influence these beliefs.

People may have a very biased or incorrect view of what consequences they might face. Correcting these perspectives through information, education, and awareness activities, will help to increase public support for the policy measures envisaged.

People who believe that a particular phenomenon (e.g., speeding or drunk driving) is an important cause of road traffic injuries are more supportive of policy measures meant to reduce this phenomenon (Table 59, p.221). These results suggest that 'educating' the population about the causes of crashes can contribute to their willingness to support policy measures that aim to reduce the prevalence of these causes. It is also important to inform the public of the relevance of the measure and the anticipated benefits, while explicitly recognizing the potential for negative side effects such as some limitations of freedom or additional costs.

Deep-seated beliefs, such as those linked to core values and faith, are often more difficult to change than secondary, more practical beliefs and ideas (Aarts et al., 2014). The discussion of the expected consequences of measures in Chapter 7 showed that the opposition to measures may be fuelled by practical rather than ideological considerations. Persuasion is likely to be more effective when addressing such pragmatic beliefs.

People who perceive an ethical basis for their attitudes tend to show greater correspondence with behavioural intentions and greater resistance to persuasive messages, than people who do not link such a moral basis to their attitudes (Luttrell et al., 2015). This finding suggests that by making road users more aware that driving on the road has (several) ethical dimensions, they might be more likely to behave in a responsible way and support policy measures in road safety.

An effective way of getting controversial measures introduced is via trials and pilot projects. This has been documented for measures such as introduction of 30 km/h zones (Sammer, 1994), road pricing (Transport for London, 2004) and section control (Schuitema et al., 2010); this approach is also supported by Aarts et al. (2014).

Personal experience of the effects of a policy measure is often much more effective for correcting biased or incomplete views than information campaigns. An additional advantage is that politicians and the public are more willing to agree to temporary measures. However, for many interventions it may be difficult to organise trials pilot initiatives, because they are seen as discriminatory or illegal, but where they are possible I recommend them highly.

8.5.2 Including fairness considerations in road safety measures

Fairness and other ethical issues are seldom explicitly considered in ex ante evaluations. Elvik (2009) has pointed out that decisions on road safety measures that are only based on cost-benefit considerations may be seen as unfair. Like other authors (e.g. Hokstad & Vatn (2008), van Wee et al (2014) and van Wee & Rietveld (2013)) I call policy-makers to ensure that fairness and other ethical considerations are more explicitly integrated in their ex ante evaluations and priority setting of measures.

More fairness in road safety is not just a matter of assessing individual measures, but rather ensuring that a fair balance of measures is taken so that the safety of all road users increases. It is hard to justify that particular road users (e.g. car drivers) are given high priority when investing resources elsewhere (e.g. for senior pedestrians) would have a bigger effect in terms of traffic injuries and deaths avoided. In practice, this recommendation should lead to a higher prioritisation of measures that are beneficial for VRUs (Fahlquist, 2009; van Wee, 2016; van Wee et al., 2014). I recognise, however, that this is easier said than done, because some measures can be implemented more easily than others, and many actors have a say in the implementation of measures

References

- Aarts, L. T., Eenink, R. G., Weijermans, W. A. M., Knapper, A., Schagen, I., & van Schagen, I. (2014). *Soms moet er iets gebeuren voor er iets gebeurt. Verkenning van mogelijkheden om de haalbaarheid van de verkeersveiligheidsdoelstellingen te vergroten*. Den Haag, Netherlands: SWOV.
- Achermann Stürmer, Y., Meesmann, U., & Berbatovci, H. (2019). *Driving under the influence of alcohol and drugs. ESRA2 Thematic report Nr. 5. ESRA project (E-Survey of Road users' Attitudes)*. Bern, Switzerland: Swiss Council for Accident Prevention.
- Achit, H., & Carnis, L. (2014). Physical Impairment and Medical Care Spending for Road Crash Victims. *Securitas Vialis*, 18(June), 36–53.
- Adminaite, D., Jost, G., Stipdonk, H., & Ward, H. (2017). *Ranking EU progress on road safety. 11th Road Safety Performance Index Report*. Brussels, Belgium: ETSC.
- af Wåhlberg, A. E., Dorn, L., & Kline, T. (2010). The effect of social desirability on self reported and recorded road traffic accidents. *Transportation Research Part F: Traffic Psychology and Behaviour*, 13(2), 106–114. <https://doi.org/10.1016/j.trf.2009.11.004>
- Albalade, D. (2012). Social Preferences and Policy Centralisation: The Case of US Speed Limits. *Journal of Economic and Social Policy*, 15(1), 24.
- Ali, M. T., Hui, X., Hashmi, Z. G., Dhiman, N., Scott, V. K., Efron, D. T., ... Haider, A. H. (2013). Socioeconomic disparity in inpatient mortality after traumatic injury in adults. *Surgery (United States)*, 154(3), 461–467. <https://doi.org/10.1016/j.surg.2013.05.036>
- Allen, K. (2012). What Is an Ethical Dilemma? Retrieved from http://www.socialworker.com/feature-articles/ethics-articles/What_Is_an_Ethical_Dilemma?/
- Antov, D., Banet, A., Barbier, C., Bellet, T., Bimpeh, Y., Boulanger, A., ... Zavrdes, N. (2010). *European Road Users' Risk Perception and Mobility. The SARTRE 4 survey*. (J. Cestac & P. Delhomme, Eds.). European Commission.
- Arruñada, B. (2010). Protestants and Catholics: Similar work Ethic, Different Social Ethic. *The Economic Journal*, 120(547), 890–918. <https://doi.org/10.1111/j.1468-0297.2009.02325.x>
- Asaria, M., Cookson, R., & Griffin, S. (2014). Incorporating Health Inequality Impacts into Cost-Effectiveness Analysis. In *Encyclopedia of Health Economics, Volume 2* (pp. 22–26). Elsevier. <https://doi.org/10.1016/B978-0-12-375678-7.01415-2>
- Atchley, P., Shi, J., & Yamamoto, T. (2014). Cultural foundations of safety culture: A comparison of traffic safety culture in China, Japan and the United States. *Transportation Research Part F: Traffic Psychology and Behaviour*, 26(PB), 317–325. <https://doi.org/10.1016/j.trf.2014.01.004>
- Audard, C. (2014). Fair / Fairness / Equity. In B. Cassin, E. Apter, J. Lezra, & M. Wood (Eds.), *Dictionary of Untranslatables: A Philosophical Lexicon* (pp. 333–333). Princeton University Press.
- Bachynski, K. E. (2012). Playing hockey, riding motorcycles, and the ethics of protection. *American Journal of Public Health*, 102(12), 2214–2220. <https://doi.org/10.2105/AJPH.2012.300721>
- Baker, R., Blumberg, S. J., Brick, J. M., Couper, M. P., Courtright, M., Dennis, J. M., ... Lavrakas, P. J. (2010). Research synthesis. AAPOR report on online panels. *Public Opinion Quarterly*, 74(4), 711–781. <https://doi.org/10.1093/poq/nfq048>
- Bany, P. (2013). Philosophical Considerations on Vision Zero. *The Archives of Transport*, XXV–XXVI(1–2), 5–15.
- Barrett-Howard, E., & Tyler, T. R. (1986). Procedural justice as a criterion in allocation decisions. *Journal of Personality and Social Psychology*, 50(2), 296–304. <https://doi.org/10.1037/0022-3514.50.2.296>
- Bartczak, J. (2012). Transport System Telematics Ethical issues of CCTV monitoring

- and surveillance in road transport ITS applications. *Archives of Transport System Telematics*, 5(1), 3–6.
- Bateman-House, A. (2014). Bikes, helmets, and public health: Decision-making when goods collide. *American Journal of Public Health*, 104(6), 986–992. <https://doi.org/10.2105/AJPH.2013.301810>
- Baumol, W. J. (1982). Applied Fairness Theory and Rationing Policy. *The American Economic Review*, 72(4), 639–651.
- Bearth, A., & Siegrist, M. (2016). Are risk or benefit perceptions more important for public acceptance of innovative food technologies: A meta-analysis. *Trends in Food Science and Technology*, 49, 14–23. <https://doi.org/10.1016/j.tifs.2016.01.003>
- Beauchamp, T. L., & Childress, J. F. (2013). *Principles of Biomedical Ethics*. Oxford: Oxford University Press.
- Bergmann, L. T., Schlicht, L., Meixner, C., König, P., Pipa, G., Boshhammer, S., & Stephan, A. (2018). Autonomous vehicles require socio-political acceptance—an empirical and philosophical perspective on the problem of moral decision making. *Frontiers in Behavioral Neuroscience*, 12(February), 1–12. <https://doi.org/10.3389/fnbeh.2018.00031>
- Bergmann, S., & Sager, T. (2008). *The ethics of mobilities rethinking place, exclusion, freedom and environment*. Farnham, UK; Burlington, VT, USA: Ashgate Publishing.
- Besley, J. C. (2010). Public Engagement and the Impact of Fairness Perceptions on Decision Favorability and Acceptance. *Science Communication*, 32(2), 256–280. <https://doi.org/10.1177/1075547009358624>
- Bies, R. J. (1986). Identifying principles of interactional justice: the case of corporate recruiting. In *National Academy of Management Meetings, Chicago, August 13-16, 1986*. Chicago.
- Bies, R. J., & Moag, J. S. (1986). Interactional justice: Communications criteria of fairness. In R. Lewitzki, M. Bazerman, & B. H. Sheppard (Eds.), *Research on Negotiation in Organizations, Vol. 1*. Greenwich, CT: Jai Press.
- Bingham, C. R. (2011). *Young unlicensed drivers: Three studies to understand the association of lifestyle and area associated risk*. Ann Arbor.
- Bishop, C. A., Liu, S., Stephens, A. N., & Fitzharris, M. (2017). Associations between alcohol consumption patterns and attitudes towards alcohol interlocks. *Accident Analysis and Prevention*, 108(July), 83–90. <https://doi.org/10.1016/j.aap.2017.08.021>
- BIVV. (2016). *Nationale VerkeersONVeiligheidsenquête 2016*. Brussels, Belgium: Belgisch Instituut voor de Verkeersveiligheid.
- Bliss, T., & Breen, J. (2009). *Implementing the Recommendations of the World Report on Road Traffic Injury Prevention. Country Guidelines for the Conduct of Road Safety Capacity Reviews and the Related Specification of Lead Agency Reforms, Investment Strategies and Safety Projects*. Washington DC: World Bank Global Road Safety Facility.
- Blumberg, L. J. (2003). Balancing efficiency and equity in the design of coverage expansions for children. *The Future of Children*, 13(1), 204–211.
- Boateng, A., Wang, Y., Ntim, C., & Glaister, K. W. (2021). National culture, corporate governance and corruption: A cross-country analysis. *International Journal of Finance and Economics*, 26(3), 3852–3874. <https://doi.org/10.1002/ijfe.1991>
- Bollen, K. A., Glanville, J. L., & Stecklov, G. (2001). Socioeconomic Status and Class in Studies of Fertility and Health in Developing Countries. *Annual Review of Sociology*, 27(2001), 153–185. <https://doi.org/10.1146/annurev.soc.27.1.153>
- Borrell, C., Plasència, A., Huisman, M., Costa, G., Kunst, A., Andersen, O., ... Mackenbach, J. P. (2005). Education level inequalities and transportation injury mortality in the middle aged and elderly in European settings. *Injury Prevention : Journal of the International Society for Child and Adolescent Injury Prevention*, 11(lcd), 138–142. <https://doi.org/10.1136/ip.2004.006346>

- Boston, J., Homola, J., Sinclair, B., Torres, M., & Tucker, P. D. (2018). The Dynamic Relationship between Personality Stability and Political Attitudes. *Public Opinion Quarterly*. <https://doi.org/10.1093/poq/nfy001>
- Boyatzis, R. E. (1998). *Transforming qualitative information : thematic analysis and code development*. book, Thousands Oaks, CA, USA & London, UK: SAGE Publications.
- Brandstätter, C., Schlembach, C., Furian, G., & Kaiser, S. (2019). The Traffic Safety Culture of (European) Car Drivers: Operationalizing the Concept of TSC by Re-analyzing the SARTRE4 Study. In N. J. Ward, B. Watson, & K. Fleming-Vogl (Eds.), *Traffic Safety Culture: Definition, Foundation, and Application* (pp. 95–115). Bingley, UK: Emerald Publishing Limited.
- Braveman, P. (2006). Health disparities and health equity: concepts and measurement. *Annual Review of Public Health*, 27, 167–194. <https://doi.org/10.1146/annurev.publhealth.27.021405.102103>
- Braveman, P., & Gruskin, S. (2003). Defining equity in health. *Journal of Epidemiology and Community Health*, 57(4), 254–258. <https://doi.org/10.1136/jech.57.4.254>
- Bryman, A. (2012). *Social Research Methods. 4th edition. Social Research Methods* (4th ed.). Oxford University Press. <https://doi.org/10.4135/9781849209939>
- Bryman, A., & Cramer, D. (2011). *Quantitative Data Analysis with IBM SPSS 17, 18 and 19: A Guide for Social Scientists*. London, UK: Routledge.
- Burstein, P. (2003). The impact of public opinion on public policy: A review and an agenda. *Political Research Quarterly*, 56(1), 29–40. <https://doi.org/10.1177/106591290305600103>
- Buttler, I. (2016). *Enforcement and Support for Road Safety Policy Measures: ESRA Thematic Report No. 6. ESRA project (E-Survey of Road users' Attitudes)*. Warschau, Poland: Instytutu Transportu Samochodowego (ITS).
- Cairney, P., Pyta, V., Thoresen, T., Catchpole, J., Van Dam, S., & Baruah, A. (2016). *Safety of Disadvantaged Road Users*. Sydney.
- Camilloni, L., Farchi, S., Chini, F., Giorgi Rossi, P., Borgia, P., & Guasticchi, G. (2013). How socioeconomic status influences road traffic injuries and home injuries in Rome. *International Journal of Injury Control and Safety Promotion*, 20(2), 134–143. <https://doi.org/10.1080/17457300.2012.692695> [doi]
- Carnis, L. (2015). Éthique et sécurité routière: enjeux et conséquences pour l'évaluation des politiques publiques. In G. Blanchard & L. Carnis (Eds.), *Évaluation des politiques de sécurité routière. Méthodes, outils et limites*. (pp. 217–242). Paris: L'Harmattan.
- CEREMA. (2020). *Lowering the speed limit to 80 km/h. Final assessment report*. Paris, France: Cerema.
- Cestac, J., Kraïem, S., & Assailly, J.-P. (2016). Cultural values and random breath tests as moderators of the social influence on drunk driving in 15 countries. *Journal of Safety Research*, 56, 89–96. <https://doi.org/10.1016/j.jsr.2015.12.001>
- Chan Kim, W., & Mauborgne, R. A. (1993). Procedural Justice, Attitudes, and Subsidiary Top Management Compliance With Multinationals' Corporate Strategic Decisions. *The Academy of Management Journal*, 36(3), 502–526. <https://doi.org/10.2307/256590>
- Charmaz, K. (1983). The Grounded Theory Method: An Explication and Interpretation. In R. M. Emerson (Ed.), *Contemporary Field Research: A Collection of Readings*. Waveland Press.
- Charmaz, K. (2000). Grounded Theory: Objectivist and Constructivist Methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research. 2nd edition*. Thousands Oaks, CA, USA: SAGE Publications.
- Charmaz, K. (2002). Qualitative Interviewing and Grounded Theory Analysis. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of Interview Research: Context and Method*. Thousands Oaks, CA, USA: SAGE Publications.
- Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*. London, UK: SAGE Publications.

- Chen, H.-Y., Jan, S., Boufous, S., Martiniuk, A. L. C., Ivers, R. Q., Senserrick, T., ... Muscatello, D. (2012). Variations in car crash-related hospitalization costs amongst young adults in New South Wales, Australia. *Injury*, 43(9), 1593–1599. <https://doi.org/10.1016/j.injury.2011.06.016>
- Cherry, R. A. (2010). Repeal of the Pennsylvania motorcycle helmet law: reflections on the ethical and political dynamics of public health reform. *BMC Public Health*, 10, 202. <https://doi.org/10.1186/1471-2458-10-202>
- Choi, B. C. K., & Pak, A. W. P. (2005). A catalog of biases in questionnaires. *Preventing Chronic Disease*, 2(1), 1–13.
- Christiansen, P. (2018). Public support of transport policy instruments, perceived transport quality and satisfaction with democracy. What is the relationship? *Transportation Research Part A: Policy and Practice*, 118(August), 305–318. <https://doi.org/10.1016/j.tra.2018.09.010>
- Christie, N., Sleney, J., Ahmed, F., & Knight, E. (2012). Engaging the Somali community in the road safety agenda: A process evaluation from the London Borough of Hounslow. *Journal of Community Health*, 37(4), 814–821. <https://doi.org/10.1007/s10900-011-9515-y>
- Christie, N., & Whitfield, G. (2011). *RSRR 123 Road User Safety and Disadvantage – Appendix 2 : Literature Review*.
- Coeckelbergh, M. (2016). Responsibility and the Moral Phenomenology of Using Self-Driving Cars. *Applied Artificial Intelligence*, 30(8), 748–757. <https://doi.org/10.1080/08839514.2016.1229759>
- Cohen-Charash, Y., & Spector, P. E. (2001). The Role of Justice in Organizations: A Meta-Analysis. *Organizational Behavior and Human Decision Processes*, 86(2), 278–321. <https://doi.org/10.1006>
- Constantinou, E., Panayiotou, G., Konstantinou, N., Loutsiou-Ladd, A., & Kapardis, A. (2011). Risky and aggressive driving in young adults: Personality matters. *Accident Analysis and Prevention*, 43(4), 1323–1331. <https://doi.org/10.1016/j.aap.2011.02.002>
- Consumer Protection Bureau. (2021). Extra Note: Child Restraint Law. Retrieved July 23, 2021, from <https://www.doj.nh.gov/consumer/sourcebook/child-restraint.htm>
- Coombes, M. E. (1997). *An intra- & inter-provincial analysis of the Fair Pharmacare policy in British Columbia*. University of British Columbia.
- Cordellieri, P., Baralla, F., Ferlazzo, F., Sgalla, R., Piccardi, L., & Giannini, A. M. (2016). Gender effects in young road users on road safety attitudes, behaviors and risk perception. *Frontiers in Psychology*, 7(September), 1–11. <https://doi.org/10.3389/fpsyg.2016.01412>
- Crawford, J. T., Brandt, M. J., Chambers, J. R., & Motyl, M. (2017). Supplemental Material for Social and Economic Ideologies Differentially Predict Prejudice Across the Political Spectrum, but Social Issues Are Most Divisive. *Journal of Personality and Social Psychology*, 112(3), 383–412. <https://doi.org/10.1037/pspa0000074.supp>
- Crone, D. L., & Laham, S. M. (2015). Multiple moral foundations predict responses to sacrificial dilemmas. *Personality and Individual Differences*, 85, 60–65. <https://doi.org/10.1016/j.paid.2015.04.041>
- Cubbin, C., & Smith, G. S. (2002). Socioeconomic inequalities in injury: critical issues in design and analysis. *Annual Review of Public Health*, 23, 349–375. <https://doi.org/10.1146/annurev.publhealth.23.100901.140548> [doi]r100901.140548 [pii]
- Culyer, A. J., & Wagstaff, A. (1993). Measuring Equality and Equity in Health and Health Care. *Journal of Health Economics*, 12, 431–457. [https://doi.org/10.1016/0167-6296\(93\)90004-X](https://doi.org/10.1016/0167-6296(93)90004-X)
- Dahlen, E. R., Martin, R. C., Ragan, K., & Kuhlman, M. M. (2005). Driving anger, sensation seeking, impulsiveness, and boredom proneness in the prediction of unsafe driving. *Accident Analysis and Prevention*, 37(2), 341–348. <https://doi.org/10.1016/j.aap.2004.10.006>

- Daniels, N. (2000). Accountability for reasonableness. *BMJ*, 321(7272), 1300–1301. <https://doi.org/10.1136/bmj.321.7272.1300>
- Daniels, N., Saloner, B., & Gelpi, A. H. (2009). Access, Cost, And Financing: Achieving An Ethical Health Reform. *Health Affairs*, 28(5), W909–W916.
- Daniels, S., Brijs, T., Nuyts, E., & Wets, G. (2010). Explaining variation in safety performance of roundabouts. *Accident Analysis and Prevention*, 42(2), 393–402. <https://doi.org/10.1016/j.aap.2009.08.019>
- Daniels, S., Martensen, H., Schoeters, A., Van den Berghe, W., Papadimitriou, E., Ziakopoulos, A., ... Perez, O. M. (2019). A systematic cost-benefit analysis of 29 road safety measures. *Accident Analysis and Prevention*, 133. <https://doi.org/10.1016/j.aap.2019.105292>
- Davidovic, D., & Harring, N. (2020). Exploring the cross-national variation in public support for climate policies in Europe: The role of quality of government and trust. *Energy Research and Social Science*, 70(September 2020), 101785. <https://doi.org/10.1016/j.erss.2020.101785>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, 13(3), 319–339. <https://doi.org/10.2307/249008>
- De Cremer, D., & Tyler, T. R. (2007). The effects of trust in authority and procedural fairness on cooperation. *The Journal of Applied Psychology*, 92(3), 639–649. <https://doi.org/10.1037/0021-9010.92.3.639>
- De Leeuw, E. D., Hox, J. J., & Dilman, D. A. (2008). *International handbook of survey methodology*. New York, NY: Taylor & Francis.
- De Vos, J., & Singleton, P. A. (2020). Travel and cognitive dissonance. *Transportation Research Part A: Policy and Practice*, 138(July), 525–536. <https://doi.org/10.1016/j.tra.2020.06.014>
- Debinski, B., Smith, K. C., & Gielen, A. (2014). Public opinion on motor vehicle-related injury prevention policies: a systematic review of a decade of research. *Traffic Injury Prevention*, 15(April 2015), 243–251. <https://doi.org/10.1080/15389588.2013.816419>
- Department for Transport. (2004). *Safety culture and work-related road accidents. Road safety Research Report No. 51*. London, UK: Department for Transport (DfT).
- Department for Transport. (2019). *The Road Safety Statement 2019. A Lifetime of Road Safety. Moving Britain Ahead*. London, UK: Department for Transport.
- Dermol, V. (2019). Relationship between Human Capital and National Culture. *Management*, 14(3), 173–184. <https://doi.org/10.26493/1854-4231.14.173-184>
- Deutsch, M. (1975). Equity, Equality, and Need: What Determines Which Value Will Be Used as the Basis of Distributive Justice? *Journal of Social Issues*, 31(3), 137–149. <https://doi.org/10.1111/j.1540-4560.1975.tb01000.x>
- Devlin, B., & Magill, G. (2006). The process of ethical decision making. *Best Practice & Research Clinical Anaesthesiology*, 20(4), 493–506. <https://doi.org/10.1016/j.bpa.2006.09.001>
- Dietrich, M. (2021). Addressing unequal risk exposure in the development of automated vehicles. *Ethics and Information Technology*, (0123456789). <https://doi.org/10.1007/s10676-021-09610-1>
- Dijkstra, L., & Poelman, H. (2014). A harmonised definition of cities and rural areas: the new degree of urbanisation. *Regional and Urban Policy*.
- Douglas, M. A., & Swartz, S. M. (2015). Knights of the Road: Safety, Ethics, and the Professional Truck Driver. *Journal of Business Ethics*, 129(4). <https://doi.org/10.1007/s10551-015-2761-7>
- Downs, J., Shults, R., & West, B. (2017). Attitudes toward mandatory ignition interlocks for all offenders convicted of driving while intoxicated. *Journal of Safety Research*, 63, 99–103. <https://doi.org/10.1016/j.jsr.2017.08.002>
- Driver, J. (2007). *Ethics: The Fundamentals*. Malden, MA: Blackwell Publishing Ltd.
- Dworkin, G. (2017). Paternalism. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Spring 201). Metaphysics Research Lab, Stanford University.

- Dworkin, R. (1977). De Funis v. Sweatt. In M. Cohen, T. Nagel, & T. Scanlon (Eds.), *Equality and Preferential Treatment: A philosophy and Public Affairs Reader*. (pp. 63–68). Chichester: Princeton University Press.
- Eagly, A. H. (1993). *The psychology of attitudes / Alice H. Eagly, Shelly Chaiken*. (S. Chaiken, Ed.). book, Fort Worth, TX: Harcourt Brace Jovanovich College Publishers.
- Eby, D. W., Molnar, L. J., Kostyniuk, L. P., St. Louis, R. M., Zanier, N., Lepkowski, J. M., & Bergen, G. (2017). Perceptions of alcohol-impaired driving and the blood alcohol concentration standard in the United States. *Journal of Safety Research*, 63, 73–81. <https://doi.org/10.1016/j.jsr.2017.08.013>
- ECF. (2014). ECF HELMET FACTSHEET. Retrieved July 18, 2021, from https://ecf.com/sites/ecf.com/files/Helmet-factsheet-_17042015_Final.pdf
- Ecorys. (2014). *Study on Prevention of Drink-Driving by Use of Alcohol Interlock Devices*. Rotterdam, The Netherlands: Ecorys.
- Edwards, J., Freeman, J., Soole, D., & Watson, B. (2014). A framework for conceptualising traffic safety culture. *Transportation Research Part F: Traffic Psychology and Behaviour*, 26(PB), 293–302. <https://doi.org/10.1016/j.trf.2014.03.002>
- Elvebakk, B. (2005). *Ethics and road safety policy*. TOI Rapport (Vol. 786). Oslo.
- Elvebakk, B. (2007). Vision Zero: Remaking Road Safety. *Mobilities*, 2(3), 425–441. <https://doi.org/10.1080/17450100701597426>
- Elvebakk, B. (2015). Paternalism and acceptability in road safety work. *Safety Science*, 79, 298–304. <https://doi.org/10.1016/j.ssci.2015.06.013>
- Elvebakk, B., & Steiro, T. (2009). First principles, second hand: Perceptions and interpretations of vision zero in Norway. *Safety Science*, 47(7), 958–966. <https://doi.org/10.1016/j.ssci.2008.10.005>
- Elvik, R. (2001). Cost-benefit analysis of road safety measures: applicability and controversies. *Accident Analysis & Prevention*, 33(1), 9–17. [https://doi.org/10.1016/S0001-4575\(00\)00010-5](https://doi.org/10.1016/S0001-4575(00)00010-5)
- Elvik, R. (2003). How would setting policy priorities according to cost-benefit analyses affect the provision of road safety? *Accident Analysis & Prevention*, 35(4), 557–570. [https://doi.org/10.1016/S0001-4575\(02\)00034-9](https://doi.org/10.1016/S0001-4575(02)00034-9)
- Elvik, R. (2006). Are individual preferences always a legitimate basis for evaluating the costs and benefits of public policy? *Transport Policy*, 13(5), 379–385. <https://doi.org/10.1016/j.tranpol.2006.01.002>
- Elvik, R. (2009). The trade-off between efficiency and equity in road safety policy. *Safety Science*, 47(6), 817–825. <https://doi.org/10.1016/j.ssci.2008.10.012>
- Elvik, R. (2013). Paradoxes of rationality in road safety policy. *Research in Transportation Economics*, 43(1), 62–70. <https://doi.org/10.1016/j.retrec.2012.12.008>
- Elvik, R. (2014). Problems in determining the optimal use of road safety measures. *Research in Transportation Economics*, 47(0349), 27–36. <https://doi.org/10.1016/j.retrec.2014.09.016>
- Elvik, R. (2021). Democracy, governance, and road safety. *Accident Analysis and Prevention*, 154(March), 106067. <https://doi.org/10.1016/j.aap.2021.106067>
- Eriksson, L., & Bjørnskau, T. (2012). Acceptability of traffic safety measures with personal privacy implications. *Transportation Research Part F: Traffic Psychology and Behaviour*, 15(3), 333–347. <https://doi.org/10.1016/j.trf.2012.02.006>
- Eriksson, L., Garvill, J., & Nordlund, A. M. (2006). Acceptability of travel demand management measures: The importance of problem awareness, personal norm, freedom, and fairness. *Journal of Environmental Psychology*, 26(1), 15–26. <https://doi.org/10.1016/j.jenvp.2006.05.003>
- Eriksson, L., Garvill, J., & Nordlund, A. M. (2008). Acceptability of single and combined transport policy measures: The importance of environmental and policy specific beliefs. *Transportation Research Part A: Policy and Practice*, 42(8), 1117–1128. <https://doi.org/10.1016/j.tra.2008.03.006>

- Esmaeilikia, M., Grzebieta, R., & Olivier, J. (2018). A Systematic Review of Bicycle Helmet Laws Enacted Worldwide. *Journal of the Australasian College of Road Safety*, 29(3), 30–38.
- European Commission. (2019). *EU Road Safety Policy Framework 2021-2030 - Next steps towards "Vision Zero."* Brussels: European Commission, Directorate General for Transport.
- European Commission. (2020a). *Road safety targets - Monitoring report November 2020. European Road Safety Observatory*. Brussels, Belgium: European Commission, Directorate General for Transport.
- European Commission. (2020b). *Road safety thematic report - Speeding. European Road Safety Observatory*. Brussels: European Commission, Directorate General for Transport.
- European Commission. (2021). *Road safety targets Monitoring, May 2021. European Road Safety Observatory*. Brussels: European Commission, Directorate General for Transport.
- Evans, K., de Moura, N., Chauvier, S., Chatila, R., & Dogan, E. (2020). Ethical Decision Making in Autonomous Vehicles: The AV Ethics Project. *Science and Engineering Ethics*, 26(6), 3285–3312. <https://doi.org/10.1007/s11948-020-00272-8>
- Evans, L. (2008). Death in Traffic: Why Are the Ethical Issues Ignored? *Studies in Ethics, Law, and Technology*, 2(1). <https://doi.org/10.2202/1941-6008.1014>
- EVS/WVS. (2020a). *European Values Study and World Values Survey: Joint EVS/WVS 2017-2021 Dataset (Joint EVS/WVS). Dataset Version 1.0.0*. Madrid, Spain & Vienna, Austria: JD Systems Institute & WVSA. <https://doi.org/10.14281/18241.2>
- EVS/WVS. (2020b). *Joint EVS/WVS 2017-2021 Dataset (Joint EVS/WVS)*. Cologne, Germany: GESIS Data Archive. ZA7505 Data file Version 1.0.0. <https://doi.org/10.4232/1.13095>
- Factor, R., Mahalel, D., & Yair, G. (2008). Inter-group differences in road-traffic crash involvement. *Accident Analysis and Prevention*, 40(6), 2000–2007. <https://doi.org/10.1016/j.aap.2008.08.022>
- Fahlquist, J. N. (2006). Responsibility ascriptions and Vision Zero. *Accident Analysis & Prevention*, 38(6), 1113–1118. <https://doi.org/10.1016/j.aap.2006.04.020>
- Fahlquist, J. N. (2007). *Moral Responsibility and the Ethics of Traffic Safety. Theses in Philosophy from the Royal Institute of Technology*. Royal Institute of Technology, Stockholm.
- Fahlquist, J. N. (2009). Saving lives in road traffic - ethical aspects. *Journal of Public Health*, 17(6), 385–394. <https://doi.org/10.1007/s10389-009-0264-7>
- Fang, T. (2003). Cross Cultural Management A Critique of Hofstede's Fifth Cultural Dimension. *International Journal of Cross Cultural Management*, 3(3), 347–368.
- Fell, J. C. (2019). Underutilized strategies in traffic safety: Results of a nationally representative survey. *Traffic Injury Prevention*, 20(sup2), S57–S62. <https://doi.org/10.1080/15389588.2019.1654605>
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA, USA: Stanford University Press.
- Finuras, A. P. M. de C. (2013). *Confiança nas Instituições e Valores Culturais : Estudo Internacional Comparado entre Angola, Cabo Verde, Moçambique e Portugal*. Universidade Lusófona de Humanidades e Tecnologias.
- Fischer, R. (2009). Where is culture in cross cultural research?: An outline of a multilevel research process for measuring culture as a shared meaning system. *International Journal of Cross Cultural Management*, 9(1), 25–49. <https://doi.org/10.1177/1470595808101154>
- Fleurbaey, M., & Schokkaert, E. (2009). Unfair inequalities in health and health care. *Journal of Health Economics*, 28(1), 73–90. <https://doi.org/10.1016/j.jhealeco.2008.07.016>
- Florent, V., Marie-Axelle, G., Laurent, C., Frédéric, M., Marie, P., & Anthony, P. (2021).

- The role of perceived legitimacy in understanding traffic rule compliance: A scoping review. *Accident Analysis and Prevention*, 159(April). <https://doi.org/10.1016/j.aap.2021.106299>
- Foad, C. M. G., Whitmarsh, L., Hanel, P. H. P., & Haddock, G. (2021). The limitations of polling data in understanding public support for COVID-19 lockdown policies. *Royal Society Open Science*, 8(7). <https://doi.org/10.1098/rsos.210678>
- Fog, A. (2020). A Test of the Reproducibility of the Clustering of Cultural Variables. *Cross-Cultural Research*, 55, 29. <https://doi.org/10.1177/1069397120956948>
- Forward, S., & Samuelsson, P. (2008). *Yrkesförares syn på regelefterlevnad i trafiken*. Linköping, Sweden: VTI.
- Friendly, M., & Denis, D. (2005). The early origins and development of the scatterplot. *Journal of the History of the Behavioral Sciences*, 41(2), 103–130. <https://doi.org/10.1002/jhbs.20078>
- Gaganis, C., Hasan, I., Papadimitri, P., & Tasiou, M. (2019). National culture and risk-taking: Evidence from the insurance industry. *Journal of Business Research*, 97(April 2018), 104–116. <https://doi.org/10.1016/j.jbusres.2018.12.037>
- Galobardes, B., Shaw, M., Lawlor, D. a, Lynch, J. W., & Davey Smith, G. (2006). Indicators of socioeconomic position (part 1). *Journal of Epidemiology and Community Health*, 60(1), 7–12. <https://doi.org/10.1136/jech.2004.023531>
- Garvill, J., Marell, A., & Westin, K. (2003). Factors influencing drivers' decision to install an electronic speed checker in the car. *Transportation Research Part F: Traffic Psychology and Behaviour*, 6(1), 37–43. [https://doi.org/10.1016/S1369-8478\(02\)00045-1](https://doi.org/10.1016/S1369-8478(02)00045-1)
- Gaygisiz, E. (2010a). Cultural values and governance quality as correlates of road traffic fatalities: A nation level analysis. *Accident Analysis and Prevention*, 42(6), 1894–1901. <https://doi.org/10.1016/j.aap.2010.05.010>
- Gaygisiz, E. (2010b). Economic and cultural correlates of road-traffic accident fatality rates in OECD countries. *Perceptual and Motor Skills*, 109(2), 531–545. <https://doi.org/10.2466/pms.109.2.531-545>
- Geber, S., Baumann, E., Czerwinski, F., & Klimmt, C. (2021). The Effects of Social Norms Among Peer Groups on Risk Behavior: A Multilevel Approach to Differentiate Perceived and Collective Norms. *Communication Research*, 48(3), 319–345. <https://doi.org/10.1177/0093650218824213>
- Gerson, K., & Horowitz, R. (2002). Observations and Interviewing: Option and Choices. In T. May (Ed.), *Qualitative Research in Action*. London, UK: SAGE Publications.
- Gilens, M. (2001). Political Ignorance and Collective Policy Preferences. *American Political Science Review*, 95(2), 379–396.
- Girasek, D. C. (2012). Towards operationalising and measuring the Traffic Safety Culture construct. *International Journal of Injury Control and Safety Promotion*, 19(1), 37–46. <https://doi.org/10.1080/17457300.2011.603147>
- Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago, USA: Aldine.
- Goldenbeld, C. (1998). *European car drivers' opinion about road safety measures and in-car devices: analysis of SARTRE 2 survey results in terms of how European car drivers differ in their preferences for road safety measures*. Leidschendam: SWOV.
- Goldenbeld, C. (2002). *Publiek draagvlak voor verkeersveiligheid en verkeersveiligheidsmaatregelen. Overzicht van bevindingen en mogelijkheden voor onderzoek*. Leidschendam, The Netherlands: SWOV Stichting Wetenschappelijk Onderzoek Verkeersveiligheid.
- Goldenbeld, C., & De Craen, S. (2013). The comparison of road safety survey answers between web-panel and face-to-face; Dutch results of SARTRE-4 survey. *Journal of Safety Research*, (46), 13–20. <https://doi.org/http://doi.org/10.1016/j.jsr.2013.03.004>
- Gostin, L. O., & Gostin, K. G. (2009). A broader liberty: J.S. Mill, paternalism and the public's health. *Public Health*, 123(11), 214–221.

- <https://doi.org/10.1016/j.puhe.2008.12.024>
- Goszczynska, M., Tyszka, T., & Slovlic, P. (1991). Risk perception in Poland: A comparison with three other countries. *Journal of Behavioral Decision Making*, 4(3), 179–193. <https://doi.org/10.1002/bdm.3960040305>
- Graham, J., Nosek, B. a, Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of Personality and Social Psychology*, 101(2), 366–385. <https://doi.org/10.1097/00005053-199107000-00016>
- Granié, M.-A., Thévenet, C., Varet, F., Evennou, M., Oulid-Azouz, N., Lyon, C., ... Van den Berghe, W. (2020). Effect of Culture on Gender Differences in Risky Driver Behavior through Comparative Analysis of 32 Countries. *Transportation Research Record*, 2675(3), 274–287. <https://doi.org/10.1177/0361198120970525>
- Greenberg, J. (1993). The social side of fairness: Interpersonal and informational classes of organizational justice. In R. Cropanzano (Ed.), *Justice in the workplace: Approaching fairness in human resources management* (pp. 79–103). Hillsdale, NJ: Erlbaum.
- Grill, K., & Fahlquist, J. N. (2012). Responsibility, paternalism and alcohol interlocks. *Public Health Ethics*, 5(2), 116–127. <https://doi.org/10.1093/phe/phs015>
- Guest, G., Bunce, A., & Johnson, L. (2006). How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field Methods*, 18(1), 59–82. <https://doi.org/10.1177/1525822X05279903>
- Guindo, L. A., Wagner, M., Baltussen, R., Rindress, D., van Til, J., Kind, P., & Goetghebeur, M. M. (2012). From efficacy to equity: Literature review of decision criteria for resource allocation and healthcare decisionmaking. *Cost Effectiveness and Resource Allocation : C/E*, 10(1), 9. <https://doi.org/10.1186/1478-7547-10-9>
- Gupta, V., Hanges, P. J., & Dorfman, P. (2002). Cultural clusters: methodology and findings. *Journal of World Business*, 37, 11–15. [https://doi.org/doi.org/10.1016/S1090-9516\(01\)00070-0](https://doi.org/doi.org/10.1016/S1090-9516(01)00070-0)
- Haarmann, H. (2007). *Foundations of culture: Knowledge-construction, belief systems and worldview in their dynamic interplay*. Bern, Switzerland: Peter Lang.
- Haddak, M., Pochet, P., Licaj, I., Randriantovomanana, E., Vari, J., & Mignot, D. (2012). Inégalités socio-spatiales de risque routier et mobilité à l'adolescence. In L. Carnis & D. Mignot (Eds.), *Pour une économie de la sécurité routière. Emergence d'une approche pour l'élaboration de politiques publiques*. (collection, pp. 99–120). Economica.
- Haerpfer, C., Inglehart, R., Moreno, A., Welzel, C., Kizilova, K., J., D.-M., ... Puranen et al (eds.), B. (2020). *World Values Survey: Round Seven–Country-Pooled Datafile*. (C. Haerpfer, R. Inglehart, A. Moreno, C. Welzel, K. Kizilova, D.-M. J., ... B. Puranen et al., Eds.). Madrid, Spain & Vienna, Austria: JD Systems Institute & WVSA Secretariat. <https://doi.org/10.14281/18241.1>
- Hail, Y., & McQuaid, R. (2021). The concept of fairness in relation to women transport users. *Sustainability (Switzerland)*, 13(5). <https://doi.org/10.3390/su13052919>
- Hansson, S. O. (2003). Ethical Criteria of Risk Acceptance. *Erkenntnis*, 59(3), 291–309. <https://doi.org/10.1023/A:1026005915919>
- Hansson, S. O. (2010). The Harmful Influence of Decision Theory on Ethics. *Ethical Theory and Moral Practice*, 13(5), 585–593. <https://doi.org/10.1007/s10677-010-9232-0>
- Hansson, S. O. (2014). Making Road Traffic Safer: Reply to Ori. *Philosophical Papers*, 43(3), 365–375. <https://doi.org/10.1080/05568641.2014.976439>
- Harring, N., Jagers, S. C., & Matti, S. (2017). Public support for pro-environmental policy measures: Examining the impact of personal values and ideology. *Sustainability (Switzerland)*, 9(5). <https://doi.org/10.3390/su9050679>
- Hayenhjelm, M., & Wolff, J. (2012). The moral problem of risk impositions: A survey of the literature. *European Journal of Philosophy*, 20(SUPPL. 1), 1–54. <https://doi.org/10.1111/j.1468-0378.2011.00482.x>
- Henning, M. A., Malpas, P., Ram, S., Rajput, V., Krstić, V., Boyd, M., & Hawken, S. J. (2016). Students' responses to scenarios depicting ethical dilemmas: a study of

- pharmacy and medical students in New Zealand. *Journal of Medical Ethics*, medethics-2015-103253. <https://doi.org/10.1136/medethics-2015-103253>
- Hensher, D. A., & Li, Z. (2013). Referendum voting in road pricing reform: A review of the evidence. *Transport Policy*, 25, 186–197. <https://doi.org/10.1016/j.tranpol.2012.11.012>
- Herk, H., & Torelli, C. (Eds.). (2017). *Cross Cultural Issues in Consumer Science and Consumer Psychology. Current Perspectives and Future Directors* (1st ed.). Springer International Publishing. <https://doi.org/10.1007/978-3-319-65091-3>
- Hesjevoll, I. S., & Elvik, R. (2016). Effect of traffic volume on road safety. Retrieved November 14, 2018, from https://www.roadsafety-dss.eu/assets/data/pdf/synopses/Effect_of_traffic_volume_on_road_safety_23112016.pdf
- Hevelke, A., & Nida-Rümelin, J. (2015). Responsibility for Crashes of Autonomous Vehicles: An Ethical Analysis. *Science and Engineering Ethics*, 21(3), 619–630. <https://doi.org/10.1007/s11948-014-9565-5>
- Hillman, M., Adams, J., & Whitelegg, J. (1990). *One False Move... A study of children's independent mobility*. London: Policy Studies Institute.
- Hingson, R., Levenson, S. M., Heeren, T., Mangione, T., Rodgers, C., Schiavonne, T., & Hertz, R. P. (1988). Repeal of the Massachusetts seat belt law. *American Journal of Public Health*, 78(5), 548–552. <https://doi.org/10.2105/AJPH.78.5.548>
- Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations* (2nd Ed.). Thousands Oaks: SAGE Publications.
- Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online Readings in Psychology and Culture*, 2(1), 1–26. <https://doi.org/10.9707/2307-0919.1014>
- Hofstede, G. H., Hofstede, G.-J., & Minkov, M. (2010). *Cultures and Organizations : Software of the Mind – Intercultural Cooperation and Its Importance for Survival* (3rd Ed.). New York & London: McGraw-Hill.
- Hofstede, G., & McCrae, R. R. (2004). Personality and Culture Revisited: Linking Traits and Dimensions of Culture. *Cross-Cultural Research*, 38(1), 52–88. <https://doi.org/10.1177/1069397103259443>
- Hokstad, P., & Vatn, J. (2008). Ethical dilemmas in traffic safety work. *Safety Science*, 46(10), 1435–1449. <https://doi.org/10.1016/j.ssci.2007.10.006>
- House et al. (2004). *Culture, Leadership, and Organizations. The GLOBE Study of 62 Societies*. SAGE Publications.
- House, R., Javidan, M., Hanges, P., & Dorfman, P. (2002). Understanding culture and implicit leadership theories across the globe: An introduction to project GLOBE. *Journal of World Business*, 37, 3–10. [https://doi.org/doi.org/10.1016/S1090-9516\(01\)00069-4](https://doi.org/doi.org/10.1016/S1090-9516(01)00069-4)
- Høye, A. (2018a). Bicycle helmets – To wear or not to wear? A meta-analyses of the effects of bicycle helmets on injuries. *Accident Analysis and Prevention*, 117(April), 85–97. <https://doi.org/10.1016/j.aap.2018.03.026>
- Høye, A. (2018b). Recommend or mandate? A systematic review and meta-analysis of the effects of mandatory bicycle helmet legislation. *Accident Analysis and Prevention*, 120(August), 239–249. <https://doi.org/10.1016/j.aap.2018.08.001>
- Huberman, A. M., & Miles, M. B. (1994). Data Management and Analysis Methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research*. Thousands Oaks, CA, USA: SAGE Publications.
- Huettinger, M. (2008). Cultural dimensions in business life: Hofstede's indices for Latvia and Lithuania. *Baltic Journal of Management*, 3(3). <https://doi.org/10.1108/17465260810902414>
- Hundley, J. C., Kilgo, P. D., Miller, P. R., Chang, M. C., Hensberry, R. a, Meredith, J. W., & Hoth, J. J. (2004). Non-helmeted motorcyclists: a burden to society? A study using the National Trauma Data Bank. *The Journal of Trauma*, 57(5), 944–949. <https://doi.org/10.1097/01.TA.0000149497.20065.F4>

- Hunt, S. D., & Vitell, S. J. (2006). The general theory of marketing ethics: A revision and three questions. *Journal of Macromarketing*, 26(2), 143–153. <https://doi.org/10.1177/0276146706290923>
- Husak, D. N. (2004). Vehicles and Crashes: Why is this Moral Issue Overlooked? *Social Theory & Practice*, 30(3), 351–370.
- IBM Corp. (2020). IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp.
- IBM SPSS Statistics for Windows, V. 25. 0. (2017). SPSS. Armonk, NY: IBM Corp.
- Imazai, K., & Ohbuchi, K. (1998). Utility and fairness concerns in policy evaluation among Japanese people. *Japanese Psychological Research*, 40(4), 186–197. <https://doi.org/10.1111/1468-5884.00093>
- Inglehart, R. (1997). *Modernization and Postmodernization : Cultural, Economic, and Political Change in 43 Societies*. Princeton, NJ, USA: Princeton University Press.
- Inglehart, R., & Welzel, C. (2005). *Modernization, Cultural Change, and Democracy: The Human Development Sequence*. Cambridge University Press.
- Ishaque, M. M., & Noland, R. B. (2008). Behavioural Issues in Pedestrian Speed Choice and Street Crossing Behaviour : A Review. *Transport Reviews*, 28(1), 61–85. <https://doi.org/10.1080/01441640701365239>
- ITF. (2016). *Zero Road Deaths and Serious Injuries. Leading a Paradigm Shift to a Safe System*. Zero Road Deaths and Serious Injuries. Paris, France: OECD Publishing. <https://doi.org/10.1787/9789282108055-en>
- Iversen, H., & Rundmo, T. (2002). Personality, risky driving and accident involvement among Norwegian drivers. *Personality and Individual Differences*, 33(8), 1251–1263. [https://doi.org/10.1016/S0191-8869\(02\)00010-7](https://doi.org/10.1016/S0191-8869(02)00010-7)
- Johnston, C. D., & Ballard, A. O. (2016). Economists and Public Opinion: Expert Consensus and Economic Policy Judgments. *Journal of Politics*, 78(2), 1–41. <https://doi.org/10.1086/684629>
- Jonah, B. A. (1997). Sensation seeking and risky driving: A review and synthesis of the literature. *Accident Analysis and Prevention*, 29(5), 651–665. [https://doi.org/10.1016/S0001-4575\(97\)00017-1](https://doi.org/10.1016/S0001-4575(97)00017-1)
- Jones, M. M., & Bayer, R. (2007). Paternalism and its discontents: Motorcycle helmet laws, libertarian values, and public health. *American Journal of Public Health*, 97(2), 208–217. <https://doi.org/10.2105/AJPH.2005.083204>
- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1986). Fairness as a Constraint on Profit Seeking: Entitlements in the Market. *American Economic Review*, 76(4), 728–741. <https://doi.org/10.2307/1806070>
- Kallbekken, S., & Sælen, H. (2011). Public acceptance for environmental taxes: Self-interest, environmental and distributional concerns. *Energy Policy*, 39(5), 2966–2973. <https://doi.org/10.1016/j.enpol.2011.03.006>
- Kamm, F. M. (2011). Sen on Justice and Rights: A Review Essay. *Philosophy and Public Affairs*, 39(1), 82–104. <https://doi.org/10.1111/j.1088-4963.2011.01199.x>
- Kangas, O. E., Niemelä, M., & Varjonen, S. (2014). When and why do ideas matter? the influence of framing on opinion formation and policy change. *European Political Science Review*, 6(1), 73–92. <https://doi.org/10.1017/S1755773912000306>
- Kapiriri, L., Norheim, O. F., & Martin, D. K. (2009). Fairness and accountability for reasonableness. Do the views of priority setting decision makers differ across health systems and levels of decision making? *Social Science & Medicine* (1982), 68(4), 766–773. <https://doi.org/10.1016/j.socscimed.2008.11.011>
- Kaplow, L., & Shavell, S. (2001). Fairness versus Welfare. *Harvard Law Review*, 114(4), 961–1388. <https://doi.org/10.2307/1342642>
- Kelly, M., Nielson, N., & Snoddon, T. (2014). Aging Population and Driver Licensing: A Policy Perspective. *Canadian Public Policy*, 40(1), 31–44. <https://doi.org/10.3138/cpp.2012-081>
- Kelman, H. C. (1958). Compliance, identification, and internalization three processes of attitude change. *Journal of Conflict Resolution*, 1(2), 51–60.

- <https://doi.org/10.1177/002200275800200106>
- King, M. J., Watson, B., & Fleiter, J. J. (2019). Applying the Traffic Safety Culture Approach in Low- and Middle-Income Countries. In N. J. Ward, B. Watson, & K. Fleming-Vogl (Eds.), *Traffic Safety Culture: Definition, Foundation, and Application* (pp. 251–274). Bingley, UK: Emerald Publishing Limited.
- Knowles, E. S., & Riner, D. D. (2007). Omega Approaches to Persuasion. Overcoming Resistance. In A. R. Pratkanis (Ed.), *The Science of Social Influence* (1st Editio, p. 32). New York: Psychology Press.
- Koch, T., & Peter, C. (2017). Effects of Equivalence Framing on the Perceived Truth of Political Messages and the Trustworthiness of Politicians. *Public Opinion Quarterly*, 81(4), 847–865. <https://doi.org/10.1093/poq/nfx019>
- Koornstra, M. J., Lynam, D. A., Nilsson, G., Noordzij, P., Petterson, H. E., Wegman, F., & Wouters, P. (2002). *SUNflower: A comparative study of the development of road safety in Sweden, the United Kingdom, and the Netherlands*. Leidschendam: SWOV.
- Krosnick, J., & Presser, S. (2010). Question and questionnaire design. In P. Marsden & J. Wright (Eds.), *Handbook of Survey Research* (2nd Ed.). Bingley: Emerald Group Publishing.
- Krügel, S., & Uhl, M. (2022). Autonomous vehicles and moral judgments under risk. *Transportation Research Part A: Policy and Practice*, 155(October 2020), 1–10. <https://doi.org/10.1016/j.tra.2021.10.016>
- Kvale, S. (1996). *Interviews: An Introduction to Qualitative Research Interviewing*. Thousands Oaks, CA, USA: SAGE Publications.
- Kverndokk, S., Frisch, R., & Rose, A. (2008). *Equity and justice in global warming policy* (Nota de Lavoro No. 80.2008). Milano.
- Kyselá, E., Ščasný, M., & Zvěřinová, I. (2019). Attitudes toward climate change mitigation policies: a review of measures and a construct of policy attitudes. *Climate Policy*, 19(7), 878–892. <https://doi.org/10.1080/14693062.2019.1611534>
- Ladhari, R. (2009). A review of twenty years of SERVQUAL research. *International Journal of Quality and Service Sciences*, 1(2), 172–198. <https://doi.org/10.1108/17566690910971445>
- Laflamme, L., Burrows, S., & Hasselberg, M. (2009). *Socioeconomic Differences in Injury Risks. A Review of Findings and a Discussion of Potential Countermeasures*. Copenhagen.
- Laflamme, L., Hasselberg, M., & Burrows, S. (2010). 20 Years of Research on Socioeconomic Inequality and Children's-Unintentional Injuries Understanding the Cause-Specific Evidence at Hand. *International Journal of Pediatrics*, 2010, 1–23. <https://doi.org/10.1155/2010/819687>
- Lajunen, T., & Özkan, T. (2011). Self-report instruments and methods. In B. E. Porter (Ed.), *Handbook of Traffic Psychology* (pp. 43–59). Academic Press. <https://doi.org/10.1016/B978-0-12-381984-0.10004-9>
- Lajunen, T., & Summala, H. (2003). Can we trust self-reports of driving? Effects of impression management on driver behaviour questionnaire responses. *Transportation Research Part F: Traffic Psychology and Behaviour*, 6(2), 97–107. [https://doi.org/10.1016/S1369-8478\(03\)00008-1](https://doi.org/10.1016/S1369-8478(03)00008-1)
- Lefkowitz, J. (2003). *Ethics and values in industrial-organizational psychology*. Mahwah, NY: Lawrence Erlbaum Associates Inc.
- Leichter, H. (1986). Lives, liberty, and seat belts in Britain: lessons for the United States. *International Journal of Health Services: Planning, Administration, Evaluation*, 16(2), 213–226. <https://doi.org/10.2190/PN93-31UE-N1VF-DK57>
- Lenguerrand, E., Martin, J.-L., Chiron, M., Lagarde, E., & Laumon, B. (2008). Road crash involvement and professional status: A prospective study using the French Gazel cohort. *Accident Analysis and Prevention*, 40(1), 126–136. <https://doi.org/10.1016/j.aap.2007.04.009>
- Lerner, B. H. (2012). Drunk driving across the globe: Let's learn from one another. *The Lancet*. [https://doi.org/10.1016/S0140-6736\(12\)60798-3](https://doi.org/10.1016/S0140-6736(12)60798-3)

- Leung, K., Tong, K.-K., & Lind, E. A. (2007). Realpolitik versus fair process: moderating effects of group identification on acceptance of political decisions. *Journal of Personality and Social Psychology*, 92(3), 476–489. <https://doi.org/10.1037/0022-3514.92.3.476>
- Leventhal, G. S. (1976). Fairness in social relationships. In J. W. Thibaut, J. T. Spence, & R. C. Carson (Eds.), *Contemporary topics in social psychology*. Morriston, NJ: General Learning Press.
- Leventhal, G. S. (1980). What should be done with equity theory? In K. J. Gergen, M. S. Greenberg, & R. H. Willis (Eds.), *Social Exchange: Advances in Theory and Research*. New York: Plenum Press.
- Ligue de Défense des Conducteurs. (2020). Le 80 km/h perd du terrain: plus de 31 500 km repassés à 90 en 2020 ! Retrieved from <https://www.liguedesconducteurs.org/vitesse-infos-et-intox/le-80-km-h-fiasco-de-l-annee-pour-le-gouvernement>
- Lin, P. (2016). Why Ethics Matters for Autonomous Cars. In M. Maurer, J. C. Gerdes, B. Lenz, & H. Winner (Eds.), *Autonomous driving. Technical, Legal and Social Aspects* (pp. 69–86). Berlin Heidelberg: Springer-Verlag GmbH. <https://doi.org/10.1007/978-3-662-48847-8>
- Lind, E. A., & Tyler, T. R. (1988). *The social psychology of procedural justice*. New York: Plenum Press.
- Linkov, V., Zaoral, A., Řezáč, P., & Pai, C. W. (2019). Personality and professional drivers' driving behavior. *Transportation Research Part F: Traffic Psychology and Behaviour*, 60, 105–110. <https://doi.org/10.1016/j.trf.2018.10.017>
- Lissak, R. I., & Sheppard, B. H. (1983). Beyond Fairness - the Criterion Problem in Research on Dispute Intervention. *Journal of Applied Social Psychology*, 13(1), 45–65. <https://doi.org/10.1111/j.1559-1816.1983.tb00886.x>
- Liu, B., Ivers, R., Norton, R., Boufous, S., Blows, S., & Lo, S. K. (2009). Helmets for preventing injury in motorcycle riders. *Cochrane Database of Systematic Reviews*, (1), 1–42. <https://doi.org/10.1002/14651858.cd004333>
- Lofland, J., & Lofland, L. (1995). *Analyzing Social Settings: A Guide to Qualitative Observation and Analysis*. 3rd edition. Belmont, CA, USA: Wadsworth.
- Losavio, M., Pastukov, P., & Polyakova, S. (2015). Cyber Black Box/Event Data Recorder: Legal and Ethical Perspectives and Challenges with Digital Forensics. *Journal of Digital Forensics Security and Law*, 10(4), 43–57.
- LTSA. (2000). *Road safety strategy 2010. A consultation document*. Wellington, New Zealand: National Road Safety Committee. Lant Transport Safety Authority.
- Lund, I. O., & Rundmo, T. (2009). Cross-cultural comparisons of traffic safety, risk perception, attitudes and behaviour. *Safety Science*, 47(4), 547–553. <https://doi.org/10.1016/j.ssci.2008.07.008>
- Luttrell, A., Petty, R. E., Briñol, P., & Wagner, B. C. (2015). Making it moral: Merely labeling an attitude as moral increases its strength. *Journal of Experimental Social Psychology*, 65, 82–93. <https://doi.org/10.1016/j.jesp.2016.04.003>
- Lyons, R. A., Jones, S. J., Deacon, T., & Heaven, M. (2003). Socioeconomic variation in injury in children and older people: a population based study. *Injury Prevention*, 9(1), 33–37. <https://doi.org/10.1136/ip.9.1.33>
- Maleki, A., & de Jong, M. (2014). *A Proposal for Clustering the Dimensions of National Culture*. *Cross-Cultural Research* (Vol. 48). <https://doi.org/10.1177/1069397113510268>
- Malhotra, N. K., & McCort, J. D. (2001). A cross-cultural comparison of behavioral intention models. Theoretical consideration and an empirical investigation. *International Marketing Review*, 18(3), 235–269.
- Marginson, S. (2011). Equity, status and freedom: a note on higher education. *Cambridge Journal of Education*, 41(1), 23–36. <https://doi.org/10.1080/0305764X.2010.549456>
- Martensen, H. (2014). *@RISK: Analyse van het risico op ernstige en dodelijke verwondingen in het verkeer in functie van leeftijd en verplaatsingswijze*. Brussels.

- Martensen, H. (2017). Age-based screening of elderly drivers. Retrieved September 21, 2018, from https://www.roadsafety-dss.eu/assets/data/pdf/synopses/Agebased_screening_of_elderly_drivers_20062017.pdf
- Martensen, H., Daniels, S., Van den Berghe, W., Wijnen, W., Weijermars, W., Carnis, L., ... Elvik, R. (2018). *Guidelines for priority setting between measures with practical examples, Deliverable Number 3.5 of the H2020 project SafetyCube*.
- Martensen, H., & Diependaele, K. (2014). Comparison of European Countries with and without age based screening of older drivers. *Proceedings of the International Conference Ageing Society and Safe Mobility, Bergisch Gladbach*, 11.
- Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum Qualitative Sozialforschung*, 11(3). <https://doi.org/10.17169/fqs-11.3.1428>
- Maxmen, A. (2018). A moral map for AI cars Survey reveals global variations in ethical rules of the road for autonomous vehicles. *Nature*, 562(July), 469.
- McCartt, A. T., & Eichelberger, A. H. (2012). Attitudes Toward Red Light Camera Enforcement in Cities With Camera Programs. *Traffic Injury Prevention*, 13(1), 14–23. <https://doi.org/10.1080/15389588.2011.625745>
- McCartt, A. T., Wells, J. K., & Teoh, E. R. (2010). Attitudes toward in-vehicle advanced alcohol detection technology. *Traffic Injury Prevention*, 11(2), 156–164. <https://doi.org/10.1080/15389580903515419>
- McCoy, J. H., & Lee, H. L. (2014). Using Fairness Models to Improve Equity in Health Delivery Fleet Management. *Production and Operations Management*, 23(6), 965–977. <https://doi.org/10.1111/poms.12101>
- McInturff, B., & Harrington, E. (2006). A presentation of key findings from a national survey of 800 drivers. In *MADD International Technology Symposium*. Albuquerque, NM, June 19–20.
- McKenna, F. P. (2007). *The perceived legitimacy of intervention: a key feature for road safety. Improving Traffic Safety Culture in the United States: The Journey Forward*. Washington DC, USA: AAA Foundation for Traffic Safety.
- Meesmann, U., Martensen, H., & Dupont, E. (2015). Impact of alcohol checks and social norm on driving under the influence of alcohol (DUI). *Accident Analysis and Prevention*, 80, 251–261. <https://doi.org/10.1016/j.aap.2015.04.016>
- Meesmann, U., & Schoeters, A. (2016). *Hoe kijken autobestuurders naar verkeersveiligheid? Resultaten van de vijfde nationale attitudemeting over verkeersveiligheid van het BIVV (2015)*. Brussels, Belgium: BIVV - Belgisch Instituut voor de Verkeersveiligheid.
- Meesmann, U., Torfs, K., & Cools, M. (2020). Socio-cognitive factors in road safety monitoring – Cross-national comparison of driving under the influence of alcohol, drugs or medication. *IATSS Research*, 44(3), 180–187. <https://doi.org/10.1016/j.iatssr.2020.09.004>
- Meesmann, U., Torfs, K., Nguyen, H., & Van den Berghe, W. (2018). *Do we care about road safety? Key findings from the ESRA1 project in 38 countries*. Brussels, Belgium: Vias institute – Knowledge Centre Road Safety.
- Meesmann, U., Torfs, K., & Van den Berghe, W. (2017). *The ESRA-Project: Synthesis of the Main Findings from the 1st ESRA survey in 25 Countries*. Brussels: Vias institute.
- Meesmann, U., Torfs, K., & Van den Berghe, W. (2019). *ESRA2 Methodology. ESRA2 report N°1*. Brussels, Belgium: Vias institute.
- Meesmann, U., Torfs, K., Wardenier, N., & Van den Berghe, W. (2021). *ESRA2 methodology. ESRA2 report Nr. 1 (updated version). ESRA project (E-Survey of Road users' Attitudes)* (Vol. 1). Brussels, Belgium: Vias institute.
- Mehdizadeh, M., Shariat-Mohaymany, A., & Nordfjærn, T. (2019). Driver behaviour and crash involvement among professional taxi and truck drivers: Light passenger cars versus heavy goods vehicles. *Transportation Research Part F: Traffic Psychology and Behaviour*, 62, 86–98. <https://doi.org/10.1016/j.trf.2018.12.010>

- Mekonnen, T. H., Tesfaye, Y. A., Moges, H. G., & Gebremedin, R. B. (2019). Factors associated with risky driving behaviors for road traffic crashes among professional car drivers in Bahirdar city, northwest Ethiopia, 2016: A cross-sectional study. *Environmental Health and Preventive Medicine*, 24(1), 1–9. <https://doi.org/10.1186/s12199-019-0772-1>
- Melinder, K. (2007). Socio-cultural characteristics of high versus low risk societies regarding road traffic safety. *Safety Science*, 45(3), 397–414. <https://doi.org/10.1016/j.ssci.2006.07.004>
- Messick, D. M., Bloom, S., Boldizar, J. P., & Samuelson, C. D. (1985). Why we are fairer than others. *Journal of Experimental Social Psychology*, 21(5), 480–500. [https://doi.org/10.1016/0022-1031\(85\)90031-9](https://doi.org/10.1016/0022-1031(85)90031-9)
- Mikula, G., Petri, B., & Tanzer, N. (1990). What people regard as unjust: Types and structures of everyday experiences of injustice. *European Journal of Social Psychology*, 20(February 1989), 133–149. <https://doi.org/10.1002/ejsp.2420200205>
- Mill, J. S. (1985). *On liberty*. New York: Penguin books.
- Miller, L. (2012). The Moral Philosophy of Automobiles. *Journal of Agricultural and Environmental Ethics*, 25(5), 637–655. <https://doi.org/10.1007/s10806-011-9320-8>
- Ministerial Conference on Road Safety. (2020). Stockholm Declaration. In *Third Global Ministerial Conference on Road Safety: Achieving Global Goals 2030*. Stockholm, Sweden.
- Ministry of Transport. (2019). *Public attitudes to road safety. Results of the 2016 survey*. Wellington: New Zealand Government.
- Minkov, M. (2011). *Cultural Differences in a Globalizing World*. Bingley, UK: Emerald Group Publishing Limited.
- Minkov, M. (2016). Predictors of Societal Accident Proneness Across 92 Countries. *Cross-Cultural Research*, 50(2), 103–122. <https://doi.org/10.1177/1069397115626139>
- Minkov, M. (2018). A revision of Hofstede's model of national culture: old evidence and new data from 56 countries. *Cross Cultural & Strategic Management*, 25(2), 231–256. <https://doi.org/10.1108/CCSM-03-2017-0033>
- Minkov, M., Bond, M. H., Dutt, P., Schachner, M., Morales, O., Sanchez, C., ... Mudd, B. (2018). A Reconsideration of Hofstede's Fifth Dimension: New flexibility Versus Monumentalism Data From 54 Countries. *Cross-Cultural Research*, 52(3), 309–333. <https://doi.org/10.1177/1069397117727488>
- Minkov, M., Dutt, P., Schachner, M., Jandosova, J., Khassenbekov, Y., Morales, O., & Blagoev, V. (2019). What would people do with their money if they were rich? A search for Hofstede dimensions across 52 countries. *Cross Cultural and Strategic Management*, 26(1), 93–116. <https://doi.org/10.1108/CCSM-11-2018-0193>
- Minkov, M., Dutt, P., Schachner, M., Morales, O., Sanchez, C., Jandosova, J., ... Mudd, B. (2017). A revision of Hofstede's individualism-collectivism dimension: A new national index from a 56-country study. *Cross Cultural & Strategic Management*, 24(3), 386–404. <https://doi.org/10.1108/CCSM-11-2016-0197>
- Minkov, M., & Hofstede, G. (2012a). Hofstede's fifth dimension: New evidence from the world values survey. *Journal of Cross-Cultural Psychology*, 43(1), 3–14. <https://doi.org/10.1177/0022022110388567>
- Minkov, M., & Hofstede, G. (2012b). Is National Culture a Meaningful Concept? Cultural Values Delineate Homogeneous National Clusters of In-Country Regions. *Cross-Cultural Research*, 46(2), 133–159. <https://doi.org/10.1177/1069397111427262>
- Minkov, M., & Kaasa, A. (2021). A test of the revised Minkov-Hofstede model of culture: Mirror images of subjective and objective culture across nations and the 50 US States. *Cross-Cultural Research*, (May), 1–52. <https://doi.org/10.1177/10693971211014468>
- Minkov, M., Schachner, M., Sanchez, C., & Morales, O. (2018). A New Worldwide Measure of Happiness Explains National Differences in Suicide Rates and

- Cigarette Consumption. *Cross-Cultural Research*, 106939711879968.
<https://doi.org/10.1177/1069397118799688>
- Mo, J., & Walrand, J. (2000). Fair end-to-end window-based congestion control. *IEEE/ACM Transactions on Networking*, 8(5), 556–567.
<https://doi.org/10.1109/90.879343>
- Molin, E. J. E., & Brookhuis, K. A. (2007). Modelling acceptability of the intelligent speed adapter. *Transportation Research Part F: Traffic Psychology and Behaviour*, 10(2), 99–108. <https://doi.org/10.1016/j.trf.2006.06.008>
- Moore, L., Cisse, B., Batomen Kuimi, B. L., Stelfox, H. T., Turgeon, A. F., Lauzier, F., ... Bourgeois, G. (2015). Impact of socio-economic status on hospital length of stay following injury: a multicenter cohort study. *BMC Health Services Research*, 15(1), 285. <https://doi.org/10.1186/s12913-015-0949-2>
- Moorman, R. H. (1991). Relationship Between Organizational Justice and Organizational Citizenship Behaviors : Do Fairness Perceptions Influence Employee Citizenship? *Journal of Applied Psychology*, 76(6), 845–855.
- Morain, S., & Largent, E. (2019). Ethical acceptability of reducing the legal blood alcohol concentration limit to 0.05. *American Journal of Public Health*, 109(5), 709–713. <https://doi.org/10.2105/AJPH.2018.304908>
- Mullen, C., Tight, M., Whiteing, A., & Jopson, A. (2014). Knowing their place on the roads: What would equality mean for walking and cycling? *Transportation Research Part A: Policy and Practice*, 61, 238–248.
<https://doi.org/10.1016/j.tra.2014.01.009>
- Mullen, P. M. (2014). Are numbers still killing people: And what is being done about it? *Operations Research for Health Care*, 3(2), 91–98.
<https://doi.org/10.1016/j.orhc.2013.10.003>
- Munnich, L. W. J., & Loveland, J. D. (2011). Do Americans oppose controversial evidence-based road safety policies? *Transportation Research Record*, (2213), 9–12. <https://doi.org/10.3141/2213-02>
- Nævestad, T. O., & Bjørnskau, T. (2012). How Can the Safety Culture Perspective be Applied to Road Traffic? *Transport Reviews*, 32(2), 139–154.
<https://doi.org/10.1080/01441647.2011.628131>
- Nagler, M. G. (2013). Does social capital promote safety on the roads? *Economic Inquiry*, 51(2), 1218–1231. <https://doi.org/10.1111/j.1465-7295.2011.00411.x>
- Napier, J. L., & Tyler, T. R. (2008). Does moral conviction really override concerns about procedural justice? A reexamination of the value protection model. *Social Justice Research*, 21(4), 509–528. <https://doi.org/10.1007/s11211-008-0083-y>
- NHTSA. (2015). *Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey. Traffic Safety Facts*. Washington DC: US Department of Transportation - National Highway Traffic Safety Administration - National Center for Statistics and Analysis.
- Nieuwkamp, R., Martensen, H., & Meesmann, U. (2017). Alcohol interlock. Retrieved August 29, 2019, from https://www.roadsafety-dss.eu/assets/data/pdf/synopses/Alcohol_interlock_08062017.pdf
- Nilsson, A., & Erlandsson, A. (2015). The Moral Foundations taxonomy: Structural validity and relation to political ideology in Sweden. *Personality and Individual Differences*, 76, 28–32. <https://doi.org/10.1016/j.paid.2014.11.049>
- Nordfjærn, T., Jørgensen, S. H., & Rundmo, T. (2012). Safety attitudes, behaviour, anxiety and perceived control among professional and non-professional drivers. *Journal of Risk Research*, 15(8), 875–896.
<https://doi.org/10.1080/13669877.2012.670132>
- Nordfjærn, T., Jørgensen, S., & Rundmo, T. (2011). A cross-cultural comparison of road traffic risk perceptions, attitudes towards traffic safety and driver behaviour. *Journal of Risk Research*, 14(6), 657–684.
<https://doi.org/10.1080/13669877.2010.547259>
- Nordfjærn, T., Simsekoglu, Ö., & Rundmo, T. (2014). Culture related to road traffic safety: A comparison of eight countries using two conceptualizations of culture.

- Accident Analysis and Prevention*, 62, 319–328.
<https://doi.org/10.1016/j.aap.2013.10.018>
- Nussbaum, M. C. (2013). *Creating capabilities: The human development approach*. Cambridge, MA: Belknap Press.
- Nyaupane, G. yanP, Graefe, A. R., & Burns, R. C. (2007). Understanding equity in the recreation user fee context. *Leisure Sciences*, 29(5), 425–442.
<https://doi.org/10.1080/01490400701394899>
- Okely, J. (1994). Thinking through Fieldwork. In A. Bryman & R. D. Burgess (Eds.), *Analyzing Qualitative Data*. London, UK: Routledge.
- Onywera, V. O., & Blanchard, C. (2013). Road accidents: a third burden of “disease” in sub-Saharan Africa. *Global Health Promotion*, 20(4), 52–55.
<https://doi.org/10.1177/1757975913502688>
- Ori, M. (2014). The Morality of Motorcycling. *Philosophical Papers*, 43(3), 345–363.
<https://doi.org/10.1080/05568641.2014.976438>
- Ori, M. (2020). Why Not Road Ethics? *Theoria (Sweden)*, 86(3).
<https://doi.org/10.1111/theo.12248>
- Osberg, L., & Smeeding, T. (2006). “Fair” Inequality? Attitudes toward Pay Differentials: The United States in Comparative Perspective. *American Sociological Review*, 71, 450–473.
- Otto, J., Ward, N. J., & Finley, K. (2019). Guidance for the Measurement and Analysis of Traffic Safety Culture. In N. J. Ward, B. Watson, & K. Fleming-Vogl (Eds.), *Traffic Safety Culture: Definition, Foundation, and Application* (pp. 65–91). Bingley, UK: Emerald Publishing Limited.
- Özkan, T., & Lajunen, T. (2007). The role of personality, culture, and economy in unintentional fatalities: An aggregated level analysis. *Personality and Individual Differences*, 43(3), 519–530. <https://doi.org/10.1016/j.paid.2006.12.020>
- Palys, T. (2008). Purposive Sampling. In L. M. Given (Ed.), *The Sage Encyclopedia of Qualitative Research Methods*. Thousands Oaks, CA, USA: SAGE Publications.
- Peden, M., Scurfield, R., Sleet, D., Mohan, D., Hyder, A. A., Jarawan, E., & Mathers, C. (2004). World report on road traffic injury prevention (p. 244). Geneva, Switzerland: World Health Organization.
<https://doi.org/doi.org/10.1080/17457300.2013.792282>
- Penyalver, D., Turró, M., & Zavala-Rojas, D. (2018). Intergenerational perception of the utility of major transport projects. *Research in Transportation Economics*, 70(November 2017), 97–111. <https://doi.org/10.1016/j.retrec.2017.11.001>
- Pereira, R. H. M., Schwanen, T., & Banister, D. (2016). Distributive justice and equity in transportation. *Transport Reviews*, 0(0), 1–22.
<https://doi.org/10.1080/01441647.2016.1257660>
- Peterson, R. S. (1994). The Role of Values in Predicting Fairness Judgments and Support of Affirmative Action. *Journal of Social Issues*, 50(4), 95–115.
<https://doi.org/10.1111/j.1540-4560.1994.tb01199.x>
- Pires, C., Torfs, K., Areal, A., Goldenbeld, C., Vanlaar, W., Granié, M.-A., ... Meesmann, U. (2020). Car drivers’ road safety performance: A benchmark across 32 countries. *IATSS Research*. <https://doi.org/10.1016/j.iatssr.2020.08.002>
- Pressley, J. C., Barlow, B., Kendig, T., & Paneth-Pollak, R. (2007). Twenty-Year Trends in Fatal Injuries to Very Young Children: The Persistence of Racial Disparities. *Pediatrics*, 119(4), e875–e884. <https://doi.org/10.1542/peds.2006-2412>
- R Core Team. (2020). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing.
- Rabin, M. (1993). Incorporating Fairness into Game Theory and Economics. *The American Economic Review*, 83(5), 1281–1302.
- Rachels, J., & Rachels, S. (2003). *The Elements of Moral Philosophy*. McGraw Hill Companies, Inc. Mc Graw Hill. <https://doi.org/10.5840/teachphil198710358>
- Radun, I., Radun, J., Kaistinen, J., Olivier, J., Kecklund, G., & Theorell, T. (2019). Endangering yourself to save another: A real life ethical dilemma. *Transportation*

- Research Part F: Traffic Psychology and Behaviour*, 64, 318–322.
<https://doi.org/10.1016/j.trf.2019.05.015>
- Rakauskas, M. E., Ward, N. J., & Gerberich, S. G. (2009). Identification of differences between rural and urban safety cultures. *Accident Analysis and Prevention*, 41(5), 931–937. <https://doi.org/10.1016/j.aap.2009.05.008>
- Rasinski, K. A. (1987). What's Fair Is Fair-Or Is It? Value Differences Underlying Public Views About Social Justice. *Journal of Personality and Social Psychology*, 53(1), 201–211.
- Rathgeber, W., Schrogl, K.-U., & Williamson, R. A. (2010). *The Fair and Responsible Use of Space*. (W. Rathgeber, K.-U. Schrogl, & R. A. Williamson, Eds.) (Vol. 4). Vienna: Springer Vienna. <https://doi.org/10.1007/978-3-211-99653-9>
- Rawls, J. (1958). Justice as Fairness. *The Philosophical Review*, 67(2), 164–194. <https://doi.org/10.2307/2182612>
- Rawls, J. (1999). *A theory of justice (Revised edition)*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Reader, T. W., Noort, M. C., Shorrock, S., & Kirwan, B. (2015). Safety sans frontières: An international safety culture model. *Risk Analysis*, 35(5), 770–789. <https://doi.org/10.1111/risa.12327>
- Reimers, A., & Laflamme, L. (2005). Neighbourhood social and socio-economic composition and injury risks. *Acta Paediatrica*, 94(10), 1488–1494. <https://doi.org/10.1080/08035250510038929>
- Rienstra, S. A., Rietveld, P., & Verhoef, E. T. (1999). The social support for policy measures in passenger transport. A statistical analysis for the Netherlands. *Transportation Research Part D: Transport and Environment*, 4(3), 181–200. [https://doi.org/10.1016/S1361-9209\(99\)00005-X](https://doi.org/10.1016/S1361-9209(99)00005-X)
- Robertson, R., & Vanlaar, W. (2008). Elderly drivers: Future challenges? *Accident Analysis & Prevention*, 40(6), 1982–1986. <https://doi.org/10.1016/j.aap.2008.08.012>
- Ronen, S., & Shenkar, O. (2013). Mapping world cultures: Cluster formation, sources and implications. *Journal of International Business Studies*, 44(9), 867–897. <https://doi.org/10.1057/jibs.2013.42>
- Rübbelke, D. T. G. (2011). International support of climate change policies in developing countries: Strategic, moral and fairness aspects. *Ecological Economics*, 70(8), 1470–1480. <https://doi.org/10.1016/j.ecolecon.2011.03.007>
- Runyan, C. W., & Earp, J. a. (1985). Epidemiologic evidence and motor vehicle policy making. *American Journal of Public Health*, 75(4), 354–357.
- Sagberg, F., Selpi, Bianchi Piccinini, G. F., & Engström, J. (2015). A review of research on driving styles and road safety. *Human Factors*, 57(7), 1248–1275. <https://doi.org/10.1177/0018720815591313>
- Sammer, G. (1994). General 30 kph speed limit in the city: the results of a model project in the city of Graz. In *Proceedings of the Third International Conference on Safety and the Environment in the 21st Century: Lessons from the Past, Shaping the Future, November 7-10, 1994, Tel Aviv, Israel*. Tel Aviv.
- Santoni de Sio, F. (2021). The European Commission report on ethics of connected and automated vehicles and the future of ethics of transportation. *Ethics and Information Technology*. <https://doi.org/10.1007/s10676-021-09609-8>
- Savas, E. S. (1978). On Equity in Providing Public Services. *Management Science*, 24(8), 800–808. <https://doi.org/10.1287/mnsc.24.8.800>
- Saxe, R. (2016). Moral status of accidents. *Proceedings of the National Academy of Sciences*, 113(17), 201604154. <https://doi.org/10.1073/pnas.1604154113>
- Schinckus, L., Meesmann, U., Delannoy, S., Wardenier, N., & Torfs, K. (2021). *Hoe kijken weggebruikers naar verkeersveiligheid? Resultaten van de zesde nationale attitudemeting (2018)*. Brussels, Belgium: Vias institute – Knowledge Centre Road Safety.
- Schoeters, A., Daniels, S., & Wahl, J. (2019). *Belgium in a European perspective. Systematic comparison of road safety indicators*. Brussels, Belgium: Vias institute

- Knowledge Centre Road Safety.
- Schröder, T., & Mieg, H. A. (2008). The impact of perceived justice on contingent value judgments. *Journal of Applied Social Psychology*, 38(1), 135–158. <https://doi.org/10.1111/j.1559-1816.2008.00299.x>
- Schueler, B. E., & West, M. R. (2016). Sticker Shock. *Public Opinion Quarterly*, 80(1), 90–113. <https://doi.org/10.1093/poq/nfv047>
- Schuitema, G., Steg, L., & Forward, S. (2010). Explaining differences in acceptability before and acceptance after the implementation of a congestion charge in Stockholm. *Transportation Research Part A: Policy and Practice*, 44(2), 99–109. <https://doi.org/10.1016/j.tra.2009.11.005>
- Schwartz, S. H. (1999). A theory of cultural values and some implications for work. *Applied Psychology*, 48(1), 23–47. <https://doi.org/10.1080/026999499377655>
- Schwartz, S. H. (2006). A theory of cultural value orientations: Explication and applications. *Comparative Sociology*, 5(2–3), 137–180.
- Seiders, K., & Berry, L. L. (1998). Service Fairness: What It Is and Why It Matters. *The Academy of Management Executive (1993-2005)*, 12(2), 8–20. <https://doi.org/10.2307/4165454>
- Sen, A. (1987). *On Ethics and Economics*. Malden, MA: Blackwell Publishing.
- Shen, H., Bednarz, T., Nguyen, H., Feng, F., Wyeld, T., Hoek, P. J., & Lo, E. H. S. (2019). Information visualisation methods and techniques: State-of-the-art and future directions. *Journal of Industrial Information Integration*, 16(August), 100102. <https://doi.org/10.1016/j.jii.2019.07.003>
- Sheppard, B. H., & Lewicki, R. J. (1987). Toward general principles of managerial fairness. *Social Justice Research*, 1(2), 161–176. <https://doi.org/10.1007/BF01048014>
- Shults, R. A., & Bergen, G. (2012). Attitudes towards requiring ignition interlocks for all driving while intoxicated offenders: Findings from the 2010 HealthStyles survey. *Injury Prevention*, 19(1), 68–71. <https://doi.org/10.1136/injuryprev-2012-040367>
- Siegrist, M., Connor, M., & Keller, C. (2012). Trust, Confidence, Procedural Fairness, Outcome Fairness, Moral Conviction, and the Acceptance of GM Field Experiments. *Risk Analysis*, 32(8), 1394–1403. <https://doi.org/10.1111/j.1539-6924.2011.01739.x>
- Singer, P. (2011). *Practical ethics* (3rd ed.). Cambridge : Cambridge University Press.
- Siren, A., & Haustein, S. (2015). Driving licences and medical screening in old age: Review of literature and European licensing policies. *Journal of Transport & Health*, 2(1), 68–78. <https://doi.org/10.1016/j.jth.2014.09.003>
- Siren, A., & Meng, A. (2012). Cognitive screening of older drivers does not produce safety benefits. *Accident Analysis and Prevention*, 45, 634–638. <https://doi.org/10.1016/j.aap.2011.09.032>
- Skitka, L. J. (2002). Do the Means Always Justify the Ends, or Do the Ends Sometimes Justify the Means? A Value Protection Model of Justice Reasoning. *Personality and Social Psychology Bulletin*, 28(5), 588–597. <https://doi.org/10.1177/0146167202288003>
- Skitka, L. J., & Mullen, E. (2002). Understanding Judgments of Fairness in a Real-World Political Context: A Test of the Value Protection Model of Justice Reasoning. *Personality and Social Psychology Bulletin*, 28(10), 1419–1429. <https://doi.org/10.1177/014616702236873>
- Smids, J. (2018). The moral case for intelligent speed adaptation. *Journal of Applied Philosophy*, 35(2), 205–221. <https://doi.org/10.1111/japp.12168>
- Smith, K. C., Debinski, B., Pollack, K., Vernick, J., Bowman, S., Samuels, A., & Gielen, A. (2014). Research-informed evidence and support for road safety legislation: findings from a national survey. *Accident Analysis and Prevention*, 73, 109–115. <https://doi.org/10.1016/j.aap.2014.08.016>
- Smith, P. B., Dugan, S., & Trompenaars, F. (1996). National culture and the values of organizational employees: A dimensional analysis across 43 nations. *Journal of Cross-Cultural Psychology*, (March).

- <https://doi.org/https://doi.org/10.1177/0022022196272006>
- Solmazer, G., Uzumcuoglu, Y., & Özkan, T. (2016). The role of traffic law enforcements in the relationship between cultural variables and traffic fatality rates across some countries of the world. *Transportation Research Part F: Traffic Psychology and Behaviour*, 38, 137–150. <https://doi.org/10.1016/j.trf.2016.01.001>
- Steindl, C., Jonas, E., Sittenthaler, S., Traut-Mattausch, E., & Greenberg, J. (2015). Understanding psychological reactance: New developments and findings. *Zeitschrift Fur Psychologie / Journal of Psychology*, 223(4), 205–214. <https://doi.org/10.1027/2151-2604/a000222>
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407–424. <https://doi.org/10.1111/0022-4537.00175>
- Strauss, A. L., & Corbin, J. M. (1998). *Basics of Qualitative Research: Techniques and procedures for Developing Grounded Theory*. Thousands Oaks, CA, USA: SAGE Publications.
- Stuart, S. N. (2002). *Handbook of Public Policy Evaluation*. (S. N. Stuart, Ed.). SAGE Publications. <https://doi.org/http://dx.doi.org/10.4135/9781412973533>
- Sturms, L. M., van der Sluis, C. K., Groothoff, J. W., Eisma, W. H., & den Duis, H. J. (2002). The health-related quality of life of pediatric traffic victims. *The Journal of Trauma*, 52(1), 88–94. <https://doi.org/10.1097/00005373-200201000-00016>
- Sudman, S., & Bradburn, N. M. (1982). *Asking Questions: A Practical Guide to Questionnaire Design*. San Francisco, CA, USA: Jossey Bass.
- Tabary, M., Ahmadi, S., Amirzade-Iranaq, M. H., Shojaei, M., Sohrabi Asl, M., Ghodsi, Z., ... Rahimi-Movaghar, V. (2021). The effectiveness of different types of motorcycle helmets – A scoping review. *Accident Analysis & Prevention*, 154, 106065. <https://doi.org/10.1016/J.AAP.2021.106065>
- Tapp, A., Nancarrow, C., & Davis, A. (2015). Support and compliance with 20mph speed limits in Great Britain. *Transportation Research Part F: Traffic Psychology and Behaviour*, 31, 36–53. <https://doi.org/10.1016/j.trf.2015.03.002>
- Tarabar, D. (2019). Does national culture change as countries develop? Evidence from generational cleavages. *Journal of Institutional Economics*, 15(3), 397–412. <https://doi.org/10.1017/S1744137418000280>
- Tavits, M. (2007). Principle vs. pragmatism: Policy shifts and political competition. *American Journal of Political Science*, 51(1), 151–165. <https://doi.org/10.1111/j.1540-5907.2007.00243.x>
- Tear, M. J., Reader, T. W., Shorrock, S., & Kirwan, B. (2020). Safety culture and power: Interactions between perceptions of safety culture, organisational hierarchy, and national culture. *Safety Science*, 121(March 2018), 550–561. <https://doi.org/10.1016/j.ssci.2018.10.014>
- Thibaut, John W., & Walker, L. (1975). *Procedural justice: A psychological analysis*. Hillsdale, NJ: Lawrence Erlbaum Associates Inc.
- Thomson, J. A., & Tolmie, A. K. (2001). Road accident involvement of children from ethnic minorities. *Road Safety Research Report*, (19), 37.
- Tingvall, C., & Haworth, N. (1999). Vision Zero - An ethical approach to safety and mobility. In *6th ITE International Conference Road Safety & Traffic Enforcement: Beyond 2000, Melbourne, 6-7 September 1999* (pp. 1–14).
- Tobler, C., Visschers, V. H. M., & Siegrist, M. (2012). Addressing climate change: Determinants of consumers' willingness to act and to support policy measures. *Journal of Environmental Psychology*, 32(3), 197–207. <https://doi.org/10.1016/j.jenvp.2012.02.001>
- Tourangeau, R., & Smith, T. W. (1996). Asking Sensitive Questions: The Impact of Data Collection Mode, Question Format, and Question Context. *Public Opinion Quarterly*, 60(2), 275–304.
- Toy, S., Tapp, A., Musselwhite, C., & Davis, A. (2014). Can social marketing make 20mph the new norm? *Journal of Transport and Health*, 1(3), 165–173. <https://doi.org/10.1016/j.jth.2014.05.003>

- Transport for London. (2004). *Congestion Charging Central London. Impacts Monitoring - Second Annual Report*. London, UK: Mayor of London.
- Trompenaars, F., & Hampden-Turner, C. (1997). *Riding the Waves of Culture: Understanding Cultural Diversity in Business*. (2nd revise). London, UK: Nicholas Brealey Publishing.
- Tyler, T. R. (1994). Governing amid Diversity: The Effect of Fair Decisionmaking Procedures on the Legitimacy of Government. *Law & Society Review*, 28(4), 809–831.
- Tyler, T. R. (2000). Social Justice: Outcome and Procedure. *International Journal of Psychology*, 35(2), 117–125. <https://doi.org/10.1080/002075900399411>
- Tyler, T. R. (2006). *Why people obey the law*. Princeton NJ: Princeton University Press. <https://doi.org/https://doi.org/10.1515/9781400828609>
- Tyler, T. R., Boeckmann, R. J., Smith, H. J., & Huo, Y. J. (1997). *Social justice in a diverse society*. Boulder, CO: Westview Press.
- United Nations Statistics Division. (2019). Population by age, sex and urban/rural residence. Retrieved January 25, 2021, from <http://data.un.org/Data.aspx?d=POP&f=tableCode:22>
- Van den Berghe, W. (2017). *The association between road safety and socioeconomic situation (SES). An international literature review. Vias Research Report*. Brussels, Belgium: Vias institute.
- Van den Berghe, W. (2018). Ethical issues in road safety policy-making. In *Proceedings of 7th Transport Research Arena TRA 2018, April 16-19, 2018, Vienna, Austria* (p. 10). Vienna.
- Van den Berghe, W. (2020). Factors determining public support for policy measures in road safety. An international survey and its findings for China. *Road & Rail Transport Safety: Examples from the International Experience and Implications for China. Technical Communication*, 1(1), 68–89.
- Van den Berghe, W. (Ed.). (2021). *All for zero. Een gedeelde visie over verkeersveiligheid in België*. Brussels, Belgium: Vias institute.
- Van den Berghe, W., & Christie, N. (2022). International and intercultural differences in arguments used against road safety policy measures. *IATSS Research*, 46(April), 46–62. <https://doi.org/10.1016/j.iatssr.2021.10.007>
- Van den Berghe, W., Fleiter, J. J., & Cliff, D. (2020). *Towards the 12 voluntary global targets for road safety. Guidance for countries on activities and measures to achieve the voluntary global road safety performance targets*. Brussels: Vias institute and Genève: Global Road Safety Partnership.
- Van den Berghe, W., & Schachner, M. (2019). *How national culture impacts on the level of public support for policy measures in road safety*. Helsinki (Finland) and Brussels (Belgium): Hofstede Insights and Vias institute.
- Van den Berghe, W., Schachner, M., Sgarra, V., & Christie, N. (2020). The association between national culture, road safety performance and support for policy measures. *IATSS Research*, 44(3), 197–211. <https://doi.org/10.1016/j.iatssr.2020.09.002>
- Van den Berghe, W., Sgarra, V., Usami, D. S., González-Hernández, B., & Meesmann, U. (2020). *Public support for policy measures. ESRA2 thematic report. ESRA project (E-Survey of Road users' Attitudes)*. Brussels, Belgium: Vias institute & Rome, Italy: Research Centre for Transport and Logistics.
- van Wee, B. (2011). *Transport and ethics: Ethics and the evaluation of transport policies and projects*. Edward Elgar Publishing. <https://doi.org/10.4337/9781849809658.00001>
- van Wee, B. (2012). How suitable is CBA for the ex-ante evaluation of transport projects and policies? A discussion from the perspective of ethics. *Transport Policy*, 19(1), 1–7. <https://doi.org/10.1016/j.tranpol.2011.07.001>
- van Wee, B. (2016). Focus on costs and ethical considerations : assessing the impacts of regulating vehicle emissions and safety. *ITF Discussion Papers*, (Draft Discussion Paper prepared for the Roundtable on Assessing regulatory changes in the

- transport sector (6-7 October 2016, Stockholm)), 14.
- van Wee, B., Hagenzieker, M. P., & Wijnen, W. (2014). Which indicators to include in the ex ante evaluations of the safety effects of policy options ? Gaps in evaluations and a discussion based on an ethical perspective. *Transport Policy*, 31, 19–26. <https://doi.org/10.1016/j.tranpol.2013.11.002>
- van Wee, B., & Rietveld, P. (2013). Using value of statistical life for the ex ante evaluation of transport policy options: A discussion based on ethical theory. *Transportation*, 40(2), 295–314. <https://doi.org/10.1007/s11116-012-9425-6>
- van Wee, B., & Roeser, S. (2013). Ethical Theories and the Cost–Benefit Analysis-Based Ex Ante Evaluation of Transport Policies and Plans. *Transport Reviews*, 33(6), 743–760. <https://doi.org/10.1080/01441647.2013.854281>
- Vanderheiden, S. (2006). Assessing the case against the SUV. *Environmental Politics*, 15(1), 23–40. <https://doi.org/10.1080/09644010500418688>
- Vanem, E. (2012). Ethics and fundamental principles of risk acceptance criteria. *Safety Science*. Elsevier Ltd. <https://doi.org/10.1016/j.ssci.2011.12.030>
- Vereeck, L., & Vrolix, K. (2007). The social willingness to comply with the law: The effect of social attitudes on traffic fatalities. *International Review of Law and Economics*, 27(4), 385–408. <https://doi.org/10.1016/j.irl.2007.07.002>
- Viegas, J. M. (2001). Making urban road pricing acceptable and effective: searching for quality and equity in urban mobility. *Transport Policy*, 8(4), 289–294. [https://doi.org/10.1016/S0967-070X\(01\)00024-5](https://doi.org/10.1016/S0967-070X(01)00024-5)
- Visschers, V. H. M., & Siegrist, M. (2012). Fair play in energy policy decisions: Procedural fairness, outcome fairness and acceptance of the decision to rebuild nuclear power plants. *Energy Policy*, 46, 292–300. <https://doi.org/10.1016/j.enpol.2012.03.062>
- Vitolla, F., Raimo, N., Rubino, M., & Garegnani, G. M. (2021). Do cultural differences impact ethical issues? Exploring the relationship between national culture and quality of code of ethics. *Journal of International Management*, 27(1), 100823. <https://doi.org/10.1016/j.intman.2021.100823>
- Vringer, K., & Carabain, C. L. (2020). Measuring the legitimacy of energy transition policy in the Netherlands. *Energy Policy*, 138(June 2019), 111229. <https://doi.org/10.1016/j.enpol.2019.111229>
- Wagstaff, A., & van Doorslaer, E. (2013). Measuring and Testing for Inequity in the Delivery of Health Care. *The Journal of Human Resources*, 35(4), 716–733.
- Wang, Y., Wang, Y., Xie, L., & Zhou, H. (2018). Impact of perceived uncertainty on public acceptability of congestion charging: An empirical study in China. *Sustainability (Switzerland)*, 11(1), 1–21. <https://doi.org/10.3390/su11010129>
- Ward, N. J., Finley, K., Townsend, A., & Scott, B. G. (2021). The effects of message threat on psychological reactance to traffic safety messaging. *Transportation Research Part F: Traffic Psychology and Behaviour*, 80, 250–259. <https://doi.org/10.1016/j.trf.2021.04.013>
- Ward, N. J., Linkenbach, J., Keller, S. N., & Otto, J. (2010). *White Paper on Traffic Safety Culture*. Western Transportation Institute, College of Engineering Montana State University.
- Ward, N. J., Otto, J., & Finley, K. (2019). Ten principles of traffic safety culture. In *Traffic Safety Culture: Definition, Foundation, and Application*. Bingley, UK: Emerald Publishing Limited.
- Ward, N. J., Watson, B., & Fleming-Vogl, K. (2019). *Traffic Safety Culture: Definition, Foundation, and Application*. Bingley, UK: Emerald Publishing Limited.
- Warner, H. W., Özkan, T., Lajunen, T., & Tzamalouka, G. (2011). Cross-cultural comparison of drivers' tendency to commit different aberrant driving behaviours. *Transportation Research Part F: Traffic Psychology and Behaviour*, 14(5), 390–399. <https://doi.org/10.1016/j.trf.2011.04.006>
- Warren, C. A. B. (2002). Qualitative Interviewing. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of Interview Research: Context and Method*. Thousands Oaks, CA, USA: SAGE Publications.

- Watling, C. N., & Leal, N. (2012). Exploring perceived legitimacy of traffic law enforcement. In T. Senserrick (Ed.), *Proceedings of the 2012 Australasian College of Road Safety National Conference* (pp. 1–13). Sydney: Australasian College of Road Safety.
- Webler, T., & Tuler, S. (2000). Fairness and Competence in Citizen Participation: Theoretical Reflections from a Case Study. *Administration & Society*, 32(5), 566–595. <https://doi.org/10.1177/00953990022019588>
- Wegman, F. (2017). The future of road safety: A worldwide perspective. *IATSS Research*, 40(2), 66–71. <https://doi.org/10.1016/j.iatssr.2016.05.003>
- Wegman, F., & Aarts, L. T. (2005). *Door met Duurzaam Veilig – Nationale Verkeersveiligheidsverkenning voor de Jaren 2005-2020*. Leidschendam: Stichting Wetenschappelijk Onderzoek Verkeersveiligheid.
- Whitehead, M. (1990). *The Concepts and Principles of Equity in Health*. Copenhagen, Denmark: WHO Regional Office Europe.
- Whitehead, M. (1992). The concepts and principles of equity in health. *International Journal of Health Services: Planning, Administration, Evaluation*, 22(3), 429–445. <https://doi.org/10.2190/986L-LHQ6-2VTE-YRRN>
- WHO. (2004). *Guidance on ethics and equitable access to HIV treatment and care*. Geneva: WHO. Geneva, Switzerland: World Health Organization.
- WHO. (2018). *Global Status Report on Road Safety 2018*. Geneva: World Health Organization.
- Wiegmann, D. A., von Thaden, T. L., & Gibbons, A. M. (2007). A review of safety culture theory and its potential application to traffic safety. *Improving Traffic Safety Culture in the United States*, (Reason 2000).
- Wilkinson, R., & Pickett, K. (2011). *The spirit level. Why Greater Equality Makes Societies Stronger*. New York, USA: Bloomsbury Publishing.
- Williams, A. (1997). Intergenerational equity: An exploration of the “fair innings” argument. *Health Economics*, 6(2), 117–132. [https://doi.org/10.1002/\(SICI\)1099-1050\(199703\)6:2<117::AID-HEC256>3.0.CO;2-B](https://doi.org/10.1002/(SICI)1099-1050(199703)6:2<117::AID-HEC256>3.0.CO;2-B)
- Winter, J. C. F. De, & Dodou, D. (2016). National correlates of self-reported traffic violations across 41 countries. *Personality and Individual Differences*, 98, 145–152. <https://doi.org/10.1016/j.paid.2016.03.091>
- Witchalls, P. J. (2012). Is national culture still relevant? *Interculture Journal: Online-Zeitschrift Für Interkulturelle Studien*, 11–19.
- Wolff, J. (2019). *Ethics and Public Policy. A Philosophical Inquiry (2nd Edition)*. Routledge.
- Wood, T., & Porter, E. (2017). The Elusive Backfire Effect: Mass Attitudes’ Steadfast Factual Adherence. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2819073>
- Xia, L., Monroe, K. B., & Cox, J. L. (2012). The Price Is Unfair! A of Price Framework Fairness. *Journal of Marketing*, 68(4), 1–15. <https://doi.org/10.1509/jmkg.68.4.1.42733>
- Xiao, Y. (2020). Analysis of the influencing factors of the unsafe driving behaviors of online car-hailing drivers in China. *PLoS ONE*, 15(4), 1–13. <https://doi.org/10.1371/journal.pone.0231175>
- Ziller, C., & Helbling, M. (2021). Public support for state surveillance. *European Journal of Political Research*, 60(4), 994–1006. <https://doi.org/10.1111/1475-6765.12424>
- Zimmer, M. (2005). Surveillance, Privacy and the Ethics of Vehicle Safety Communication Technologies. *Ethics and Information Technology*, 7(4), 201–210. <https://doi.org/10.1007/s10676-006-0016-0>
- Zou, X., Tam, K.-P., Morris, M. W., Lee, S.-L., Lau, I. Y.-M., & Chiu, C.-Y. (2009). Culture as common sense: perceived consensus versus personal beliefs as mechanisms of cultural influence. *Journal of Personality and Social Psychology*, 97(4), 597–597. <https://doi.org/10.1037/a0016399>

Appendices

Appendix A1. Detailed tables on national indicators

Table 68. Indicators used for the country-level analyses

Area	Variable	Source	Countries
Country	Country code 3	ISO	173
	Country code 2	ISO	173
	Country name	UN	173
Country cluster	Continent	Own	173
	Global region	World Bank	173
	Cultural cluster	GLOBE	173
Demography	Population	World Bank	173
	Median age	UNDESA	172
	Average age	WVS/EVS	76
	Average age category (6 intervals)	WVS/EVS	76
	Population under 35	ESRA	60
Education	Education index	UNESCO	172
	Highest educational level attained	WVS/EVS	76
	Skilled labour force	ILO	152
	Reading performance	PISA	75
	Mathematics performance	PISA	76
	Science performance	PISA	76
	Variation reading (90 versus 10)	PISA	75
	Variation mathematics (90 versus 10)	PISA	76
	Variation science (90 versus 10)	PISA	76
	No higher education	ESRA	60
	Highest level of education	ESS	29
	Highest level of education, ES - ISCED	ESS	29
Road crash fatalities	Fatalities	WHO	173
	% Car passengers fatalities	WHO	107
	% PTW fatalities	WHO	108
	% Cyclist fatalities	WHO	105
	% Pedestrian fatalities	WHO	120
	% Alcohol fatalities	WHO	91
Road crash fatality rate	Fatality rate per capita (100,000 inhabitants)	WHO	173
	Car crash fatality rate	Calculated	107
	PTW crash fatality rate	Calculated	108
	Cyclist crash fatality rate	Calculated	105
	Pedestrian crash fatality rate	Calculated	120
	Alcohol crash fatality rate	Calculated	90
	Fatality rate per 1000 km	Calculated	168
	Fatality rate per 1000 m ³ gasoline consumption	Calculated	169
	Fatality rate per 100 000 vehicles	Calculated	148
	Occupational injuries per capita	ILO	73
	Occupational fatalities	ILO	73

Area	Variable	Source	Countries
Support for measures	Alcohol interlock for recidivists (ALC)	ESRA	61
	Zero alcohol for novice drivers (ZEN)	ESRA	60
	Zero alcohol for all drivers (ZER)	ESRA	61
	Install ISA system (ISA)	ESRA	49
	Install Speed Warning signs (SWS)	ESRA	48
	Seatbelt reminder all seats (SRE)	ESRA	48
	All cyclists wear helmet (HEL)	ESRA	61
	Children cyclists wear helmet (HEC)	ESRA	48
	PTW wear helmet (HEP)	ESRA	48
	Pedestrians wear reflective material (RFL)	ESRA	49
	Cyclists wear reflective material (RFC)	ESRA	48
	PTW wear reflective material (RFP)	ESRA	48
	No use mobile phones in cars (NMP)	ESRA	60
	No use headphones by pedestrians (NHP)	ESRA	48
	No use headphones by cyclists (NHC)	ESRA	48
Level of support for measures	ALC - 1 to ALC - 5	ESRA	48
	ZEN - 1 to ZEN - 5	ESRA	48
	ZER - 1 to ZER - 5	ESRA	48
	ISA - 1 to ISA - 5	ESRA	48
	SWS - 1 to SWS - 5	ESRA	48
	SRE - 1 to SRE - 5	ESRA	48
	HEL - 1 to HEL - 5	ESRA	48
	HEC - 1 to HEC - 5	ESRA	48
	HEP - 1 to HEP - 5	ESRA	48
	RFL - 1 to RFL - 5	ESRA	48
	RFC - 1 to RFC - 5	ESRA	48
	RFP - 1 to RFP - 5	ESRA	48
	NMP - 1 to NMP - 5	ESRA	48
	NHP - 1 to NHP - 5	ESRA	48
	NHC - 1 to NHC - 5	ESRA	48
Roads	Road length	CIA Factbook	168
	Road length/100 000 population	Calculated	168
Exposure	Motor vehicles per capita	World Bank	148
	Gasoline consumption (in Mio liter per year)	US EIA	169
	Gasoline consumption per capita	Calculated	173
	Cycling population	ESRA	61
Regulation	Speed limit rural roads (km/h)	WHO	149
	BAC limit general population (g/dl)	WHO	137
Enforcement	Speed enforcement score	WHO	158
	Alcohol enforcement score	WHO	160
	Seat-belt enforcement score	WHO	154
	Child restraint enforcement score	WHO	146
	Helmet PTW enforcement score	WHO	158
	The traffic rules for DUI should be stricter	ESRA	61
	The traffic rules for speeding should be stricter	ESRA	61
	Likelihood to be checked for DUI	ESRA	60

Area	Variable	Source	Countries
	Likelihood to be checked for Speeding	ESRA	60
	Checked for DUI last 12 months	ESRA	60
Unsafe behaviour	Driving over BAC limit	ESRA	61
	Driving after drinking alcohol	ESRA	60
	Exceeding speed limits in built-up areas	ESRA	61
	Exceeding speed limits outside built-up areas	ESRA	61
	Exceeding speed limits on motorways	ESRA	60
	Read a text message/email	ESRA	60
	Cycle without a helmet	ESRA	60
	% Rear passengers wearing seat-belt	WHO	63
	% riders PTW wearing helmet	WHO	75
	% passengers PTW wearing helmet	WHO	63
Subjective Safety	Subjective safety as pedestrian	ESRA	60
	Subjective safety as cyclist	ESRA	60
	Subjective safety as moped rider	ESRA	60
	Subjective safety as motorcycle rider	ESRA	60
	Subjective safety as car driver	ESRA	60
	Subjective safety as car passenger	ESRA	60
	Subjective safety as bus passenger	ESRA	60
	Feeling of safety of walking alone in local area after dark	ESS	29
Economic development	GNI per capita	WHO	171
	Income level	World Bank	173
	Income level coded	World Bank	173
	Human Development Index (HDI)	HDR-UNDP	172
	Employment status	WVS/EVS	76
Inequality	Gini index	World Bank	150
	Inequality Index	HDR-UNDP	159.00
	Gender Gap	WEF	141
	Gender Inequality Index	HDR-UNDP	155
Income	Scale of incomes (WVS7)	WVS/EVS	46
	Scale of incomes (EVS5)	WVS/EVS	33
	Usual gross pay	ESS	29
	Fairness of gross income	ESS	29
	Fairness of net income	ESS	29
	Fair level of gross income	ESS	29
	Fair level of net income	ESS	29
Hofstede cultural dimensions	Independent	Hofstede	53
	Confucianist	Hofstede	53
	Power Distance	Hofstede	98
	Individualism	Hofstede	98
	Masculinity	Hofstede	98
	Uncertainty Avoidance	Hofstede	98
	Long term orientation	Hofstede	98
	Indulgence	Hofstede	92
Schwartz cultural values	Harmony	Schwartz	72
	Embeddedness	Schwartz	72

Area	Variable	Source	Countries
	Hierarchy	Schwartz	72
	Mastery	Schwartz	72
	Affective Autonomy	Schwartz	72
	Intellectual Autonomy	Schwartz	72
	Egalitarianism	Schwartz	72
GLOBE cultural dimensions	Uncertainty Avoidance Societal Practices	GLOBE	59
	Future Orientation Societal Practices	GLOBE	59
	Power Distance Societal Practices	GLOBE	59
	Institutional Collectivism Societal Practices	GLOBE	59
	Humane Orientation Societal Practices	GLOBE	59
	Performance Orientation Societal Practices	GLOBE	59
	In-Group Collectivism Societal Practices	GLOBE	59
	Gender Egalitarianism Societal Practices	GLOBE	59
	Assertiveness Societal Practices	GLOBE	59
	Uncertainty Avoidance Societal Values	GLOBE	59
	Future Orientation Societal Values	GLOBE	59
	Power Distance Societal Values	GLOBE	59
	Institutional Collectivism Societal Values	GLOBE	59
	Human Orientation Societal Values	GLOBE	59
	Performance Orientation Societal Values	GLOBE	59
	In-group Collectivism Societal Values	GLOBE	59
	Gender Egalitarianism Societal Values	GLOBE	59
	Assertiveness Societal Values	GLOBE	59
Culture (ESS)	Important to live in secure and safe surroundings	ESS	29
	Important to do what is told and follow rules	ESS	29
	Important to make own decisions and be free	ESS	29
	Important to help people and care for others	ESS	29
	Important that government is strong	ESS	29
	Important to seek adventures & have exciting life	ESS	29
	Important to behave properly	ESS	29
	Important to be loyal to friends	ESS	29
	Important to follow traditions and customs	ESS	29
	Important to seek fun and things that give pleasure	ESS	29
Happiness	Happiness	W Happiness R	144
	Freedom	W Happiness R	144
	Generosity	W Happiness R	144
	Feeling of happiness	WVS/EVS	76
	State of health (subjective)	WVS/EVS	76
	Satisfaction with your life	WVS/EVS	76
	How much freedom of choice and control	WVS/EVS	76
	Student life satisfaction	PISA	68
	How satisfied with life as a whole	ESS	29
	How happy are you	ESS	29
Trust in people	Trust in family	WVS/EVS	76
	Trust in neighbourhood	WVS/EVS	76
	Trust in people you know personally	WVS/EVS	76

Area	Variable	Source	Countries
	Trust in people you meet for the first time	WVS/EVS	76
	Trust in people of another religion	WVS/EVS	76
	Trust in people of another nationality	WVS/EVS	76
	Most people can be trusted	ESS	29
	Most people try to take advantage of you	ESS	29
	Most of the time people are helpful	ESS	29
Trust in institutions	Confidence in the press	WVS/EVS	76
	Confidence in the police	WVS/EVS	75
	Confidence in the parliament	WVS/EVS	76
	Confidence in the civil services	WVS/EVS	76
	Confidence in the government	WVS/EVS	75
	Confidence in the political parties	WVS/EVS	76
	Confidence in the justice system and courts	WVS/EVS	75
	Trust in country's parliament	ESS	29
	Trust in the legal system	ESS	29
	Trust in the police	ESS	29
	Trust in politicians	ESS	29
	Trust in political parties	ESS	29
Democracy	Corruption	Transparency International	166
	Democracy Index	The Economist	160
	Electoral democracy index	V-Dem	166
	Liberal democracy index	V-Dem	166
	Participatory democracy index	V-Dem	166
	Deliberative democracy index	V-Dem	166
	Egalitarian democracy index	V-Dem	166
	V-Dem Index	V-Dem	166
	Women have the same rights as men.	WVS/EVS	76
	Importance of democracy	WVS/EVS	76
Political system	Government effectiveness	World Bank	173
	Political system ensures everyone fair chance to participate	ESS	29
	Government takes into account interests of citizens	ESS	29
	Decisions in country politics are transparent	ESS	29
	Political system allows people to have a say in what government does	ESS	29
	Political system allows people to have influence on politics	ESS	29
	Satisfaction with the national government	ESS	29
	How satisfied with the way democracy works in country	ESS	29
	Confident that justice always prevails over injustice	ESS	29
	Democraticness in own country	WVS/EVS	76
	Votes are counted fairly	WVS/EVS	76
	Election officials are fair	WVS/EVS	76
	Satisfaction with the political system	WVS/EVS	75
Political views	Future changes: Greater respect for authority	WVS/EVS	76
	Interest in politics	WVS/EVS	76

Area	Variable	Source	Countries
	Self-positioning on political scale	WVS/EVS	65
	Income equality	WVS/EVS	76
	Private versus state ownership of business	WVS/EVS	76
	Government responsibility	WVS/EVS	76
	Government can keep people under video surveillance	WVS/EVS	75
	Proud of nationality	WVS/EVS	76
	Interested in politics	ESS	29
	Placement on left right scale	ESS	29
	Important that people have equal opportunities	ESS	29
	Fair when wealth is equally distributed	ESS	29
	Fair when hard-working people earn more	ESS	29
	Fair when takes care of poor and in need	ESS	29
	Fair when people with high status enjoy privileges	ESS	29
Various	Religiousness	ESS	29
	Religious person	WVS/EVS	76
	% that never skipped a whole day at school	PISA	74
	Justifiable to avoid a fare on public transport	WVS/EVS	74
	Post-Materialist index 4-item	WVS/EVS	76
	Alcohol consumption	WHO	169

Table 69. Country ISO codes and country clusters

Code	Country name	Continent	Global region	Cultural cluster
AFG	Afghanistan	Asia	South Asia	Central Asia
ALB	Albania	Europe	Europe & Central Asia	Eastern Europe
AGO	Angola	Africa	Sub-Saharan Africa	Sub-Saharan Africa
ARG	Argentina	America	Latin America & Caribbean	Latin America
ARM	Armenia	Europe	Europe & Central Asia	Eastern Europe
AUS	Australia	UCAN	East Asia & Pacific	Anglo
AUT	Austria	Europe	Europe & Central Asia	Germanic Europe
AZE	Azerbaijan	Asia	Europe & Central Asia	Eastern Europe
BGD	Bangladesh	Asia	South Asia	Southern Asia
BRB	Barbados	America	Latin America & Caribbean	Latin America
BLR	Belarus	Europe	Europe & Central Asia	Eastern Europe
BEL	Belgium	Europe	Europe & Central Asia	Germanic Europe
BLZ	Belize	America	Latin America & Caribbean	Latin America
BEN	Benin	Africa	Sub-Saharan Africa	Sub-Saharan Africa
BTN	Bhutan	Asia	South Asia	Confucian Asia
BOL	Bolivia	America	Latin America & Caribbean	Latin America
BIH	Bosnia & Herzeg.	Europe	Europe & Central Asia	Eastern Europe
BWA	Botswana	Africa	Sub-Saharan Africa	Sub-Saharan Africa
BRA	Brazil	America	Latin America & Caribbean	Latin America
BGR	Bulgaria	Europe	Europe & Central Asia	Eastern Europe
BFA	Burkina Faso	Africa	Sub-Saharan Africa	Sub-Saharan Africa
BDI	Burundi	Africa	Sub-Saharan Africa	Sub-Saharan Africa
CPV	Cabo Verde	Africa	Sub-Saharan Africa	Sub-Saharan Africa
KHM	Cambodia	Asia	East Asia & Pacific	Southern Asia
CMR	Cameroon	Africa	Sub-Saharan Africa	Sub-Saharan Africa
CAN	Canada	UCAN	North America	Anglo
CAF	Central African Republic	Africa	Sub-Saharan Africa	Sub-Saharan Africa
TCD	Chad	Africa	Sub-Saharan Africa	Sub-Saharan Africa
CHL	Chile	America	Latin America & Caribbean	Latin America
CHN	China	Asia	East Asia & Pacific	Confucian Asia
COL	Colombia	America	Latin America & Caribbean	Latin America
COM	Comoros	Africa	Sub-Saharan Africa	Sub-Saharan Africa
COG	Congo	Africa	Sub-Saharan Africa	Sub-Saharan Africa
COD	Congo, Democ. Republic	Africa	Sub-Saharan Africa	Sub-Saharan Africa
CRI	Costa Rica	America	Latin America & Caribbean	Latin America
CIV	Côte d'Ivoire	Africa	Sub-Saharan Africa	Sub-Saharan Africa
HRV	Croatia	Europe	Europe & Central Asia	Eastern Europe
CUB	Cuba	America	Latin America & Caribbean	Latin America
CYP	Cyprus	Europe	Europe & Central Asia	Middle East
CZE	Czech Republic	Europe	Europe & Central Asia	Eastern Europe
DNK	Denmark	Europe	Europe & Central Asia	Nordic Europe
DOM	Dominican Republic	America	Latin America & Caribbean	Latin America
ECU	Ecuador	America	Latin America & Caribbean	Latin America
EGY	Egypt	Africa	Middle East & North Africa	Middle East
SLV	El Salvador	America	Latin America & Caribbean	Latin America

Code	Country name	Continent	Global region	Cultural cluster
GNQ	Equatorial Guinea	Africa	Sub-Saharan Africa	Sub-Saharan Africa
ERI	Eritrea	Africa	Sub-Saharan Africa	Sub-Saharan Africa
EST	Estonia	Europe	Europe & Central Asia	Eastern Europe
SWZ	Eswatini	Africa	Sub-Saharan Africa	Sub-Saharan Africa
ETH	Ethiopia	Africa	Sub-Saharan Africa	Sub-Saharan Africa
FJI	Fiji	UCAN	East Asia & Pacific	Other
FIN	Finland	Europe	Europe & Central Asia	Nordic Europe
FRA	France	Europe	Europe & Central Asia	Latin Europe
GAB	Gabon	Africa	Sub-Saharan Africa	Sub-Saharan Africa
GMB	Gambia	Africa	Sub-Saharan Africa	Sub-Saharan Africa
GEO	Georgia	Europe	Europe & Central Asia	Eastern Europe
DEU	Germany	Europe	Europe & Central Asia	Germanic Europe
GHA	Ghana	Africa	Sub-Saharan Africa	Sub-Saharan Africa
GRC	Greece	Europe	Europe & Central Asia	Eastern Europe
GRD	Grenada	America	Latin America & Caribbean	Latin America
GTM	Guatemala	America	Latin America & Caribbean	Latin America
GIN	Guinea	Africa	Sub-Saharan Africa	Sub-Saharan Africa
GNB	Guinea-Bissau	Africa	Sub-Saharan Africa	Sub-Saharan Africa
GUY	Guyana	America	Latin America & Caribbean	Latin America
HND	Honduras	America	Latin America & Caribbean	Latin America
HKG	Hong Kong	Asia	East Asia & Pacific	Confucian Asia
HUN	Hungary	Europe	Europe & Central Asia	Eastern Europe
ISL	Iceland	Europe	Europe & Central Asia	Nordic Europe
IND	India	Asia	South Asia	Southern Asia
IDN	Indonesia	Asia	East Asia & Pacific	Southern Asia
IRN	Iran	Asia	Middle East & North Africa	Central Asia
IRQ	Iraq	Asia	Middle East & North Africa	Middle East
IRL	Ireland	Europe	Europe & Central Asia	Anglo
ISR	Israel	Asia	Middle East & North Africa	Latin Europe
ITA	Italy	Europe	Europe & Central Asia	Latin Europe
JAM	Jamaica	America	Latin America & Caribbean	Latin America
JPN	Japan	Asia	East Asia & Pacific	Confucian Asia
JOR	Jordan	Asia	Middle East & North Africa	Middle East
KAZ	Kazakhstan	Asia	Europe & Central Asia	Central Asia
KEN	Kenya	Africa	Sub-Saharan Africa	Sub-Saharan Africa
KIR	Kiribati	UCAN	East Asia & Pacific	Other
KOR	Korea, Rep.	Asia	East Asia & Pacific	Confucian Asia
KWT	Kuwait	Asia	Middle East & North Africa	Middle East
KGZ	Kyrgyzstan	Asia	Europe & Central Asia	Central Asia
LAO	Lao	Asia	East Asia & Pacific	Confucian Asia
LVA	Latvia	Europe	Europe & Central Asia	Eastern Europe
LBN	Lebanon	Asia	Middle East & North Africa	Middle East
LSO	Lesotho	Africa	Sub-Saharan Africa	Sub-Saharan Africa
LBR	Liberia	Africa	Sub-Saharan Africa	Sub-Saharan Africa
LBY	Libya	Africa	Middle East & North Africa	Middle East
LTU	Lithuania	Europe	Europe & Central Asia	Eastern Europe

Code	Country name	Continent	Global region	Cultural cluster
LUX	Luxembourg	Europe	Europe & Central Asia	Germanic Europe
MDG	Madagascar	Africa	Sub-Saharan Africa	Sub-Saharan Africa
MWI	Malawi	Africa	Sub-Saharan Africa	Sub-Saharan Africa
MYS	Malaysia	Asia	East Asia & Pacific	Southern Asia
MDV	Maldives	Asia	South Asia	Other
MLI	Mali	Africa	Sub-Saharan Africa	Sub-Saharan Africa
MLT	Malta	Europe	Middle East & North Africa	Middle East
MRT	Mauritania	Africa	Sub-Saharan Africa	Sub-Saharan Africa
MUS	Mauritius	Africa	Sub-Saharan Africa	Southern Asia
MEX	Mexico	America	Latin America & Caribbean	Latin America
FSM	Micronesia	UCAN	East Asia & Pacific	Other
MDA	Moldova	Europe	Europe & Central Asia	Eastern Europe
MNG	Mongolia	Asia	East Asia & Pacific	Central Asia
MNE	Montenegro	Europe	Europe & Central Asia	Eastern Europe
MAR	Morocco	Africa	Middle East & North Africa	Middle East
MOZ	Mozambique	Africa	Sub-Saharan Africa	Sub-Saharan Africa
MMR	Myanmar	Asia	East Asia & Pacific	Southern Asia
NAM	Namibia	Africa	Sub-Saharan Africa	Sub-Saharan Africa
NPL	Nepal	Asia	South Asia	Southern Asia
NLD	Netherlands	Europe	Europe & Central Asia	Germanic Europe
NZL	New Zealand	UCAN	East Asia & Pacific	Anglo
NIC	Nicaragua	America	Latin America & Caribbean	Latin America
NER	Niger	Africa	Sub-Saharan Africa	Sub-Saharan Africa
NGA	Nigeria	Africa	Sub-Saharan Africa	Sub-Saharan Africa
MKD	North Macedonia	Europe	Europe & Central Asia	Eastern Europe
NOR	Norway	Europe	Europe & Central Asia	Nordic Europe
OMN	Oman	Asia	Middle East & North Africa	Middle East
PAK	Pakistan	Asia	South Asia	Southern Asia
PSE	Palestine	Asia	Middle East & North Africa	Middle East
PAN	Panama	America	Latin America & Caribbean	Latin America
PNG	Papua New Guinea	Asia	East Asia & Pacific	Middle East
PRY	Paraguay	America	Latin America & Caribbean	Latin America
PER	Peru	America	Latin America & Caribbean	Latin America
PHL	Philippines	Asia	East Asia & Pacific	Southern Asia
POL	Poland	Europe	Europe & Central Asia	Eastern Europe
PRT	Portugal	Europe	Europe & Central Asia	Latin Europe
QAT	Qatar	Asia	Middle East & North Africa	Middle East
ROU	Romania	Europe	Europe & Central Asia	Eastern Europe
RUS	Russian Federation	Europe	Europe & Central Asia	Eastern Europe
RWA	Rwanda	Africa	Sub-Saharan Africa	Sub-Saharan Africa
LCA	Saint Lucia	America	Latin America & Caribbean	Other
WSM	Samoa	UCAN	East Asia & Pacific	Other
STP	Sao Tome & Principe	Africa	Sub-Saharan Africa	Sub-Saharan Africa
SAU	Saudi Arabia	Asia	Middle East & North Africa	Middle East
SEN	Senegal	Africa	Sub-Saharan Africa	Sub-Saharan Africa
SRB	Serbia	Europe	Europe & Central Asia	Eastern Europe

Code	Country name	Continent	Global region	Cultural cluster
SYC	Seychelles	Africa	Sub-Saharan Africa	Sub-Saharan Africa
SGP	Singapore	Asia	East Asia & Pacific	Southern Asia
SVK	Slovakia	Europe	Europe & Central Asia	Eastern Europe
SVN	Slovenia	Europe	Europe & Central Asia	Eastern Europe
SLB	Solomon Islands	Asia	East Asia & Pacific	Other
ZAF	South Africa	Africa	Sub-Saharan Africa	Sub-Saharan Africa
ESP	Spain	Europe	Europe & Central Asia	Latin Europe
LKA	Sri Lanka	Asia	South Asia	Southern Asia
SDN	Sudan	Africa	Sub-Saharan Africa	Sub-Saharan Africa
SUR	Suriname	America	Latin America & Caribbean	Latin America
SWE	Sweden	Europe	Europe & Central Asia	Nordic Europe
CHE	Switzerland	Europe	Europe & Central Asia	Germanic Europe
SYR	Syria	Asia	Middle East & North Africa	Middle East
TWN	Taiwan	Asia	<i>East Asia & Pacific</i>	Middle East
TJK	Tajikistan	Asia	Europe & Central Asia	Central Asia
TZA	Tanzania	Africa	Sub-Saharan Africa	Sub-Saharan Africa
THA	Thailand	Asia	East Asia & Pacific	Confucian Asia
TLS	Timor-Leste	Asia	East Asia & Pacific	Southern Asia
TGO	Togo	Africa	Sub-Saharan Africa	Sub-Saharan Africa
TON	Tonga	UCAN	East Asia & Pacific	Other
TTO	Trinidad & Tobago	America	Latin America & Caribbean	Latin America
TUN	Tunisia	Africa	Middle East & North Africa	Middle East
TUR	Turkey	Asia	Europe & Central Asia	Middle East
TKM	Turkmenistan	Asia	Europe & Central Asia	Central Asia
UGA	Uganda	Africa	Sub-Saharan Africa	Sub-Saharan Africa
UKR	Ukraine	Europe	Europe & Central Asia	Eastern Europe
ARE	United Arab Emirates	Asia	Middle East & North Africa	Middle East
GBR	United Kingdom	Europe	Europe & Central Asia	Anglo
USA	United States	UCAN	North America	Anglo
URY	Uruguay	America	Latin America & Caribbean	Latin America
UZB	Uzbekistan	Asia	Europe & Central Asia	Central Asia
VUT	Vanuatu	UCAN	East Asia & Pacific	Other
VEN	Venezuela	America	Latin America & Caribbean	Latin America
VNM	Viet Nam	Asia	East Asia & Pacific	Confucian Asia
ZMB	Zambia	Africa	Sub-Saharan Africa	Sub-Saharan Africa
ZWE	Zimbabwe	Africa	Sub-Saharan Africa	Sub-Saharan Africa

Sources: ISO, UN, GLOBE

UCAN = USA, Canada, Australia, New Zealand and part of Pacific Ocean

Table 70. Countries covered and values of some key variables in the database of national indicators

Country	Human Development Index	Fatality rate	Support for policy measure															National culture	
			ALC	ZEN	ZER	ISA	SWS	SRE	HEL	HEC	HEP	RFL	RFC	RFP	NMP	NHP	NHC	Independent	Confucianist
Afghanistan	0.511	15.1																	
Albania	0.795	13.6																	
Angola	0.581	23.6																	
Argentina	0.845	14.0	84.9%	85.8%	80.9%				77.8%						70.6%			60.9	29.1
Armenia	0.776	17.1																	
Australia	0.944	5.6	84.7%	85.4%	50.6%	57.5%	65.8%	81.4%	84.0%	90.0%	89.4%	31.1%	82.5%	77.2%	57.6%	38.8%	64.8%	79.6	54.2
Austria	0.922	5.2	71.6%	83.2%	51.2%	43.5%	54.3%	66.2%	57.7%	84.4%	91.0%	57.1%	77.6%	75.9%	36.8%	49.1%	65.9%	80.7	44.4
Azerbaijan	0.756	8.7																	
Bangladesh	0.632	15.3																	
Barbados	0.814	5.6																	
Belarus	0.823	8.9																	
Belgium	0.931	5.8	76.1%	78.1%	57.6%	57.9%	64.8%	81.0%	58.3%	83.8%	82.4%	60.2%	81.3%	80.9%	47.5%	44.6%	62.7%	85.4	58.3
Belize	0.716	28.3																	
Benin	0.545	27.5	91.3%	93.4%	90.5%	95.5%	96.7%	96.7%	93.0%	90.1%	95.9%	74.0%	90.9%	83.9%	74.4%	55.4%	75.1%		
Bhutan	0.654	17.4																	
Bolivia	0.718	15.5	92.1%	85.9%	84.3%				91.9%						76.4%				
Bosnia and Herzegovina	0.780	15.7																	
Botswana	0.735	23.8																	
Brazil	0.765	19.7	72.1%	87.7%	83.4%				77.6%						70.2%			49.9	26.1
Bulgaria	0.816	10.2	89.7%	83.2%	81.1%	79.1%	83.5%	83.4%	75.5%	87.8%	91.6%	64.9%	92.1%	92.0%	46.2%	57.2%	72.9%		
Burkina Faso	0.452	30.5																	
Burundi	0.433	34.7																	
Cabo Verde	0.665	25.0																	

Country	Human Development Index	Fatality rate	Support for policy measure															National culture	
			ALC	ZEN	ZER	ISA	SWS	SRE	HEL	HEC	HEP	RFL	RFC	RFP	NMP	NHP	NHC	Independent	Confucianist
Cambodia	0.594	17.8																	
Cameroon	0.563	30.1	89.7%	82.8%	74.0%	88.2%	95.6%	96.6%	92.2%	94.1%	96.1%	54.9%	86.8%	84.8%	60.8%	65.2%	77.9%		
Canada	0.929	5.8	85.0%	85.6%	59.1%	49.0%	61.8%	76.9%	75.7%	89.7%	88.4%	54.0%	81.3%	83.2%	62.7%	43.7%	66.4%	78.6	54.6
Central African Rep.	0.397	33.6																	
Chad	0.398	27.6																	
Chile	0.851	12.5	89.5%	87.2%	88.2%				88.0%						61.1%			60.1	14.1
China	0.761	18.2	89.0%		80.0%	82.0%			50.0%			56.0%						55.4	72.1
Colombia	0.767	18.5	89.3%	88.1%	89.8%	77.5%	87.9%	90.0%	94.3%	94.6%	95.2%	46.2%	92.5%	92.1%	65.0%	43.9%	63.8%	45.1	6.1
Comoros	0.554	26.5																	
Congo	0.574	27.4																	
Congo, Dem. Rep.	0.480	33.7																	
Costa Rica	0.810	16.7	93.4%	85.8%	82.5%				93.8%						66.2%				
Côte d'Ivoire	0.538	23.6	91.6%	82.1%	81.8%	88.1%	94.2%	94.2%	88.4%	95.3%	91.8%	44.9%	83.9%	82.3%	56.5%	46.4%	62.5%		
Croatia	0.851	8.1																	
Cuba	0.783	8.5																	
Cyprus	0.887	5.1																	
Czech Rep.	0.900	5.9	78.3%	86.1%	73.7%	56.1%	67.0%	68.8%	67.2%	90.9%	88.3%	65.4%	82.5%	82.4%	43.4%	47.1%	71.8%	76.5	46.6
Denmark	0.940	4.0	84.5%	69.1%	52.4%	55.7%	63.6%	76.4%	54.2%	80.5%	89.1%	63.7%	82.8%	78.7%	56.5%	36.6%	54.2%	90.6	56.9
Dominican Republic	0.756	34.6																	
Ecuador	0.759	21.3	89.1%	79.7%	82.5%				91.0%						67.7%				
Egypt	0.707	9.7	85.6%	84.1%	88.0%	78.8%	84.8%	77.8%	81.9%	84.2%	83.1%	49.9%	78.9%	79.4%	53.2%	45.7%	55.8%	30.9	23.8
El Salvador	0.673	22.2																	
Equatorial Guinea	0.592	24.6																	
Eritrea	0.459	25.3																	

Country	Human Development Index	Fatality rate	Support for policy measure															National culture	
			ALC	ZEN	ZER	ISA	SWS	SRE	HEL	HEC	HEP	RFL	RFC	RFP	NMP	NHP	NHC	Independent	Confucianist
Estonia	0.892	6.1																	
Eswatini	0.611	26.9																	
Ethiopia	0.485	26.7																	
Fiji	0.743	9.6																	
Finland	0.938	4.7	88.6%	69.4%	60.1%	52.1%	64.6%	77.6%	60.7%	85.2%	92.8%	81.8%	83.9%	80.3%	34.1%	25.3%	36.2%	80.4	63.3
France	0.901	5.5	73.1%	74.2%	53.3%	59.7%	61.9%	79.9%	64.5%	85.1%	87.7%	56.6%	87.5%	85.6%	50.6%	31.1%	58.5%	80.5	57.2
Gabon	0.703	23.2																	
Gambia	0.496	29.7																	
Georgia	0.812	15.3																	
Germany	0.947	4.1	69.0%	84.1%	62.3%	48.1%	61.0%	70.4%	54.7%	82.5%	91.9%	51.6%	77.7%	79.9%	48.8%	49.4%	69.8%	82.6	53.5
Ghana	0.611	24.9	92.1%	84.1%	89.2%	84.9%	91.8%	94.7%	94.2%	94.2%	94.4%	69.6%	92.6%	91.0%	75.7%	71.7%	80.4%		
Greece	0.888	9.2	85.1%	83.9%	67.4%	79.9%	82.8%	90.0%	85.9%	91.7%	95.3%	51.4%	92.1%	86.6%	66.3%	50.8%	71.6%	68.0	51.5
Grenada	0.779	9.3																	
Guatemala	0.663	16.6	94.2%	89.4%	85.2%				92.3%						66.6%				
Guinea	0.477	28.2																	
Guinea-Bissau	0.480	31.1																	
Guyana	0.682	24.6																	
Honduras	0.634	16.7																	
Hong Kong	0.949	18.0																60.7	85.7
Hungary	0.854	7.8	82.5%	87.5%	83.2%	70.1%	74.7%	82.8%	59.1%	84.1%	85.6%	79.4%	92.7%	90.5%	47.8%	41.9%	69.9%	76.5	49.5
Iceland	0.949	6.6	74.8%	64.4%	57.1%	58.8%	67.8%	79.7%	77.2%	85.2%	80.9%	78.9%	87.9%	80.6%	45.0%	32.2%	44.1%		
India	0.645	22.6	83.8%	80.5%	82.0%	82.0%	83.8%	87.3%	70.9%	80.3%	90.6%	59.9%	81.5%	78.9%	70.6%	71.5%	78.6%	39.6	45.3
Indonesia	0.718	12.2																25.0	24.6
Iran	0.783	20.5																	
Iraq	0.674	20.7																	

Country	Human Development Index	Fatality rate	Support for policy measure															National culture	
			ALC	ZEN	ZER	ISA	SWS	SRE	HEL	HEC	HEP	RFL	RFC	RFP	NMP	NHP	NHC	Independent	Confucianist
Ireland	0.955	4.1	83.8%	82.6%	74.0%	64.4%	76.9%	89.9%	87.4%	92.8%	94.8%	73.4%	93.9%	92.6%	60.4%	39.7%	73.9%	67.5	46.5
Israel	0.919	4.2	82.7%	88.5%	77.3%	63.1%	70.4%	85.5%	87.2%	93.0%	95.2%	42.1%	88.0%	84.9%	48.1%	25.1%	64.6%	64.7	43.4
Italy	0.892	5.6	79.7%	53.7%	77.7%	71.9%	70.8%	80.0%	75.1%	84.5%	92.7%	64.8%	88.7%	81.3%	51.1%	48.5%	62.9%	62.7	43.7
Jamaica	0.734	13.6																	
Japan	0.919	4.1	82.2%	78.9%	78.3%	63.8%	64.9%	69.8%	41.1%	65.5%	86.0%	51.0%	75.0%	72.3%	51.0%	50.9%	75.4%	70.5	100.0
Jordan	0.729	24.4																	
Kazakhstan	0.825	17.6																39.4	49.6
Kenya	0.601	27.8	93.9%	88.4%	88.8%	86.2%	95.2%	95.4%	95.0%	92.6%	95.3%	57.9%	97.9%	96.9%	77.5%	75.1%	84.0%	25.0	8.4
Kiribati	0.630	4.4																	
Korea, Rep.	0.916	9.8	86.3%	75.4%	72.5%	67.5%	73.3%	79.5%	69.5%	82.1%	90.8%	55.1%	80.7%	82.6%	51.1%	37.8%	65.5%	66.9	85.6
Kuwait	0.806	17.6																	
Kyrgyzstan	0.697	15.4																	
Lao	0.613	16.6																	
Latvia	0.866	9.3																	
Lebanon	0.744	18.1	88.9%	86.6%	83.9%	84.2%	89.4%	87.9%	93.3%	93.4%	93.8%	67.4%	88.6%	90.4%	67.9%	47.4%	59.1%		
Lesotho	0.527	28.9																	
Liberia	0.480	35.9																	
Libya	0.724	26.1																	
Lithuania	0.882	8.0																	
Luxembourg	0.916	6.3	68.3%	77.8%	41.8%	52.4%	60.0%	82.2%	48.1%	89.5%	92.4%	58.4%	87.6%	84.3%	39.3%	36.9%	63.8%		
Madagascar	0.528	28.6																	
Malawi	0.483	31.0																	
Malaysia	0.810	23.6	84.9%	79.6%	84.7%	75.0%	80.3%	88.7%	82.2%	84.7%	87.9%	73.7%	87.7%	83.4%	58.0%	56.1%	63.1%	43.3	43.1
Maldives	0.740	0.9																	
Mali	0.434	23.1																	

Country	Human Development Index	Fatality rate	Support for policy measure															National culture	
			ALC	ZEN	ZER	ISA	SWS	SRE	HEL	HEC	HEP	RFL	RFC	RFP	NMP	NHP	NHC	Independent	Confucianist
Malta	0.895	6.1																	
Mauritania	0.546	24.7																	
Mauritius	0.804	13.7																	
Mexico	0.779	13.1	84.4%	82.8%	80.0%				85.9%						70.8%			48.5	22.1
Micronesia	0.620	1.9																	
Moldova	0.750	9.7																	
Mongolia	0.737	16.5																	
Montenegro	0.829	10.7																	
Morocco	0.686	19.6	80.3%	77.6%	77.1%	75.5%	81.8%	81.9%	83.0%	84.1%	82.2%	46.9%	78.1%	77.8%	50.6%	45.0%	58.5%		
Mozambique	0.456	30.1																	
Myanmar	0.583	19.9																47.0	35.0
Namibia	0.646	30.4																	
Nepal	0.602	15.9																	
Netherlands	0.944	3.8	79.7%	82.4%	64.9%	47.5%	52.1%	75.4%	22.8%	56.2%	63.7%	42.9%	54.7%	59.1%	55.5%	38.5%	59.9%	99.9	63.5
New Zealand	0.931	7.8																76.4	49.3
Nicaragua	0.660	17.0																	
Niger	0.394	26.2																	
Nigeria	0.539	21.4	91.7%	90.7%	90.8%	86.1%	92.0%	94.6%	93.9%	91.1%	90.6%	59.1%	88.2%	85.2%	70.2%	72.0%	76.9%	0.1	7.7
North Macedonia	0.774	6.4																	
Norway	0.957	2.7	82.4%	80.1%	73.7%	48.3%	53.4%	80.2%	67.5%	84.6%	90.6%	77.0%	84.6%	79.7%	48.8%	29.6%	45.7%	85.2	51.8
Oman	0.813	16.1																	
Pakistan	0.557	14.3																	
Palestine	0.708	5.3																	
Panama	0.815	14.3																	

Country	Human Development Index	Fatality rate	Support for policy measure															National culture	
			ALC	ZEN	ZER	ISA	SWS	SRE	HEL	HEC	HEP	RFL	RFC	RFP	NMP	NHP	NHC	Independent	Confucianist
Papua New Guinea	0.555	14.2																	
Paraguay	0.728	22.7	93.5%	86.9%	83.8%				93.2%						69.8%				
Peru	0.777	13.5	92.6%	86.8%	89.5%				90.9%						71.8%			36.5	9.0
Philippines	0.718	12.3																35.3	40.3
Poland	0.880	9.7	87.2%	79.4%	67.2%	63.9%	74.4%	78.2%	60.5%	84.0%	83.7%	79.9%	91.2%	86.8%	45.0%	44.4%	66.2%	58.7	49.9
Portugal	0.864	7.4	82.8%	79.0%	66.1%	65.1%	81.7%	87.2%	85.8%	92.7%	92.2%	74.3%	95.1%	91.9%	50.7%	56.0%	77.4%	68.4	37.1
Qatar	0.848	9.3																	
Romania	0.828	10.3																58.0	33.4
Russian Federation	0.824	18.0																57.4	58.0
Rwanda	0.543	29.7																	
Saint Lucia	0.759	35.4																	
Samoa	0.715	11.3																	
Sao Tome and Principe	0.625	27.5																	
Saudi Arabia	0.854	28.8																	
Senegal	0.512	23.4																	
Serbia	0.806	7.4	88.4%	91.9%	75.7%	79.5%	85.9%	82.8%	62.2%	83.5%	93.2%	42.6%	82.5%	83.6%	61.4%	54.9%	71.9%		
Seychelles	0.796	15.9																	
Singapore	0.938	2.8																55.5	66.4
Slovakia	0.860	6.1																	
Slovenia	0.917	6.4	85.8%	92.2%	72.2%	69.4%	79.8%	88.7%	60.2%	94.0%	92.5%	84.8%	93.9%	90.3%	54.0%	58.6%	74.2%		
Solomon Islands	0.567	17.4																	
South Africa	0.709	25.9	86.3%	79.1%	75.1%	70.9%	79.0%	87.0%	88.3%	92.4%	90.3%	76.0%	93.4%	88.5%	59.9%	55.1%	66.2%	39.9	15.7
Spain	0.904	4.1	87.2%	89.4%	80.8%	76.4%	79.7%	89.1%	86.8%	90.7%	93.9%	46.9%	90.9%	84.7%	68.2%	43.1%	78.5%	74.6	45.5

Country	Human Development Index	Fatality rate	Support for policy measure															National culture	
			ALC	ZEN	ZER	ISA	SWS	SRE	HEL	HEC	HEP	RFL	RFC	RFP	NMP	NHP	NHC	Independent	Confucianist
Sri Lanka	0.782	14.9																	
Sudan	0.510	25.7																	
Suriname	0.738	14.5																	
Sweden	0.945	2.8	86.1%	80.4%	71.5%	54.5%	62.8%	78.6%	59.3%	87.7%	90.0%	76.3%	83.3%	80.7%	47.5%	25.4%	47.2%	89.7	52.8
Switzerland	0.955	2.7	65.6%	73.9%	48.8%	56.1%	60.0%	65.7%	65.3%	86.8%	89.4%	55.2%	80.7%	77.7%	42.8%	41.4%	66.0%	83.1	37.2
Syria	0.567	26.5																	
Taiwan		13.0																52.3	85.7
Tajikistan	0.668	18.1																	
Tanzania	0.529	29.2																	
Thailand	0.777	32.7	79.9%	65.5%	60.3%	71.9%	82.0%	85.1%	77.6%	74.9%	81.2%	64.1%	77.3%	73.4%	56.9%	59.7%	59.1%	36.0	59.9
Timor-Leste	0.606	12.7																	
Togo	0.515	29.2																	
Tonga	0.725	16.8																	
Trinidad and Tobago	0.796	12.1																	
Tunisia	0.740	22.8	85.6%	82.0%	77.8%	82.2%	84.9%	87.5%	85.9%	90.9%	89.8%	50.9%	88.5%	82.2%	52.0%	48.8%	63.4%		
Turkey	0.820	12.3																58.5	36.5
Turkmenistan	0.715	14.5																	
Uganda	0.544	29.0	93.1%	88.1%	85.7%	86.5%	93.9%	94.4%	93.9%	86.2%	94.4%	65.6%	93.9%	92.3%	73.3%	74.6%	83.6%		
Ukraine	0.779	13.7																64.8	46.5
United Arab Emirates	0.890	18.1																	
United Kingdom	0.932	3.1	80.5%	80.8%	70.7%	55.9%	65.1%	80.7%	82.9%	88.4%	91.7%	43.8%	88.6%	88.4%	68.6%	35.5%	68.2%	81.8	56.9
United States	0.926	12.4	79.8%	79.2%	62.3%	43.8%	56.1%	74.1%	72.4%	84.6%	79.5%	57.0%	83.0%	79.3%	50.5%	40.8%	56.7%	69.1	48.5
Uruguay	0.817	13.4	85.6%	82.3%	76.7%				77.9%						67.5%				

Country	Human Development Index	Fatality rate	Support for policy measure															National culture	
			ALC	ZEN	ZER	ISA	SWS	SRE	HEL	HEC	HEP	RFL	RFC	RFP	NMP	NHP	NHC	Independent	Confucianist
Uzbekistan	0.720	11.5																	
Vanuatu	0.609	15.9																	
Venezuela	0.711	33.7	90.0%	82.4%	83.7%				93.9%						67.7%			41.9	0.0
Viet Nam	0.704	26.4	83.4%	74.7%	71.6%	79.0%	83.7%	82.3%	49.3%	65.5%	84.8%	46.6%	54.3%	55.0%	71.8%	56.0%	63.0%	44.1	40.2
Zambia	0.584	24.7	92.7%	88.9%	84.7%	85.1%	94.4%	95.2%	93.5%	93.9%	90.8%	74.9%	97.3%	93.9%	70.1%	71.1%	82.2%		
Zimbabwe	0.571	34.7																	
Number of countries	172	173	61	60	61	49	48	48	61	48	48	49	48	48	60	48	48	53	53

Data sources: UN, WHO, World Bank, ESRA, Hofstede Insights

Appendix A2. Background information on ESRA

ESRA (E-Survey of Road users' Attitudes) is a joint initiative of road safety institutes, research centres, public services, and private sponsors from all over the world. The core of the programme is a jointly developed questionnaire. The aim is to collect and analyse comparable data on road safety performance, in particular road safety culture and behaviour of road users. The ESRA data are used as a basis for a large set of road safety indicators. These provide scientific evidence for policy making at national and international levels.

ESRA was initiated in 2015 by myself as Research Director of Vias institute in Brussels (Belgium) and has been expanding ever since. As of today (2022) Vias institute still coordinates ESRA, in cooperation with nine other steering group partners: BAST (Germany), IATSS (Japan), Université Gustave Eiffel (France), ITS (Poland), KfV (Austria), NTUA (Greece), PRP (Portugal), SWOV (the Netherlands), and TIRF (Canada)). By the end of 2020, ESRA data had already been collected in 60 countries.

The ESRA survey addresses several types of road users (e.g. car drivers, powered-two-wheelers, cyclists, pedestrians). The themes covered include self-declared behaviour, attitudes and opinions on unsafe traffic behaviour, enforcement experiences and support for policy measures.

ESRA data are collected through online panel surveys using a representative sample of the national adult populations in each participating country (typically N = 1,000 per country). A few exceptions exist. In some countries obtaining sample sizes of at least 1,000 respondents is not feasible or very expensive with the method used, and in such cases smaller sample sizes have been used. Five market research agencies (Ipsos (formerly GfK), Punto de Fuga, Dynata (formerly RN SSI), INFAS and TNS Ilres) organised the fieldwork under the supervision of Vias institute. Hard quota are used for the distribution of gender and age groups (18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y+) distribution during the sampling procedure (United Nations Statistics Division, 2019). The geographical spread of the sample across the country is monitored (soft quota). The methodology used for sampling, data processing and data analysis used for ESRA2 is described in the methodology report for ESRA2 (Meesmann et al., 2021).

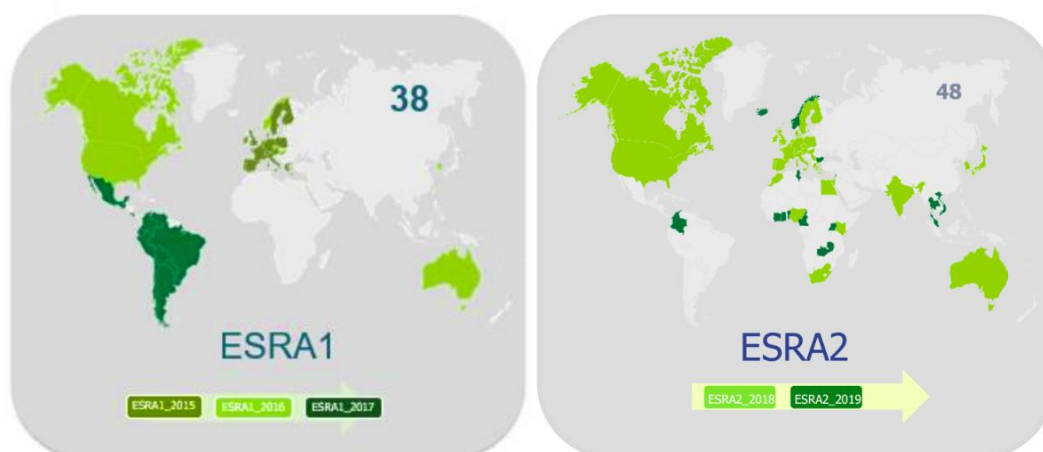
ESRA2, the most recent ESRA edition, was released in two waves. For the first wave, the fieldwork was conducted simultaneously in all 32 participating countries in December 2018. The second wave, involving the 16 additional countries, was

launched in November 2019; Due to the covid-19 pandemic situation, the fieldwork for the second wave had to be extended until July 2020 for some countries. The participating countries in ESRA2 were:

- Europe: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, United Kingdom;
- America: Canada, Colombia, USA;
- Asia and Oceania: Australia, India, Israel, Japan, Lebanon, Malaysia, South Korea, Thailand, Viet Nam;
- Africa: Benin, Cameroon, Egypt, Ghana, Ivory Coast, Kenya, Morocco, Nigeria, Tunisia, Uganda, Zambia, South Africa.

Some data from Latin American countries participating in ESRA1 (2017) has also been used. It concerns data from Argentina, Bolivia, Brazil, Chile, Costa Rica, Ecuador, Guatemala, Mexico, Paraguay, Peru, Uruguay and Venezuela. Figure 130 shows the geographical coverage of ESRA.

Figure 130: Geographical coverage of the ESRA survey



Further information on ESRA: www.esranet.eu

Appendix A3. Guide for interviewees

A hard copy of this guide was given to the interviewees at the beginning of the interviews in the face-to-face meetings. This made it easier for them to follow the structure of the interview, and also to read exactly how the policy measures were formulated. For interviews conducted via phone or videoconference, the note was sent by e-mail just before the interview. The note was translated into German for the Austrian participants and into French for the French participants.

Questionnaire guide for interviews

1. After confirming consent, the interviewees are asked to provide some personal information:
 - Gender
 - Age
 - Education level/specific qualifications or degrees
 - Employer
 - Professional position/occupation
 - Political party (*only asked for if the person is an appointed or elected political representative, or a member of the cabinet of a national, regional or local government*)

They are also asked how familiar they are with road safety and road safety policy.

2. In a second step, interviewees will be asked their meaning/understanding of what “fairness” and “fairness in policy” means – and how fairness relates to other political/ethical/ ideological principles.

More specifically:

- *What does the concept “fairness” mean to you?*
- *What do you understand by “fairness in policy”?*
- *How does “fairness”, in your view, relate to other political/ethical/ ideological principles?*

3. Thirdly, they are asked to give an overall assessment of the national plans, strategies and objectives in relation to road safety policy – what logics have been followed, what factors have been considered, and whether they perceive any elements of unfairness (and which ones).

More specifically:

- *What is your overall assessment of the national plans, strategies and objectives in relation to road safety policy (logics, factors considered, etc.)?*
- *Can you identify one or more elements of unfairness in the current legislation and existing measures in relation to road safety?*

4. Subsequently, the interviewee is presented a number of (potential) measures, which could be considered as contentious (*depending on the profile and the expertise of the interviewee, he or she may not be confronted with all these contentious measures*)

For each statement, the interviewee is asked the following questions:

- *Would you personally support or oppose a law requiring this?*
- *What is/are your main argument for your position?*
- *Do you consider this to be a fair measure?*
- *Why / Why not?*

- *What do you think is the position of the majority of the adult population in your country?*
- *What changes would be required/necessary in the measure so that you would reverse your position?*

[Next questions only to people who are representatives of a political party]

- *Is there an official position of your party? If yes, what is the position?*
- *What are the arguments supporting the position of your party?*
- *If there is no official position, what do you think it would be and why?*

The list of potential measures is :

1. **Zero tolerance for driving under the influence of alcohol (0,0‰ blood alcohol concentration) for all drivers of vehicles (cars, trucks, motorcyclists, cyclists, ...)**
2. **In all urban areas and villages the speed limit should be 30 km/h for all vehicles (except on main thoroughfares).**
3. **All people aged 70 or more should be screened on a 5 yearly basis, in order to decide whether they are still allowed to drive a car or not.**
4. **Fines that people have to pay after they have committed a traffic offence should be proportional to their income.**
5. **All cars should be equipped with an alcohol interlock system (which prevents starting and driving the vehicle if the alcohol concentration is above the legal limit).**
6. **All cyclists should wear a helmet.**
7. **Pedestrians should wear retro reflective clothing, shoes or bags when walking in the dark on public roads**
8. **All cars should be equipped with an Intelligent Speed Assistance (ISA) system that automatically limits the speed of the vehicle to the maximum speed limit.**

Appendix A4. Questionnaire for the dilemma survey

Remarks

- The questions that follow are those of the standard “Master version” in English. This version was the basis for translation into other languages (French, Spanish, German, Dutch, Chinese, Greek and Swedish) as well for the customization of certain questions to the country or region of the respondents. Words that were customized are marked in **orange**.
- The survey was programmed in KeySurvey (see <https://www.keysurvey.com/>).
- The respondents did not see Question S1 on the country and language, since the survey link they received led them directly to the right country and language version.
- The postal code (Question S2) was not visible to the respondents. The value was provided by the online panel provider.

Introductory text

Cod e	Question and answer items	Format, answer scales, filtering and routing
I1	Level of support for policy measures in road safety The aim of this survey is to better understand the factors that influence public support for policy measures in the field of road safety. Completing the survey will require about 20 minutes. Thanks in advance for your cooperation!	Text only

Socio-demographics (1)

Cod e	Question and answer items	Format, answer scales, filtering and routing
S0	The following introductory questions are needed in order to check whether you qualify to take this survey.	Text only
S1	Please select the country, region or state where you live <ul style="list-style-type: none"> <input type="radio"/> England <input type="radio"/> Flanders <input type="radio"/> Wallonia <input type="radio"/> France 	<i>Question not visible to the respondents</i> Choice menu – one answer option

	<input type="radio"/> Austria <input type="radio"/> Greece <input type="radio"/> Sweden <input type="radio"/> Argentina <input type="radio"/> China <input type="radio"/> Texas <input type="radio"/> California <input type="radio"/> Nigeria	Order of the countries stays the same, independent of the language <i>If answer = "Other", then END</i>
S2	What is the postal code of the municipality in which you live?	Question not visible to the respondents Text field (8 characters maximum)
S3	How old are you?	Integer field 2 digits Only OK if $17 < \text{answer} < 25$ $36 < \text{answer} < 46$ $59 < \text{answer} < 70$ <i>All other situations: go to END</i>
S4	What is your gender? <input type="radio"/> Female <input type="radio"/> Male <input type="radio"/> Other	One answer possible
S5	Do you have a car driving licence ? <input type="radio"/> Yes <input type="radio"/> No	One answer possible

Transportation and road safety

T0	The following questions are about the way you travel in your country and about safety in traffic.	Text only
T1	Over the past 12 months, which of the following modes of transport did you use regularly (at least a few days a month during most months) in your country?	Check all that apply

	<input type="checkbox"/> walking (including running, jogging, inline skate, skateboard, ...) at least 200 meter per trip <input type="checkbox"/> cycle (including e-bikes and speed pedelecs) <input type="checkbox"/> ride a moped or a motorcycle (including electrical ones) <input type="checkbox"/> drive a car <input type="checkbox"/> use public transport (train, bus, tram, streetcar, subway, underground, ...) <input type="checkbox"/> be a passenger in a car (without being the driver)	Randomise items
T2a	Over the last 30 days, have you done at least once any of the following, <u>when driving a car</u>? Check all that apply. <input type="checkbox"/> drive when you may have been over the legal limit for drinking and driving <input type="checkbox"/> drive consciously faster than the speed limit inside built-up areas <input type="checkbox"/> drive consciously faster than the speed limit on rural roads <input type="checkbox"/> drive consciously faster than the speed limit on motorways/freeways <input type="checkbox"/> use your mobile phone to read a text message or to check social media whilst driving <input type="checkbox"/> drive when you were so sleepy that you had trouble keeping your eyes open <input type="checkbox"/> (when driving at night) did not notice pedestrians and cyclists very well <input type="checkbox"/> use the cruise control system of the car	Filter: only to be answered by respondents who on Question T1 responded "drive a car" Check all that apply Randomise items
T2b	Over the last 30 days, have you done at least once any of the following, <u>when riding a bicycle</u>? Check all that apply. <input type="checkbox"/> cycle when you think you may have had too much to drink <input type="checkbox"/> cycle without a helmet <input type="checkbox"/> cycle while listening to music through earbuds or headphones <input type="checkbox"/> read a text message or check social media whilst cycling	Filter: only to be answered by respondents who on Question T1 responded "cycle". Check all that apply Randomise items
T2c	Over the last 30 days, have you done at least once any of the following, <u>when riding a moped or a motorcycle</u>? Check all that apply. <input type="checkbox"/> ride when you think you may have had too much to drink <input type="checkbox"/> ride without a helmet <input type="checkbox"/> ride while listening to music through earbuds or headphones <input type="checkbox"/> read a text message or check social media whilst riding	Filter: only to be answered by respondents who on Question T1 responded "ride a moped or a motorcycle". Check all that apply Randomise items
T2d	Over the last 30 days, have you done or experienced at least once any of the following, <u>when walking, running or jogging</u>? Check all that apply. <input type="checkbox"/> cross the road when a pedestrian light was red	Filter: only to be answered by respondents who on Question T1 responded "walking"

	<input type="checkbox"/> cross the road at places other than at a nearby (distance less than 20m) pedestrian crossing <input type="checkbox"/> wear retroreflective clothing, shoes or bags when you were walking or jogging in the dark <input type="checkbox"/> feel unsafe at night because car drivers drove very close to you without noticing you	Check all that apply Randomise items
T3	<p>How safe or unsafe do you feel when using these transport modes?</p> <ul style="list-style-type: none"> • walk (or run, jog, skate, ...) • ride a bicycle • ride a moped or a motorcycle • drive a car • use public transport • be a passenger in a car <p>[Answering options: “very unsafe”; “rather unsafe”, “rather safe”; “very safe”]</p>	Block question Only Items indicated by the respondent in the previous question are displayed One answer per item (compulsory) Answering options in fixed order for all items
T4	<p>The following statements relate to your experience with road traffic accidents. Select the statements that apply to you.</p> <input type="checkbox"/> I have never been involved in a traffic accident in which someone was injured <input type="checkbox"/> A family member or a close friend of mine has been involved in a traffic accident in which someone had to be taken to the hospital. <input type="checkbox"/> I personally know someone who has been severely injured when riding a bicycle	Check that apply
T5	<p>Do you agree with the following statements? Tick the boxes for all the statements with which you agree.</p> <input type="checkbox"/> Cyclists run a high risk of getting a head injury <input type="checkbox"/> Driving after drinking alcohol is a major cause of accidents <input type="checkbox"/> Speeding is a major cause of accidents <input type="checkbox"/> Not being seen by vehicle drivers is a major cause of pedestrian accidents <input type="checkbox"/> Older car drivers are often a danger to themselves and other road users in traffic <input type="checkbox"/> Males are much better drivers than females <input type="checkbox"/> The current traffic safety regulations are well enforced by the police in my country <input type="checkbox"/> The current traffic safety regulations are well respected by the road users of my country <input type="checkbox"/> The penalties for driving under the influence of alcohol are too severe <input type="checkbox"/> The penalties for driving faster than the speed limit are too severe	Check that apply Randomise items

Fairness and support for policy measures

P	The following questions are about a number of measures that could be taken in order to prevent traffic accidents and injuries. You will be asked your opinion about these possible measures.	Text only
P1a	<p>In an effort to reduce the number of people injured in road traffic accidents, one could consider the following measures. Please indicate to what extent you would oppose or rather support these measures to become legally required.</p> <ul style="list-style-type: none"> • Zero tolerance for driving under the influence of alcohol (0,0‰ blood alcohol concentration) for all drivers of vehicles (cars, trucks, motorcyclists, cyclists, ...). • All cars should be equipped with an Intelligent Speed Assistance (ISA) system that automatically limits the speed of the car to the maximum speed limit and that cannot be turned off by the driver. • Fines that people have to pay after they have committed a traffic offence should be proportional to their income. • All cyclists should wear a helmet. • The education and training needed for a car driving licence should be free of charge and integrated in the school curriculum. <p>[Answering options: “Oppose”; “Somewhat oppose”; “Neither oppose or support”; “Somewhat support”; “Support”]</p>	<p>Block question</p> <p>Randomise items</p> <p>One answer per item (compulsory)</p> <p>Answering options in fixed order for all items</p>
P1b	<p>In an effort to reduce the number of people injured in road traffic accidents, one could consider the following measures. Please indicate to what extent you would oppose or rather support these measures to become legally required.</p> <ul style="list-style-type: none"> • All cars should be equipped with an alcohol ignition interlock system (which prevents starting and driving the car if the driver’s alcohol concentration is above the legal BAC limit). • In all urban areas and villages the speed limit should be 30 km/h for all vehicles. • All people aged 70 or more should be screened every 3 years, in order to let a medical expert decide whether they are still allowed to drive a car or not. • Pedestrians should wear retroreflective clothing, shoes or bags when walking or running in the dark on public streets and roads. • Insurance companies should be allowed to differentiate the price for the car insurance premiums between men and women. <p>[Answering options: “Oppose”; “Somewhat oppose”; “Neither oppose or support”; “Somewhat support”; “Support”]</p>	<p>Block question</p> <p>Randomise items</p> <p>One answer per item (compulsory)</p> <p>Answering options in fixed order for all items</p>

P2	<p>We will now ask some more questions about 3 of the measures that were listed in the previous questions.</p>	<p>Text only</p> <p>Out of the 10 blocks “P3x-P4x-P5x”, each respondent gets 3 blocks at random. After these 3 groups of questions, Question P6 is posed.</p> <p>Since the answer options on P3a, P3b, P3c, etc. are the same, only the 2nd and 3d question of these blocks are listed here.</p>
A		
P3a	<p>Please consider the policy measure: <i>“Zero tolerance for driving under the influence of alcohol for all drivers of vehicles”</i>. Please indicate if you agree with the following statements about it (tick the boxes for all the statements with which you agree).</p> <p>This policy measure would ...</p> <ul style="list-style-type: none"> <input type="checkbox"/> not reduce road traffic injuries <input type="checkbox"/> limit people’s individual freedom or privacy <input type="checkbox"/> reduce people’s enjoyment in life <input type="checkbox"/> restrict people’s mobility <input type="checkbox"/> lead to discrimination <input type="checkbox"/> require a lot of public money <input type="checkbox"/> imply high costs for the people concerned <input type="checkbox"/> be easy to evade <input type="checkbox"/> be difficult to implement correctly <input type="checkbox"/> be an unjustifiable intervention by the state <input type="checkbox"/> be supported by many of my friends 	<p>Block question – tick all that apply</p> <p>Items are randomized</p>
P4a	<p>Please read this information carefully, since it is very important for the aims of the research.</p> <p>Alcohol consumption reduces the ability to drive a car. About 25% of all road traffic deaths are alcohol related. In Europe over 5000 people die each year on the roads</p>	<p>Text only</p>

	<p>because of drunk driving and over 50 000 are severely injured. Drunk driving also has an annual economic cost to European society of 40 billion euro.</p> <p>The successful implementation of a “zero tolerance” policy for “drinking and driving” would reduce significantly the number of road traffic victims, but would also require a significant increase in the number of police controls.</p>	
P5a	<p>This measure would have the following effect(s) on me (<i>select all the statements that apply</i>):</p> <ul style="list-style-type: none"> <input type="checkbox"/> have no effect on me at all (<i>if you answer this, you cannot tick any other box in this question</i>) <input type="checkbox"/> prevent me drinking “just enough” to be just below the legal limit <input type="checkbox"/> make me never drive after having drunk alcohol <input type="checkbox"/> make it easier for me to convince friends and family members not to drive after drinking alcohol <input type="checkbox"/> make it easier for me to refuse alcoholic drinks when offered to me <input type="checkbox"/> limit my mobility <input type="checkbox"/> limit my personal freedom <input type="checkbox"/> make me use public transport more often <input type="checkbox"/> make me use taxi services more often <input type="checkbox"/> reduce my alcohol consumption in restaurants, bars and cafés <input type="checkbox"/> reduce my joy in life <input type="checkbox"/> reduce my risk of getting involved in a traffic accident caused by others <input type="checkbox"/> reduce my risk of injuring someone else in a traffic accident after drinking too much 	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don’t drive a car regularly (Question T1).</p>
B	<p>All cars should be equipped with an ISA system that limits the speed of the car to the maximum speed limit and cannot be turned off by the driver.</p>	
P4b	<p>Please read this information carefully, since it is very important for the aims of the research.</p> <p>Inappropriate speed contributes to around 30% of fatal traffic accidents. An increase in speed by 10% already doubles the risk of getting involved in a fatal traffic accident with 50%. In the European Union, every year over 8000 people die on the roads because of speeding, and about 100 000 are seriously injured.</p>	<p>Text only</p>

	<p>A large part of these accidents could be avoided if people would respect the speed limits. ISA systems can avoid inappropriate speeding, and can therefore save thousands of lives every year. Their cost is modest and if they would be installed in all cars, there would be no need for speed controls anymore and no more speeding tickets to pay.</p>	
P5b	<p>This measure would have the following effect(s) on me (<i>select all the statements that apply</i>):</p> <ul style="list-style-type: none"> <input type="checkbox"/> have no effect on me at all (<i>if you answer this, you cannot tick any other box in this question</i>) <input type="checkbox"/> make me feel safer on roads <input type="checkbox"/> make driving more comfortable <input type="checkbox"/> make me buy second-hand cars without such an ISA system <input type="checkbox"/> make me feel unsafe when overtaking a car <input type="checkbox"/> give me the feeling of being controlled all the time <input type="checkbox"/> make driving a car less pleasant <input type="checkbox"/> make me lose time <input type="checkbox"/> make me travel less by car <input type="checkbox"/> reduce my ecological footprint <input type="checkbox"/> reduce the number of traffic fines I get <input type="checkbox"/> reduce the risk that I will cause a traffic accident myself <input type="checkbox"/> reduce my risk of getting involved in a traffic accident caused by others <input type="checkbox"/> reduce the severity of the injuries if I get involved in an accident 	<p>Tick boxes</p> <p>Items are randomized, except first one</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don't drive a car regularly (Question T1).</p>

C	Fines that people have to pay after they have committed a traffic offence should be proportional to their income.	
P4c	<p>Please read this information carefully, since it is very important for the aims of the research.</p> <p>In some countries the fine for driving too fast, depends on the income of the traffic offender. So a very rich person may have to pay up to tens of thousands of euros after speeding. The logic used to justify this approach is that rich persons can easily afford to pay a 'normal' traffic fine and will not consider that as a deterrent for risky driving in the future - but a high fine will make them think twice before speeding again.</p> <p>However, such an approach violates the principle that citizens who have committed the same crime, should also receive the same penalty.</p>	Text only
P5c	<p>This measure would have the following effect(s) on me (<i>select all the statements that apply</i>):</p> <ul style="list-style-type: none"> <input type="checkbox"/> have no effect on me at all (<i>if you answer this, you cannot tick any other box in this question</i>) <input type="checkbox"/> ensure that I will not drive after having drunk alcohol <input type="checkbox"/> make me respect speed limits much better <input type="checkbox"/> increase the total amount of traffic fines I have to pay <input type="checkbox"/> decrease the total amount of traffic fines I have to pay <input type="checkbox"/> make me disguise my real income, to reduce the amount of the fine <input type="checkbox"/> reduce the risk that I will cause a traffic accident myself <input type="checkbox"/> reduce my risk of getting involved in a traffic accident caused by others <input type="checkbox"/> make me happy because rich people will be penalised at an appropriate level <input type="checkbox"/> make driving a car less pleasant <input type="checkbox"/> make me feel that traffic fines are a just a way to make us pay more taxes 	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don't drive a car regularly (Question T1).</p>

D	All cyclists should wear a helmet.	
P4d	<p>Please read this information carefully, since it very important for the aims of the research.</p> <p>Cycling is good for your health and for the environment. But is also less safe than driving a car. The risk of being seriously injured in a traffic accident is almost 30 times higher when cycling than when driving a car. About one third of the cyclists who are severely injured in a bicycle accident have a head and/or brain injury.</p> <p>Safe bicycle helmets are available already at prices of 30 to 50 euro. Using such a bicycle helmet reduces the head and brain injuries by about 50%, and the number of injured cyclists by one-third.</p> <p>Some people find wearing a helmet impractical and think they would cycle less if wearing a helmet would be mandatory.</p>	Text only
P5d	<p>This measure would have the following effect(s) on me (<i>select all the statements that apply</i>):</p> <ul style="list-style-type: none"> <input type="checkbox"/> have no effect on me at all (<i>if you answer this, you cannot tick any other box in this question</i>) <input type="checkbox"/> make me feel safer when I ride a bicycle <input type="checkbox"/> make cycling less agreeable <input type="checkbox"/> make me cycle more <input type="checkbox"/> make me cycle less <input type="checkbox"/> make me look a bit foolish or childish <input type="checkbox"/> make me a good role model for children <input type="checkbox"/> make me more aware of safety risks on the road <input type="checkbox"/> make me see cycling as unsafe, instead of healthy and environmentally friendly <input type="checkbox"/> make me use other transport modes instead of cycling <input type="checkbox"/> be often very inconvenient, since I have to carry the helmet with me <input type="checkbox"/> reduce my interest in cycling for recreational purposes <input type="checkbox"/> reduce the joy of cycling <input type="checkbox"/> reduce the risk of being severely injured when riding a bicycle <input type="checkbox"/> make me look like a possible traffic victim 	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don't ride a bicycle regularly (Question T1).</p>

E	The education and training needed to obtain a car driving license should be free of charge and integrated in the school curriculum.	
P4e	<p>Please read this information carefully, since it very important for the aims of the research.</p> <p>Being able to drive a car is important for young adults since it increases their mobility options and job prospects. But in most countries it is quite expensive for young people to get a car driving license. Integrating driving education in the school curriculum would reduce the cost of obtaining a driving license considerably.</p> <p>It might also create more consistency and quality of driving education and training overall.</p>	Text only
P5e	<p>This measure would have the following effect(s) on me (<i>select all the statements that apply</i>):</p> <p><input type="checkbox"/> have no effect on me at all (<i>if you answer this, you cannot tick any other box in this question</i>)</p> <p><input type="checkbox"/> make or would have made it easier for me to obtain a car driving licence</p> <p><input type="checkbox"/> make or would have made it more affordable for me to obtain a car driving licence</p> <p><input type="checkbox"/> allow or have allowed me to obtain a driving licence at an earlier age</p> <p><input type="checkbox"/> make or would have made it easier for me to get the jobs I wanted</p> <p><input type="checkbox"/> make or would have made me a better driver</p> <p><input type="checkbox"/> make or would have made me use public transport less</p> <p><input type="checkbox"/> make or would have made me cycle less</p>	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p>

F	All cars should be equipped with an alcohol ignition interlock system (which prevents starting and driving the car if the alcohol concentration is above the legal BAC limit).	
P4f	<p>Please read this information carefully, since it very important for the aims of the research.</p> <p>About 25% of road traffic deaths are alcohol related. In Europe over 5000 people die each year on the roads because of drunk driving. Drunk driving also implies an economic cost to society of 40 billion euro.</p> <p>Alcohol ignition interlock systems in cars make it impossible to drive a car when the alcohol concentration in the blood is above the legal limit, and hence could reduce significantly the number of people killed and injured in accidents.</p> <p>If all cars were equipped with such a system, there would be no need for police controls for drunk driving, which would also be a considerable saving of public money.</p>	Text only
P5f	<p>This measure would have the following effect(s) on me (select all the statements that apply):</p> <ul style="list-style-type: none"> <input type="checkbox"/> have no effect on me at all (if you answer this, you cannot tick any other box in this question) <input type="checkbox"/> make it easier for me to convince friends and family members not to drive after drinking alcohol <input type="checkbox"/> make it easier for me to refuse alcoholic drinks when offered to me <input type="checkbox"/> limit my mobility <input type="checkbox"/> limit my personal freedom <input type="checkbox"/> make me use public transport more often <input type="checkbox"/> make me use taxi services more often <input type="checkbox"/> reduce my alcohol consumption in restaurants, bars and cafés <input type="checkbox"/> reduce my joy in life <input type="checkbox"/> reduce my risk of getting involved in a traffic accident caused by others <input type="checkbox"/> reduce my risk of injuring someone else in a traffic accident after drinking too much <input type="checkbox"/> feel as a strong intrusion into my personal life <input type="checkbox"/> give me the feeling of being controlled all the time <input type="checkbox"/> make me lose time <input type="checkbox"/> considerably increase the cost of driving a car <input type="checkbox"/> imply an unjustifiable extra cost for me, since I don't drink <input type="checkbox"/> not be necessary for me, since I never drive after drinking <input type="checkbox"/> be very annoying, every time I get into my car 	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don't drive a car regularly (Question T1).</p>

G	In all urban areas and villages the speed limit should be 30 km/h for all vehicles.	
P4g	<p>Please read this information carefully, since it very important for the aims of the research.</p> <p>Reducing the speed limit to 30 km/h reduces the number of road traffic accidents, and also diminishes their severity. At a speed of 30 km/h, in only 2% of the cases does a collision between a car and a pedestrian lead to a fatal accident. A speed limit of 30 km/h (or lower) also leads to more liveable cities where more people are encouraged to walk and cycle. It makes cities also safer for children.</p> <p>The main arguments against generalising such speed limits is that car drivers might lose too much time, that it might limit their freedom and that it is often safe to drive at higher speeds. But it should be noted that because of congestion in many urban areas the average speed of cars is already below 30 km/h.</p>	Text only
P5g	<p>This measure would have the following effect(s) on me (<i>select all the statements that apply</i>):</p> <ul style="list-style-type: none"> <input type="checkbox"/> have no effect on me at all (<i>if you answer this, you cannot tick any other box in this question</i>) <input type="checkbox"/> as a car driver, make my journey times much longer <input type="checkbox"/> as a car driver, make me travel less in cities <input type="checkbox"/> as a car driver, reduce the risk that I will cause a traffic accident <input type="checkbox"/> as a car driver, annoy me when I drive in cities <input type="checkbox"/> as a car driver, make me drive much slower in urban areas <input type="checkbox"/> as a pedestrian or cyclist, make me feel safer on roads <input type="checkbox"/> reduce my risk of getting involved in a traffic accident caused by others <input type="checkbox"/> reduce the severity of the injuries if I get involved in an accident <input type="checkbox"/> make me walk and cycle more <input type="checkbox"/> as a car driver, allow me to enjoy the trip and the surroundings more 	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don't drive a car regularly or don't walk or cycle regularly (Question T1).</p>

H	All people aged 70 or more should be screened every 3 years, in order to let a medical expert decide whether they are still allowed to drive a car or not.	
P4h	<p>Please read this information carefully, since it very important for the aims of the research.</p> <p>Some of the skills and abilities required to drive a car tend to diminish with age, in particular from 75 years onwards: eyesight, detection time, ... In some countries all people from a certain age onwards undergo a medical screening to check whether they should still be allowed to drive.</p> <p>Such mass screenings are very expensive and there is, moreover, evidence that these screenings do not yield the desired results - and even have the opposite effect, i.e. an increase in the number of older people being injured or killed in accidents.</p> <p>There is a broad consensus among experts is that such screenings can be useful but should be based on the type of disease/illness, rather than be based on age.</p>	Text only
P5h	<p>This measure would have the following effect(s) on me (<i>select all the statements that apply</i>):</p> <p><input type="checkbox"/> have no effect on me at all (<i>if you answer this, you cannot tick any other box in this question</i>)</p> <p><input type="checkbox"/> make my right to drive depend on a method that is not foolproof</p> <p><input type="checkbox"/> put my younger family members at ease when I am old</p> <p><input type="checkbox"/> decrease my risk of being involved in a road traffic accident when I am old</p> <p><input type="checkbox"/> decrease the risk that I injure other road users in an accident when I am old</p> <p><input type="checkbox"/> reassure me about my driving competences if I would pass the screening</p> <p><input type="checkbox"/> limit my mobility when I am old</p> <p><input type="checkbox"/> reduce my quality of life when I am old</p> <p><input type="checkbox"/> make me walk more when I am old</p> <p><input type="checkbox"/> make me cycle more when I am old</p> <p><input type="checkbox"/> make me use public transport more when I am old</p>	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don't drive a car regularly (Question T1).</p>

I	Pedestrians should wear retroreflective clothing, shoes or bags when walking or running in the dark on streets and public streets and roads.	
P4i	<p>Please read this information carefully, since it very important for the aims of the research.</p> <p>Every year, over 5000 pedestrians are killed in a road traffic accident in Europe. This is about 20% of all road fatalities. Half of the pedestrians killed on the roads are 65 years or older. Pedestrians are particularly at risk during darkness, when their risk of being involved in a road accident doubles. This is mainly due to the fact that they are less visible to other road users.</p> <p>The use of retro-reflective clothing is an effective way for pedestrians to make themselves more conspicuous to drivers. This helps warn other road users at an early stage and leads them to drive more safely.</p> <p>Opponents of imposing such a measure argue that this would be impractical, reduces people's freedom to wear what they want too much and leads to additional costs.</p>	Text only
P5i	<p>This measure would have the following effect(s) on me (select all the statements that apply):</p> <ul style="list-style-type: none"> <input type="checkbox"/> have no effect on me at all (if you answer this, you cannot tick any other box in this question) <input type="checkbox"/> make walking less agreeable <input type="checkbox"/> make me walk more at night <input type="checkbox"/> make me walk less at night <input type="checkbox"/> make me look a bit foolish or childish <input type="checkbox"/> make me a good role model for children <input type="checkbox"/> make me more aware of safety risks on the road <input type="checkbox"/> make me see walking as unsafe, instead of healthy and environmentally friendly <input type="checkbox"/> make me use other transport modes instead of walking <input type="checkbox"/> be often very inconvenient, since I would have to carry the reflective items with me <input type="checkbox"/> reduce my interest in walking for recreational purposes <input type="checkbox"/> reduce the risk of being injured in a traffic accident when walking at night <input type="checkbox"/> as a car driver, reduce the risk that I damage my car <input type="checkbox"/> as a car driver, make me feel more at ease at night, since I would see all pedestrians <input type="checkbox"/> as a car driver, reduce the risk that I injure a pedestrian <input type="checkbox"/> be expensive for me, since it obliges me to buy extra clothing <input type="checkbox"/> reduce my freedom of wearing what I want 	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don't drive a car or walk regularly (Question T1).</p>

J	Insurance companies should be allowed to differentiate the price for the car insurance premiums between men and women.	
P4j	<p>Please read this information carefully, since it very important for the aims of the research.</p> <p>On average, women are involved in fewer road accidents than men, even when one takes into account that they also drive less than men. This phenomenon applies to all age groups, including the young and novice drivers. Young women pay the same insurance premium for cars as young men, and since they have fewer accidents, they are actually subsidizing the men. So one could argue that women need to pay lower insurance premiums for cars than men.</p> <p>In many countries insurance companies are not allowed to differentiate their insurance premiums between men and women. The main legal argument is that average differences between two groups cannot be used as a ground for discriminating between individuals.</p>	Text only
P5j	<p>This measure would have the following effect(s) on me (<i>select all the statements that apply</i>):</p> <p><input type="checkbox"/> have no effect on me at all (<i>if you answer this, you cannot tick any other box in this question</i>)</p> <p><input type="checkbox"/> make the car insurance more expensive for me</p> <p><input type="checkbox"/> make the car insurance cheaper for me</p> <p><input type="checkbox"/> make me drive more safely</p> <p><input type="checkbox"/> reduce my risk of being involved in a traffic accident caused by others</p> <p><input type="checkbox"/> increase my risk of being involved in a traffic accident caused by others</p> <p><input type="checkbox"/> reduce the risk that I will cause a traffic accident myself</p> <p><input type="checkbox"/> make me register the car to female/male members of my family</p> <p><input type="checkbox"/> make car driving less attractive to me</p> <p><input type="checkbox"/> make care driving more attractive to me</p>	<p>Tick boxes</p> <p>Items are randomized, except first one.</p> <p>If first one is ticked, all the others answers disappear</p> <p>Multiple answers possible</p> <p>Several answer options are hidden when respondents don't drive a car regularly (Question T1).</p>

P6a	<p>Please indicate to what extent you would support or oppose the following measures to become legally required, in order to reduce the number of people injured or killed in road traffic accidents.</p> <ul style="list-style-type: none"> • Zero tolerance for driving under the influence of alcohol (0,0‰ blood alcohol concentration) for all drivers of vehicles (cars, trucks, motorcyclists, cyclists, ...). • All cars should be equipped with an Intelligent Speed Assistance (ISA) system that automatically limits the speed of the car to the maximum speed limit and cannot be turned off by the driver. • Fines that people have to pay after they have committed a traffic offence should be proportional to their income. • All cyclists should wear a helmet. • The education and training needed to obtain a car driving license should be free and part of the school curriculum. <p>[Answering options: “Oppose”; “Somewhat oppose”; “Neither oppose or support”; “Somewhat support”; “Support”]</p>	<p>Block question</p> <p>Randomise items</p> <p>One answer per item (compulsory)</p> <p>Answering options in fixed order for all items</p>
P6b	<p>Please indicate to what extent you would support or oppose the following measures to become legally required, in order to reduce the number of people injured or killed in road traffic accidents.</p> <ul style="list-style-type: none"> • All cars should be equipped with an alcohol ignition interlock system (which prevents starting and driving the car if the driver’s alcohol concentration is above the legal BAC limit). • In all urban areas and villages the speed limit should be 30 km/h for all vehicles. • All people aged 70 or more should be screened every 3 years, in order to let a medical expert decide whether they are still allowed to drive a car or not. • Pedestrians should wear retroreflective clothing, shoes or bags when walking in the dark on public streets and roads. • Insurance companies should be allowed to differentiate the price for the car insurance premiums between men and women. <p>[Answering options: “Oppose”; “Somewhat oppose”; “Neither oppose or support”; “Somewhat support”; “Support”]</p>	<p>Block question</p> <p>Randomise items</p> <p>One answer per item (compulsory)</p> <p>Answering options in fixed order for all items</p>

Values, attitudes and culture

C0	The following questions relate to your behaviour in daily life and your attitudes to public authorities.	Text only
C1a	<p>The list below includes some statements on the values, attitudes or behaviour that you may have. For each statement, please indicate to what extent you feel that it applies to you.</p> <ul style="list-style-type: none"> • When others are in trouble, I am usually indifferent • I am like the person that people see. I am an open book • If I am right, I will say what I think even if it can cause a conflict • I feel I deserve a lot of respect from other people • I trust people equally • I dislike spending my money on friends • I like to compete with people • I make strong efforts to maintain good relationships with people that I know • I often feel very proud of myself <p><i>[Answering options: “I am very much like this”; “I am somewhat like this”, “I am not really like this”; “I am rather the opposite of this”]</i></p>	<p>Block question</p> <p>Randomise items</p> <p>One answer per item (compulsory)</p> <p>Answering options in fixed order for all items</p>
C1b	<p>The list below includes some statements on the values, attitudes or behaviour that you may have. For each statement, please indicate to what extent you feel that it applies to you.</p> <ul style="list-style-type: none"> • I decide myself which rules in my society to respect and which to ignore • I like to have the power to tell people what to do • I think that people deserve the same respect, even if they are not my friends or relatives • I am an ordinary person, without any unique special qualities • I try to imitate the people that I respect or admire • I try to act like most other people in my society • I would like to achieve fame and glory • If I could give a job to somebody I would give it to a friend or relative • My values and beliefs are very stable. They never change 	<p>Block question</p> <p>Randomise items</p> <p>One answer per item (compulsory)</p> <p>Answering options in fixed order for all items</p>

	[Answering options: “I am very much like this”; “I am somewhat like this”, “I am not really like this”; “I am rather the opposite of this”]	
C2a	<p>Please indicate which of the following statements you agree with.</p> <ul style="list-style-type: none"> <input type="checkbox"/> I have a great deal of confidence in our national government <input type="checkbox"/> The state has the full right to regulate society to prevent people taking too many risks <input type="checkbox"/> Policy measures and regulations should be based on scientific evidence <input type="checkbox"/> Most people can be trusted <input type="checkbox"/> I live in secure surroundings and avoid anything that might endanger my safety <input type="checkbox"/> I am not interested in politics <input type="checkbox"/> I have no confidence in the police <input type="checkbox"/> Whenever science and religion conflict, religion is mostly right <input type="checkbox"/> Taking risks makes life more fun <p>[Answering options: “Agree fully”; “Agree somewhat”, “Do not agree”]</p>	<p>Block question</p> <p>Randomise items</p> <p>One answer per item (compulsory)</p> <p>Answering options in fixed order for all items</p>
C2b	<p>Please indicate which of the following statements you agree with.</p> <ul style="list-style-type: none"> <input type="checkbox"/> The state intervenes too much in the life of the people <input type="checkbox"/> Most people would try to take advantage of me if they got the chance <input type="checkbox"/> I have no confidence at all in the civil and public services <input type="checkbox"/> Politicians should follow their feelings and instincts when taking decisions <input type="checkbox"/> I have a great deal of confidence in the courts and the legal system <input type="checkbox"/> Individuals, not the state, should take more responsibility to provide for themselves <input type="checkbox"/> People mostly try to be helpful <input type="checkbox"/> My friends would say that I am a risk taker <p>[Answering options: “Agree fully”; “Agree somewhat”, “Do not agree”]</p>	<p>Block question</p> <p>Randomise items</p> <p>One answer per item (compulsory)</p> <p>Answering options in fixed order for all items</p>

Socio-demographics (2)

S	The following questions are about your personal and socioeconomic characteristics	Text only
S6	<p>Which of the following terms best describes your current professional occupation?</p> <ul style="list-style-type: none"> <input type="radio"/> a white collar worker, office worker (excluding senior executive) or employee (public or private sector) <input type="radio"/> a blue collar worker or a manual worker 	<p>One answer possible</p> <p><i>If answer = “a student”, then GO TO QUESTION S7b</i></p>

	<ul style="list-style-type: none"> <input type="radio"/> a senior executive, department head or leader of an organisation <input type="radio"/> a self-employed/independent professional <input type="radio"/> a student <input type="radio"/> being unemployed, looking for a job <input type="radio"/> retired <input type="radio"/> not fit to work <input type="radio"/> a stay-at-home spouse or parent <input type="radio"/> other 	
S7a	What is the highest qualification or educational certificate that you have obtained? <ul style="list-style-type: none"> <input type="radio"/> none or primary education <input type="radio"/> secondary education <input type="radio"/> bachelor's degree or similar <input type="radio"/> master's degree or higher 	One answer possible GO TO Question S8
S7b	You indicate that you are currently a student. What is the highest qualification or educational certificate that you are most likely to obtain? <ul style="list-style-type: none"> <input type="radio"/> secondary education <input type="radio"/> bachelor's degree or similar <input type="radio"/> master's degree or higher 	One answer possible
S8	Which of the following statements best describes how the income of your household meets your needs? <ul style="list-style-type: none"> <input type="radio"/> Living very comfortably on present income <input type="radio"/> Living comfortably on present income <input type="radio"/> Coping on present income <input type="radio"/> Finding it difficult on present income <input type="radio"/> Finding it very difficult on present income 	One answer possible

Closing message

Thank you for taking the time to complete this questionnaire!

Your answers are very useful for this research project on understanding the public support for policy measures in road safety.

Appendix A5. Distribution of arguments used by the interviewees

Table 71 and Table 72 show the number of interviewees that have used a particular argument for justifying their position on the measures discussed. Table 71 groups the positive arguments and Table 72 the negative arguments.

Table 71. Number of interviewees that used a specific supportive argument

	30K	ALC	HEL	ISA	PAY	RFL	SCR	ZER	Total
Equity (general)	12	6		5	13	3	2	5	46
Difficult to cheat/evade		3							3
Equity	12	9	0	5	13	3	2	5	49
Proportionate, right, just	4	2	2		15	1			24
Preserving liberties (gen.)								1	1
Preserving freedom			1						1
Preserving mobility	4						1		5
Preserving joy in life			1					1	2
Assuming responsibility			2			2			4
Avoiding burden	1		1						2
Limited costs for people		8	5			3			16
Preserving human liberties	9	10	12	0	15	6	1	2	55
Effective	20	10	25	7	7	4	7	10	90
Addresses import. problem	2	4	7	5	1	3	10	14	46
Good solution to problem	8	21	2	17	4	3	8	1	64
Gives the right message	3	5	3	2	2	2	2	15	34
Positive side effects	12	5	1	3	1		1	1	24
Relevance	45	45	38	34	15	12	28	41	258
Easy to implement	2	2	1			1	2		8
Efficient for society		2	3	1					6
Feasibility	2	4	4	1	0	1	2	0	14
Public support	3								3
Regulation is useful			4	2		1	1	3	11
Political Arguments	3	0	4	2	0	1	1	3	14

Table 72. Number of interviewees that used a specific opposing argument

	30K	ALC	HEL	ISA	PAY	RFL	SCR	ZER	Total
Discrimination general		1	1		3	1		1	7
Discrimination by road user	3		2	1					6
Discrimination by age							16		16
Discrimination by wealth		3		1	9				13
Discrimination by group	1	1				1			3
Easy to cheat/evade		2			5	2		3	12
Discrimination	4	7	3	2	17	4	16	4	57
Disproportionate	5	3	2		4	7	3	1	34
Restricting freedom	1	2	5	1		9		4	22
Restricting mobility	3					1	1		5
Reducing joy in life	1		2					3	6
Reducing responsibility		2	1	4		10	1		18
Increasing burden		4	3			9		1	17
Reducing privacy				1		1			2
Expensive for people		7	2	2	1	1			13
Restricting human liberties	10	18	15	8	5	38	5	18	117
Ineffective	6	1	3	3	9	4	14	13	53
Other problems more important		3	8	1		6	5	6	29
Other measures are better	9	7	4	7	14	17	10	7	75
Gives the wrong message	2	2	5		8	7			24
Negative side effects	2	1	15	11	4	4	4	2	43
Limited added value	19	14	35	22	35	38	33	28	224
Difficult to implement/enforce	10	7	4	9	7	12	2	10	61
High costs for society		1	2	1	1	4	4		13
Practical obstacles	1	8	6	1	8	16	6	1	74
Public opposition	2		5			2		3	12
Regulation is not right approach	2	1	1			1			5
Lack of transparency					1				1
Political considerations	4	1	6	0	1	3	0	3	18

